

**SUICIDAL BEHAVIOUR IN SOME HUMAN SERVICE OCCUPATIONS
WITH SPECIAL EMPHASIS ON PHYSICIANS AND POLICE**

A nationwide study

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ABSTRACT

Background: Only a small proportion of the large number of occupations have been the subject of empirical research on suicidal behaviour (suicidal ideation, suicide attempt and suicide). The largest number of studies has been conducted among physicians. Claims of high suicide rates among physicians have been made for decades. However, research on the incidence of suicide among physicians is marked by considerable debate. Comparisons between studies have often been difficult because of different methodologies, cultural differences, the quality of suicide statistics, etc. Suicidal behaviour in a specific occupation is supposed to be a result of a complex interaction between job factors such as work-related stress, access to suicide means, presence of mental disorders and self-selection by vulnerable individuals.

Research questions: The present study focuses on suicidal behaviour among physicians and police in Norway, but includes the human service occupations of dentists, nurses and theologians. The thesis tries to answer five main research questions.

- What is the prevalence of suicidal behaviour among physicians and police? (Papers I and II)
- What are the predictors of suicide planning among physicians and police? (Papers I and II)
- What are the predictors among medical students of suicide planning in the first postgraduate years, and what are the predictors that promote the transition from suicidal thoughts to suicide planning among young physicians? (Paper III)
- What is the level of suicide risk for police compared to that for the general population or other groups reported in the international research literature? (Paper IV)
- What is the suicide rate among physicians, police, nurses, dentists and theologians compared with that among graduates and the general population in Norway 1960–2000? (Paper V)

Material and methods: The thesis consists of five papers; four papers describe results from empirical studies and one paper is a literature review on suicide among

police. First, the prevalence of and predictors for suicidal behaviour were explored in a nationwide sample of Norwegian physicians in 1993 (N = 1,064). Second, the prevalence of and predictors for suicidal behaviour were explored in a nationwide sample of Norwegian police in 2000 (N = 3,272). Third, members of a nationwide cohort of Norwegian medical students (N = 631) were approached initially in their final semester, and then again in their first and fourth postgraduate years in order to identify predictors of postgraduate suicide planning at medical school and to explore the transition from suicidal thoughts to suicide planning over three to four years. Finally, a register-based study explored the suicide rates among physicians and four other human service occupations compared with those for graduates and the general population during the years 1960–2000.

Results: The self-reported lifetime prevalence of suicide planning was 10.4% among physicians and 6.4% among police, whereas the last-year prevalence for each was 2.6% and 1.7%, respectively. The self-reported lifetime prevalence of suicide attempts was 1.6% and 0.7%, respectively, while the last-year prevalence was 0.3% and 0.1%, respectively.

Predictors of suicide planning among physicians were being female, living alone, sick leave due to depression, subjective health complaints and being a specialist in anaesthesiology. The independent predictors of suicide planning among police were anxiety and depression, living alone, subjective health complaints and reality weakness personality trait. Suicide planning was mainly attributed to personal and family problems in both groups, and to a lesser extent to social, work-related or other problems. There were no gender differences among physicians. Among police, however, male police rated work problems significantly higher in importance than females, whereas female police considered personal and social problems to impact more significantly on suicide planning than male police.

In the postgraduate years, 6% reported suicide planning within the last year. Adjusted predictors in their final semester at medical school were vulnerability trait (neuroticism), severe depressive symptoms, and negative life events. Among those having previous suicidal thoughts in their final semester of study, 8% reported suicide planning in their first and fourth postgraduate years. Adjusted predictors of transition from thoughts to planning were reality weakness trait, severe depressive symptoms and a low level of perceived medical school-related stress. Thus, common predictors

for both postgraduate suicide planning and transition from thoughts to planning were depressive symptoms and personality traits. A minority had sought professional care.

The suicide rate among physicians in Norway was raised during the period 1960–2000. Although the suicide rate was significantly lower among male physicians in the 1990s than the 1980s, the rate was still higher than among other graduates and the general population. The suicide rate increased with age among physicians and other graduates, but not among non-graduates. The suicide rate among female nurses was also elevated, whereas police seemed to have an intermediate suicide risk, which is in accordance with the results of the literature review. The suicide rate among theologians was low.

Conclusions: The prevalence of suicide attempts among physicians and police is low. Moreover, the suicide rate among physicians is relatively high, while the rate among police seems to be average. This implies that physicians do not cry for help, but are inclined to act out their suicidal ideation. The reality weakness personality trait was identified as the most decisive trait for aggravation in suicidal ideation among medical students, and an independent predictor for suicide planning among police, probably due to its relation to personality disorders. Another novel finding was that subjective health complaints were independent predictors of suicide planning among both police and physicians. Elderly graduates may be another group of particular concern.

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Erlend Hem

PREFACE

My interest in suicidology started when I was a medical student. At the time, in the mid 1990s, we were told that physicians were suicide prone, and among us, there was anecdotal knowledge of some cases, including suicides committed during internship. During these years, I was eagerly writing in the students' magazine *Æsculap*, and I was curious about this issue. Being a medical student was an interesting and stimulating experience, and I especially enjoyed the clinical part of the study. We were really looking forward to practicing medicine, so how could physicians possibly be suicide prone? Could being a physician really be so devastating?

I interviewed Øivind Ekeberg and Olaf Gjerløw Aasland and wrote an article in *Æsculap* about suicide among students and physicians. Moreover, my particular editorial responsibility was book reviews, and one of the reviews I wrote myself was that of the fifth edition of Professor Nils Retterstøl's classic textbook *Selv mord* (Suicide) (Retterstøl, 1995). Finally, in medical school, we had to write a small scientific report, and my classmate Torgeir Finjord and I asked Øivind Ekeberg for guidance. We were then invited to take part in the ongoing analysis of self-reported suicidal behaviour among physicians from a nationwide survey among Norwegian physicians conducted in 1993 (The Norwegian Physicians' Survey). Thus, our student report was the forerunner to the first paper in the present thesis.

During and after internship, I was given the opportunity to do my compulsory civilian national service at the Department of Behavioural Sciences in Medicine in the University of Oslo. In 2001, I started my doctoral fellowship funded by the Norwegian Foundation for Health and Rehabilitation.

During the same period, Anne Marie Berg conducted a nationwide study among Norwegian police, funded by the Norwegian Department of Justice. Some of the same instruments used in the physicians' survey were applied, and thus made comparisons between two human service occupations feasible. Some data from the police project are presented in the second paper in this thesis. Her project will soon be ending, and her thesis, supervised by Øivind Ekeberg, Bjørn Lau and myself, will give valuable information about subjective health among Norwegian police. When planning this study, the literature review of suicide among police, which constitutes the fourth paper in this thesis, was written.

In 1993, two nationwide longitudinal studies among Norwegian medical students and young physicians were launched, partly based on some introductory

studies (Bramness et al., 1991; 1992). Nina Tangnæs Grønvold, MD, made a substantial contribution during the first years of the longitudinal studies. In 2003, a 10-year follow-up study was performed in the fourth wave of postal questionnaires, and interestingly, the response rate was as high as approximately 75%. Presently, the research group consists of two professors (Ekeberg and Vaglum), two postdoctoral researchers (Reidar Tyssen, MD; and Tore Gude, MD), two research fellows (Erlend Hem, MD; and Jan Ole Røvik, MD) and two part-time research assistants (Kristine Benedictow Finset and Hanna Strøm). The research group collaborates closely with The Research Institute of the Norwegian Medical Association and Olaf Gjerløy Aasland. In 2001, the first doctoral thesis from this project was presented (Tyssen, 2001), and the third paper in the present thesis is based on one of these cohorts of medical students and young physicians.

The health and well-being of physicians and members of other human service occupations are of concern not only to the various professions, but also to others. Impairment among physicians can be detrimental to patient care by impeding diagnosis and treatment (Tyssen & Vaglum, 2002). Moreover, a service staffed by demoralised workers cannot flourish (Smith, 2001), and it may indicate a working situation that needs to be changed (Theorell, 2000).

The thesis is written as a contribution to the field of suicidology. The increased attention to suicide and attempted suicide in recent years has resulted in a massive expansion in research, which has occurred on all fronts, including psychiatry, psychology, social sciences, biology and genetics (Hawton & van Heeringen, 2000). There has been a particularly strong focus on risk among specific subgroups, exemplified by the research programme on suicide in high-risk occupational groups (physicians, nurses, farmers) at the Centre of Suicide Research in the University of Oxford.

It has been claimed for decades that physicians have a high suicide rate. This claim was the starting point for my research, and is the focus of this thesis. However, as stated by Silverman (2000), before we can hope to identify those physicians at high risk for suicide in order to provide preventive therapeutic intervention, we must first answer the basic questions of “how many”, “when”, and “by what means”. Other occupations were included in this project to compare the results from physicians with those from other occupations. Although occupation is a central aspect in this thesis, the focus is restricted to suicidology and not occupational medicine.

The motivation for research on suicidal ideation and suicide attempts is that attempted suicide is both one of the strongest predictors of completed suicide and an important indicator of extreme emotional distress and psychological suffering. Moreover, identification of both the risk for suicide, and prevention of suicide based on risk factors, has proved to be difficult. It has therefore been proposed that risk factors for morbidity preceding suicide, especially depressive mood, suicidal ideation, and attempted suicide, should be studied. It is hoped that a better understanding of the pathways that lead to suicide, as well as the early identification and treatment of suicidal ideation, may reduce rates of both attempted and completed suicide (Hintikka et al., 1998).

LIST OF PAPERS

Paper I–V

- I. Hem E, Grønvold NT, Aasland OG, Ekeberg Ø. The prevalence of suicidal attempts and suicidal ideation among Norwegian physicians. Results from a cross-sectional survey of a nation-wide sample. *European Psychiatry* 2000; 15: 183–9.
- II. Berg AM, Hem E, Lau B, Loeb M, Ekeberg Ø. Suicidal ideation and attempts in Norwegian police. *Suicide and Life-Threatening Behavior* 2003; 33: 302–12.
- III. Tyssen R, Hem E, Vaglum P, Grønvold NT, Ekeberg Ø. The process of suicidal planning among medical doctors: predictors in a longitudinal Norwegian sample. *Journal of Affective Disorders* 2004; 80: 191–8.
- IV. Hem E, Berg AM, Ekeberg Ø. Suicide in police – a critical review. *Suicide and Life-Threatening Behavior* 2001; 31: 224–33.
- V. Hem E, Haldorsen T, Aasland OG, Tyssen R, Vaglum P, Ekeberg Ø. Suicide rates according to education with a particular focus on physicians in Norway 1960–2000. Submitted for publication.

The papers will be referred to by their Roman numerals.

1. INTRODUCTION

1.1 Suicide – a major health problem

Suicide is a major health problem. A recent *World Health Report* calculated the number of recorded suicide deaths to be 814,000 worldwide (WHO, 2001), but the real figure is unknown. A much larger number, probably 10–15 times as many, make suicide attempts (Retterstøl, 1993).

In Norway, the suicide rate was relatively stable and low after World War II, at approximately 7–8 per 100,000 inhabitants or 250 suicides per year (Retterstøl, 1995). The suicide rate increased from the end of the 1960s to 1988, when 708 persons committed suicide (16.8 per 100,000). This is the highest registered suicide rate recorded in Norway. The suicide rate doubled over 20 years, but after the end of the 1980s, the suicide rate decreased by about 30%, and then levelled out. The latest available suicide statistics in Norway show that the suicide rates have remained unchanged between 1996–2001. These are 18.4 and 6.1 per 100,000 inhabitants for men and women, respectively, or 411 men and 138 women (Statistics Norway, 2003).

The reasons for fluctuations in suicide rates are largely unknown. In Norway, there has been a suicide prevention programme since the mid 1990s. In what way this or other efforts has influenced the suicide rates cannot be convincingly shown. The ultimate goal of suicidology is obviously to prevent suicides. Generally, however, suicide prevention efforts are not based on rigorous scientific evidence, and a lot of work still has to be done to document the effectiveness of various interventions (De Leo, 2002). In fact, it was recently claimed that “[n]owhere is the lack of proven therapeutic methods greater than in the prevention of suicidal behaviour. Since suicide is the third leading cause of death in those under age 44, the lack of randomised controlled trials that examine suicide prevention is remarkable” (Oquendo & Mann, 2003).

The causes of suicide are complex and no simple explanations of the phenomenon exist (Wasserman, 2001). Logically, several approaches, both methodological and practical, should be utilised.

1.2 Suicidal behaviour

There is no consistent terminology in the area of suicidal problems, leading to a somewhat bewildering situation (Renberg, 2001). In fact, it has been claimed that we are still in our infancy when it comes to terminology (O'Carroll et al., 1996).

A common definition of suicide is as follows: "An act with a fatal outcome, that is deliberately initiated and performed by the deceased him- or herself, in the knowledge or expectation of its fatal outcome, the outcome being considered by the actor as instrumental in bringing about desired changes in consciousness and/or social conditions" (Retterstøl, 1993). Several other definitions exist. In the present study, the term suicide is used according to the ICD diagnoses; including suicide by poisoning, hanging, drowning, firearms, cutting, jumping from heights, other and unspecified cases, and late sequelae. Thus, the cases are classified as suicide on the death certificates and registered as such in the cause of death statistics from Statistics Norway.

Attempted suicide may also be defined in several ways. Retterstøl (1993) mentions five definitions of attempted suicide, including: A conscious and voluntary act that the "individual has undertaken in order to injure himself, and which the individual could not have been entirely certain of surviving, but where the injury has not led to death." The term "attempted suicide" has been criticised because it is used to describe a behaviour that may lack any serious suicidal intention. However, alternatives such as "parasuicide" and "deliberate self-harm" also have their drawbacks: "parasuicide" because it equally implies nonsuicidal intentions, and "deliberate self-harm" because of the implication that physical harm always occurs (van Heeringen, 2001). In the present study, the definition of attempted suicide is based on an instrument developed by E.S. Paykel and colleagues (1974) (see Table 1).

In this study, several terms will be used to describe suicidal behaviour (Table 1) (Paykel et al., 1974; Wasserman, 2001). Suicidal behaviour is used to cover the three main categories: suicidal ideation, suicide attempt and suicide (Wasserman, 2001). Some argue that the term "behaviour" should be restricted to actions, thereby excluding thoughts and ideas (van Heeringen, 2001; Mann, 2002).¹

¹ In two recent books, both published in 2001, the term "suicidal behaviour" is used in different ways. Wasserman (2001: 18–9) states that Pokorny introduced the concept of suicidal behaviour to cover suicidal thoughts (suicidal ideation), attempted suicide and suicide. At the same time, Paykel et al.

Table 1. Terms

<i>Term</i>	<i>Defined by Paykel et al.'s instrument</i>
Suicidal ideation	<ul style="list-style-type: none"> • Have you ever felt that life was not worth living? AND/OR • Have you ever wished you were dead?—for instance, that you could go to sleep and not wake up? AND/OR • Have you ever thought of taking your life, even if you would not really do it? AND/OR • Have you ever reached the point where you seriously considered taking your life, or perhaps made plans how you would go about doing it?
Suicidal thoughts ²	Have you ever thought of taking your life, even if you would not really do it?
Suicide planning ³	Have you ever reached the point where you seriously considered taking your life, or perhaps made plans how you would go about doing it?
Suicide attempt	Have you ever made an attempt to take your life?

1.3 Suicidal process

Over 90% of suicide victims or suicide attempters have a diagnosable psychiatric illness, most commonly a mood disorder. About 60% of all suicides occur in relation to mood disorders, and the rest are related to various other psychiatric conditions, including schizophrenia, alcoholism, substance abuse and personality disorders (Mann, 2003). However, most psychiatric patients do not commit suicide. Therefore, a

introduced such concepts as weariness of life and death wishes. These could be regarded as phenomena distinct from, and forerunners to, suicidal thoughts. With these notions, the foundation was laid for the model of suicidal process. On the other hand, van Heeringen (2001: 4) states that the term “suicidal behaviour” may cover a wide range of self-destructive behaviours with a non-fatal or fatal outcome, described by the terms “attempted suicide” and “suicide”, respectively. The terms may also be defined in different ways by the same author. Mann (1998) says: “Suicidal behaviour spans a spectrum that ranges from completed suicide to suicide attempts and, at the mildest end, suicidal ideation”. In a later paper, he defines it differently: “Suicidal behavior refers to the most ‘clear-cut’ and unambiguous act of completed suicide but also includes a heterogeneous spectrum of suicide attempts that range from highly lethal attempts (in which survival is the result of good fortune) to low-lethality attempts that occur in the context of a social crisis and contain a strong element of an appeal for help” (Mann, 2002).

² “Suicidal thoughts” are most commonly referred to as “suicidal ideation”. However, for practical reasons, “suicidal ideation” is used in the present thesis as a broader concept (questions 1–4 in Paykel et al.’s instrument), whereas “suicidal thoughts” is defined by question 3 in Paykel et al.’s instrument (as described in paper III).

³ In papers I and II, this is referred to as “serious suicidal ideation”.

psychiatric disorder is generally a necessary but insufficient condition for suicide. To identify suicide risk factors, it is necessary to look beyond the presence of a major psychiatric syndrome (Mann et al., 1999).

There are a number of reasons to separate the study of suicidal behaviour from the study of psychiatric disorders. First, the occurrence of suicidal behaviour is not bound to the borders of classical psychiatric disorders such as depression or schizophrenia, and it is more common in some somatic disorders. Second, familial transmission of suicidal behaviour occurs independently of psychiatric disorders (Träskman-Bendz & Westrin, 2001). Hence, the existence of one or more suicidal syndromes independent of psychiatric disorders has been proposed. In this view, suicidality is regarded as a clinical phenomenon in its own right, which is basically independent of clinical boundaries and may be the coincidental expression of some factor in the patient's mental structure which is triggered by a negative life situation, of which major psychiatric disorders are prime examples (Ahrens & Linden, 1996).

Investigators have proposed many models to explain or predict suicide. One such explanatory and predictive model is the stress-diathesis (stress-vulnerability) model. In the model, stress-related phenomena are separated from those related to a diathesis or trait-like predisposition (Mann et al., 1999). One stressor is almost invariably the onset or acute worsening of a psychiatric disorder, but other types of stressors, such as a psychosocial crisis, can also contribute. The diathesis for suicidal behaviour includes a combination of factors, such as sex, religion, familial and genetic components, childhood experiences, psychosocial support system, availability of highly lethal suicide methods, and various other factors (Mann, 2002). Evidence is accumulating that a suicidality syndrome can be explained, at least partly, in terms of a stress-vulnerability model for suicidality and depression (Träskman-Bendz & Westrin, 2001).

The stress-diathesis model can be supplemented with the broader model of the suicidal process (Wasserman, 2001). The "suicidal process" describes the development and progression of suicidal behaviour as a process within individuals and in interaction with their surroundings. The concept assumes the existence of an underlying and persistent vulnerability constituted by biological and psychological traits, which may become manifest under the influence of specific stressors (van Heeringen, 2001).

The suicidal process describes suicidal behaviour as a continuum of gradually increasing seriousness: feelings that life is not worth living, thoughts of taking one's life, seriously considering suicide, suicide planning and suicide attempt. It is assumed that suicidal behaviour develops from suicidal ideation and attempted suicide through to accomplished suicide. During the course of this process the suicidal tendency may vary and may develop in a positive or negative direction (Retterstøl, 1993). Many suicidal processes fade away due to coping and/or treatment (Wasserman, 2001).

The suicidal process is a common underlying perspective on suicidal behaviour. However, surprisingly few papers have focused on the aspect of process (Runeson et al., 1996; Vilhjalmsson et al., 1998). A literature search in the Medline and PsycInfo databases (1966–2002) identified only 25 papers discussing this process, most of them from a theoretical point of view. The lack of empirical studies may be due to a relative scarcity of longitudinal studies.

1.4 Human service occupations

The present study includes five human service occupations: physicians, dentists, nurses, police and theologians. The rationale is that these occupations represent different stresses and vulnerabilities: health care professionals are helpers, whereas police officers have a dual position as both “friend and foe”, and clergy may experience particular stresses due to dealing with life and death issues. Physicians, nurses and dentists are reported to have higher suicide rates, whereas reports on police are inconclusive. To our knowledge, there have been no previous studies of suicide among theologians. However, human service occupations may also include other occupations, such as auxiliary nurses, psychologists and social workers, but these are not included in the present study because of unreliable or unavailable data for the whole study period. Physicians are the focus of this thesis, because they were the starting point of this project, and because most available data and literature on suicide refer to them.

2. BACKGROUND

2.1 Prevalence studies

The first papers on suicidal ideation in the general population were published in the early 1970s (Schwab et al., 1972; Paykel et al., 1974). Since then, several surveys have been conducted, also in the Nordic countries (Vilhjalmsson et al., 1998; Kjølner & Helweg-Larsen, 2000; Renberg, 2001; Hintikka et al., 2001). In Norway, to our knowledge, there are no studies of suicidal ideation among the general population. However, there are some interesting results from surveys among adolescents. In Bjerke et al.'s survey of students at the University of Trondheim, 15% of the sample reported suicidal ideation within the past year (Bjerke et al., 1992). Among male Norwegian conscripts, the lifetime prevalence of suicidal ideation and attempted suicide was 21.7% and 2.6%, respectively (Mehlum, 1998). In a nationwide study conducted among adolescents aged 12–20 in 1992–94, more girls (10.4%) than boys (6.0%) reported a previous suicide attempt, and more girls (3.3%) than boys (1.9%) reported an attempt during the study period (Wichstrøm & Rossow, 2002). In a recent paper from a multicentre study among adolescents aged 15–16, 6.6 % reported one or more acts of deliberate self harm that met the study criteria over the course of the prior twelve-month period. Deliberate self harm was more common in females than in males (10.2 % vs. 3.1 %) (Ystgaard et al., 2003).

Recently, data from nine independently conducted epidemiological surveys using similar diagnostic assessment and criteria were compared. The rates of suicide ideation varied widely by country, the lifetime prevalence rates ranged from 2.1 to 18.5%. The rates of suicide attempts, however, were more consistent. With a few exceptions, the prevalence ranged from 3.1 to 5.9% (Weissman et al., 1999). In the US National Comorbidity Survey, the lifetime prevalence of suicidal ideation was 13.5% (“Have you ever seriously thought about committing suicide?”), suicide planning 3.9% (“Have you ever made a plan for committing suicide?”) and suicide attempt 4.6% (“Have you ever attempted suicide?”) (Kessler et al., 1999).

Two surveys may exemplify the differing results. Paykel et al. (1974) reported from an interview study lifetime prevalences of cases ranging from having the feeling that life was not worth living (11.5%) through to attempted suicide (1.1%) compared to prevalences from the previous year ranging from 7.8–0.6%. Renberg (2001) in two postal questionnaire studies reported lifetime prevalences of cases ranging from

having the feeling that life was not worth living (48.8%) through to attempted suicide (2.6%) compared to prevalences from the previous year ranging from 29.9–0.2%.

Population-based studies of attempted suicide report estimates of one-year incidence among adults ranging from 0.3% to 2.6%. From a lifetime perspective, incidences from about 0.7% to 10% are reported (see Renberg, 2001). Differences in definitions of non-fatal suicidal behaviour make it difficult to compare the results of epidemiological studies. Many attempted suicides do not come to the attention of medical or other professionals. Most studies have been conducted in the western world. However, some studies have tried to overcome these problems. For example, the WHO/EU Multicentre Study on Parasuicide showed substantial differences in annual rates of attempted suicide within Europe (for example, among females, from 72 to 542 per 100,000 inhabitants per year aged 15 years and older). In Sør-Trøndelag, Norway, the annual mean rate during the period 1989–1992 was 192 (see Kerkhof & Arensman, 2001).

2.2 Suicidal behaviour and occupation

Several occupational groups appear to have a high risk for suicide, but the reasons for this are largely unknown (Boxer et al., 1995). High suicide rates have been identified among physicians (Lindeman et al., 1996), dentists (Stack, 1996), and nurses (Hawton & Vislisel, 1999). However, debates continue over the extent to which specific occupational groups are at risk for suicide (Stack, 2000). The empirical evidence for high suicide rates may be questionable (Stack, 2000; Alexander, 2001; Loo, 2003). Systematic reviews show that the suicide rates among police are not significantly different from that among comparable male population (Loo, 2003), and a recent review stated that there is little valid evidence that dentists are more prone to suicide than the general population (Alexander, 2001). Previous research has been hampered by several methodological shortcomings, such as inadequate sample sizes, and inappropriate comparison groups (Silverman, 2000).

Important internal occupational stressors including client dependence, status integration and social isolation have been theorised. For example, physicians and dentists are dependent on patients. This has been linked to burnout, a concept originally introduced as a problem among people working in the human services (Maslach et al., 2001). Burnout is closely linked to depressive symptoms, which is associated with suicidality (Olkinuora et al., 1990; Sonneck & Wagner, 1996;

Samuelsson et al., 1997). Second, the theory of status integration suggests that persons in statistically infrequent role sets (for example, female physicians and female police officers), have higher suicide rates than their counterparts. Females in male-dominated occupations may experience additional work-related stress and social isolation. Moreover, it is postulated that there is a self-selection of vulnerable individuals to certain occupations. This is in accord with claims of a high rate of affective disorders among physicians (Firth-Cozens, 2001). Access to lethal means is also important. For example, the availability of lethal drugs in the medical professions and the firearm availability among police personnel have been linked to a high risk for suicide (Hawton et al., 2000; Stack, 2000). In sum, a high suicide risk in a specific occupation can be the result of complex interactions between job-related factors such as work-related stress, access to means, presence of mental disorders and self-selection of vulnerable individuals (Boxer et al., 1995). Importantly, an occupational group may be a target for preventive efforts (Mehlum & Mehlum, 1999).

Studies using an individual cross-sectional design show a high suicide risk in lower social class groups and a low suicide and deliberate self-harm risk in higher social class groups. Evidence from individual longitudinal studies does not, however, suggest an association between suicide and social class (Platt & Hawton, 2000). Stack points out that although most of the research evidence from the past 30 years has documented an inverse relationship between social class and suicide, there is often considerable variation in suicide risk within classes. Moreover, future research is required to disentangle the effects of socio-economic status on suicide from socio-economic status covariates, such as divorce. That is, no direct impact of socio-economic status on suicide has yet been demonstrated. Factors associated with socio-economic status may account for some or all linkages between socio-economic status and suicide (Stack, 2000). In an occupational context, different aspects of work can influence suicide risk (Stack, 2000; Qin et al., 2003). Risk factors include unemployment, economic and work-related stress.

2.2.1 Physicians

The largest number of studies on suicide in occupational groups has been conducted among physicians, and these provide the best evidence for a high suicide risk, at least among females (Arnetz et al., 1987a; Lindeman et al., 1996; Aasland et al., 2001; Hawton et al., 2001). On the other hand, a recent US consensus stated that in sharp

contrast to the heightened attention paid to physicians' smoking-related behaviour, remarkably little attention has been paid to depression and suicide among physicians (Center et al., 2003). There seem to be three streams of studies. First, those positing high suicide rates; second, those contending that physicians are no more at risk for suicide than white males in general, and; third, attempting to explain why some physicians commit suicide and others do not (Stack, 1998).

2.2.1.1 History

According to Silverman, the question of whether physicians are at high risk for suicide has been publicly debated, the subject of medical journal editorials, and internationally researched for the last 90 years (Silverman, 2000). Silverman quotes “the earliest published report of high rates of physician suicides” from 1903 (Editorial, 1903). A few years earlier, Durkheim published “Le suicide” (Durkheim, 1897), often considered as the starting point of scientific suicidology.⁴ However, in 1892, Daniel Hack Tuke (1827–1895) noted that, “[t]he commercial classes, including large merchants and bankers, yield a large proportion of suicides. Still greater is the number among the lawyers and doctors”⁵ (Goldney & Schioldann, 2002). Center et al. (2003) mention an even earlier observation of a high suicide rate among physicians, in a book published in 1858.⁶

The 1903 editorial is suggestive of views in the field 100 years ago (Editorial, 1903). The columnist states that the cause of the increase in Great Britain as well as in the USA is overcrowding of the profession and depreciation of income. “Moreover, the world is getting healthier, and this healthfulness, again, is largely due to the labors of physicians, who are the only ones that work against their own interests continuously.” Another suggestion was that physicians are familiar with death “in all its forms, and always have the means of suicide at hand”. However, the interpretation belongs to the past: “It is not remarkable ... that failures must occur, that many of our professional brethren have to drop out of the profession in one way or another, and that weaklings, those morbidly disposed, and those lacking in high principles and moral inhibitions, might very easily adopt suicide as the most direct way to end their

⁴ The founder of Norwegian sociology, Eilert Sundt (1817–75), published his classic treatise on mortality in Norway in 1855. He attributed major importance to social conditions in triggering suicide, and laid great emphasis on the responsibility of the community and on the society on which the person who committed suicide was a member (Retterstøl, 1993; Goldney & Schioldann, 2002).

⁵ Tuke DH, ed. A dictionary of psychological medicine. London: Churchill, 1892.

⁶ Bucknill JC, Tuke DH. A manual of psychological medicine. London: Churchill, 1858.

troubles. That more do not do this we think speaks well for the profession, both here and elsewhere” (Editorial, 1903).

According to von Brauchitsch (1976), an editorial in the *British Medical Journal* in 1964 “started an era of investigation”. However, after reviewing the literature, von Brauchitsch’s summary found no conclusive evidence that suicide rates among physicians, or among any medical specialty, were higher than those among the general population. In the same vein, Rose & Rosow (1973) wrote that although “it seems common knowledge that physicians are more suicide prone than other people,” when summarising 12 studies from the USA, they concluded that there was no compelling evidence that physicians were more prone to self-destruction than the general population. On the other hand, their own study showed that physicians, and health care workers as a group, were twice as suicide prone as the general population.

Already 30 years ago, Rose & Rosow noted an abundant literature on physician suicide (Rose & Rosow, 1973). One of the driving forces behind the interest in this topic is the apparent paradox that physicians, who are trained to respect, promote, and preserve life, would choose to end their own lives prematurely (Silverman, 2000).

2.2.1.2 Review

Lindeman et al. (1996) recorded problems in interpreting reviews and many original studies due to methodological shortcomings. The reviews were mostly done in the old-fashioned unsystematic way with a haphazard selection of original studies. The sources and quality of the original data were diverse, the age adjustment was not always done, and the same material appeared repeatedly. A particular problem was simplistic presentation in abstracts, summaries, press releases and editorials which easily create popular myths such as that the “suicide rate among female physicians ... is significantly higher than among male doctors” (Editorial, 1994). With good reason, one may suspect that this kind of simplification is not always based on sound and comprehensive evidence (Lindeman et al., 1996).

Lindeman et al. (1996) included 14 international studies between 1958 and 1993, and estimated the relative suicide risk for male physicians versus the general population to be between 1.1 and 3.4, and that of females to be between 2.5 and 5.7 (Lindeman et al., 1996). It is notable that in several of these studies, the risk for suicide in female physicians was as high as that in male physicians, which is very

different from the gender-specific risk for the general population (Platt & Hawton, 2000).

Since the publication of the review by Lindeman et al. (1996), a few studies have emerged from the Nordic countries (Lindeman 1997; Lindeman et al., 1997; Juel et al., 1999; Aasland et al., 2001), Great Britain (Hawton et al., 2001) and the USA (Frank et al., 2000; Torre et al., 2000). Findings from Finland and Great Britain indicate that the suicide rate among male physicians may be equal to or lower than that for the general population. This has also recently been found in Estonia, where the suicide rate was lower than expected among both male and female physicians (Innos et al., 2002). However, here the majority of physicians were women. The Finnish authors also point out that at the time of their study, male suicide mortality in Finland was among the highest in Western Europe. Findings from Denmark, Norway and the USA contrast with these findings (Juel et al., 1999; Aasland et al., 2001; Frank et al., 2000; Torre et al., 2000). Moreover, a study of 20,000 UK hospital consultants during the period 1962–92 demonstrated that although the expected number of deaths due to injury and poisoning (ICD-9: 800-999) among male physicians was lower than expected, death rates from accidental poisoning (850-869) were significantly raised. Among female consultants, a significantly raised death rate from injury and poisoning was due largely to a twofold excess of suicide (950-959) (Carpenter et al., 1997). Interestingly, the pattern in suicide statistics in occupational groups reveals many similarities between countries in Western Europe and North America. Generally, medical and allied professions exhibit high rates of suicide (Borgan & Kristofersen, 1986; Stack, 2000; Platt & Hawton, 2000).

2.2.1.3 Different specialities

The literature suggesting that certain specialists, such as psychiatrists and anaesthetists, are at high risk for suicide is beset by methodological limitations (Center et al., 2003). In 1979, all the then-published studies that had examined the rate of suicide among physicians and psychiatrists were reviewed (Bergman, 1979). It was concluded that there was no evidence that psychiatrists had a higher rate of suicide than the general population. One year later, though, it was demonstrated that the rate of suicide in American psychiatrists was significantly raised during the period 1967–72 (Rich & Pitts, 1980). In a Swedish study for the period 1969–83, four specialist groups were studied: general practitioners, internists, psychiatrists and general

surgeons. The increase in suicide risk was significant only for male surgeons (Arnetz et al., 1987a). In a large UK study of 20,000 specialists, psychiatrists had significantly raised rates for injury and poisoning. Fourteen of the 35 deaths were attributed to suicide, which, however, was not significantly elevated. General surgeons were the only specialty with a death rate of suicide significantly different from that of all consultants (RR, 0.22; 95% CI, 0.03–0.80) (Carpenter et al., 1997). Most recently, Hawton et al. (2001) found a relatively higher risk for four specialties compared to general medicine. In order of risk, these were community health, anaesthetics, psychiatry and general practice. It is not clear whether these findings reflect particular occupational stresses in these groups, or choice of specialty being influenced by factors that might differentially influence risk (Hawton et al., 2001).

2.2.1.4 Trends

Although physician suicide studies often cover long periods, to our knowledge, only two previous studies have analysed trends over time (Stefansson & Wicks, 1991; Aasland et al., 2001). A Swedish study noted a significant decline in the suicide rate among female physicians from 1961 to 1985, although a significant excess in rates was observed throughout the period. Male physicians had higher rates during the 1970s compared with the rest of the period (Stefansson & Wicks, 1991). In a Norwegian study, the trend from 1960 to 1989 was increasing for men, while for female physicians, the low number of cases prevented reliable estimation of trends (Aasland et al., 2001).

2.2.1.5 Other studies

Physicians have been studied in large epidemiological studies over several decades. The pioneers Richard Doll and Richard Peto conducted landmark studies based on a sample of 20,000 UK male physicians from 1950. Another impressive study is The American Physicians' Health Study, a large randomised controlled study launched in the early 1980s and including more than 22,000 male physicians. The Women Physicians' Health Study in the early 1990s included 4,500 female US physicians in a nationally distributed cross-sectional questionnaire study. Here, suicidal behaviour was explored (Frank & Dingle, 1999). The challenges of being a female physician have recently been studied in a Norwegian doctoral thesis in sociology (Gjerberg, 2002).

Some smaller, but frequently cited studies have been conducted in the USA. A study by the psychologist Caroline Bedell Thomas and colleagues included medical graduates from the Johns Hopkins University during the period 1948–64. These 1,337 physicians have been followed-up for decades. In a mortality study with a follow-up period until 1998, suicide was the only cause of death where the risk was greater than that for the general population. Generally, the results demonstrated substantial health benefits associated with being a physician (Torre et al., 2000). In another prospective study from the same period, Vaillant and colleagues included 47 US physicians describing mental problems. In the golden age of US doctoring, these findings attracted much more attention than their limited and biased sample deserved (see Aasland, 2003).

A body of research during the last few years deals with mental health problems and help-seeking among physicians (Firth-Cozens, 1997, 1999; Töyry et al., 2000; Tyssen, 2001; Rosvold, 2002). Most recently, the “politically correct” studies of physicians’ health have been on stress and burnout. Here also, longitudinal studies are lacking, and it is still unknown whether physicians today are more stressed and less satisfied than before (Aasland, 2003). Nevertheless, a recurring theme in medical journals is doctors’ well-being (Mechanic, 2003). Richard Smith, the editor of the *BMJ*, asked in a 2001 editorial: “Why are doctors so unhappy?” (Smith, 2001). The large number of responses ranged from “Are we unhappy?” (McKenzie, 2001) to “Doctors are unhappier than ever” (Kernick, 2003) and “Doctors the world over are unhappy” (Smith, 2002; Edwards et al., 2002). There is obviously a lack of scientific rigour.

2.2.2 Dentists

For decades,⁷ both the lay public and the professional media have continued to portray dentists as being suicide prone, and they have been constantly referenced as health care workers at high risk of committing suicide (Alexander, 2001). However, few formal attempts have been made over the last two decades to quantify or verify statistically this alleged risk on a national basis. Additionally, assertions are made that dentists have a disproportionately high incidence of alcoholism, drug abuse and

⁷ According to Alexander (2001), since 1933, reports have claimed that dentists have high suicide rates.

divorce. However, the literature rarely cites reliable data regarding these “labels,” which are repeatedly applied to the profession (Alexander, 2001).

In a Swedish study, Arnetz and colleagues followed a national cohort of dentists, academics and the general population for a period of 10 years, and identified all cases of recognised suicide during the period 1961–70. Results showed an elevated standardised mortality ratio for male dentists compared to male academics, whereas female dentists did not exhibit high risk (Arnetz et al., 1987b). In another Swedish study, Stefansson & Wicks demonstrated high suicide rates among dentists during the period 1961–85. A radical fall in the number of suicides among male dentists took place in the early 1980s, but not so for female dentists (Stefansson & Wicks, 1991). Balarajan (1989) also showed high suicide rates among dentists in England and Wales around the 1970 and 1980 censuses. Stack (1996) used US Public Health Service data from 21 States and determined that even after controls were taken into account, dentists had a suicide rate that was greater than that among the working-age population in general (Stack, 1996).

Although large-scale studies are needed before firmer conclusions can be reached (Alexander, 2001), there seems to be some evidence that the suicide rate among dentists is elevated.

2.2.3 Nurses

Generally, few prospective studies of suicide have been reported. Studies of people who have attempted suicide or who have suicidal thoughts are more common, although the factors associated with these situations may differ from those that characterise completed suicides. Some information in this regard has come from a large US study in which about 94,000 female married nurses were followed up from 1982 to 1996. In one of the papers from this study, suicide risk was high among those reporting either severe or minimal home-related stress and either severe or minimal work-related stress (Feskanich et al., 2002). Analyses from the same cohort of nurses have shown independent and significant associations with smoking and coffee consumptions. Women who drank two or more cups of coffee per day had a 70% lower risk for suicide compared with those who never drank coffee (Kawachi et al.,

1996).⁸ Women who smoked 25 or more cigarettes per day had four times the risk of committing suicide compared with those who had never smoked (Hemenway et al., 1993).⁹

Recently, Hawton & Vislisel reviewed the worldwide English language literature on suicide among nurses (Hawton & Vislisel, 1999). They found evidence from several countries that female nurses are at high risk for suicide. Very little information is available about the specific causes. Unlike some other high-risk occupational groups, it is unclear to what extent access to means for committing suicide contributes to nurses' risk. Interestingly, the authors point out that while there seems to be clear evidence that female nurses are at high risk for suicide, there is less evidence about male nurses.

In a Swedish study conducted in 1991, about 2,700 nurses (76% response rate; 15% men) answered a questionnaire including questions on suicidal ideation and attempts (Paykel et al.'s questionnaire) (Gustavsson et al., 1997). The prevalence was about the same as that among the general population. There was some indication that psychiatric nurses had a higher prevalence than other nurses. This was also indicated in a study at the psychiatric department at Karolinska Hospital (Samuelsson et al., 1997). More recently, it was shown that age- and sex-standardised *past year* prevalences of suicidal thoughts and suicide attempts were similar among mental health-care staff and the general population in Stockholm, whereas *lifetime* prevalence of both suicidal thoughts and suicide attempts was significantly higher among mental health-care staff than among the general population. Mental health-care staff included psychiatrists, psychologists, social workers, nurses and assistant nurses. The authors expressed the opinion that reports on lifetime prevalence of suicidal behaviour may be

⁸ More recent Finnish studies indicate that heavy coffee drinking may be an independent risk factor for suicide, the association seeming to be J-shaped, moderate drinkers having the lowest risk (Tanskanen et al., 2000a), and that clustering of heavy uses of alcohol, cigarettes and coffee may serve as a marker for increased risk of suicide (Tanskanen et al., 2000b).

⁹ Interestingly, an association was recently shown between cigarette smoking and the presence and severity of suicidal behaviour across major psychiatric disorders which may be related to lower brain serotonin function in smokers with depression (Malone et al., 2003). However, a recent Swedish follow-up study of approximately 49,000 men when conscripted for military training showed that an increased risk of suicide among smokers was almost entirely explained by an increased prevalence of heavy alcohol consumption and low mental well-being among smokers. That is, the association between smoking and suicide is probably due to by these other confounding factors. These results do not support the hypothesis that tobacco consumption itself is a risk factor for suicide (Hemmingsson & Kriebel, 2003). However, others argue that smoking in fact predicts suicide in a consistent, strong, dose-response, coherent, biologically plausible fashion that appears to be reversible with interventions that reduce smoking (Leistikow, 2003).

biased in populations that are not reminded of these problems in everyday life (Ramberg & Wasserman, 2000).

2.2.4 Police

It is widely argued that policing is one of the most dangerous, stressful, and health-threatening occupations (Hill & Clawson, 1988). High levels of stress, strain, alcoholism, divorce and suicide are attributed to this profession (Loo, 2003). Suicide among police has in fact been described as an epidemic (Violanti, 1996). In recent papers, it has been claimed that the suicide rate among law enforcement personnel is between two and three times that among the general population (Mohandie & Hatcher, 1999; Slovenko, 1999). However, research on police suicide has yielded widely varying rates, ranging from 5.8 suicides per 100,000 police per year in London (Heiman, 1975) to 203.7 per 100,000 per year in Wyoming (Nelson & Smith, 1970). Unfortunately, several methodological problems limit the value of these studies (Cantor et al., 1995), such as small samples and inadequate comparison groups. These problems are summed up in paper IV.

2.2.5 Theologians

To our knowledge, no previous study has investigated suicide risk among theologians. Unfortunately, there are few empirical data on religion and suicide. For example, the US Census Bureau and Department of Vital Statistics are forbidden by the Constitution from surveying religious behaviours and opinions (Maris et al., 2000).

Generally, it is acknowledged that religion tends to protect from suicide, but it is not a simple causal connection. Much of the data on suicide and religion are indirect, for example, that predominantly Catholic countries tend to have low suicide rates, but such data are inconclusive (Maris et al., 2000). Suicide is not accepted in certain religions. This may partly explain the very low suicide rates in Muslim countries. Norway is a predominantly Lutheran country, and generally Protestants have the highest suicide rates, followed by Catholics. However, religious preference is not the same as religious activity. There are some indications that those who regularly attend church are less likely than others to attempt or to commit suicide (Maris et al., 2000). The Christian church has traditionally been negative towards suicidal behaviour, and theologians may find suicide a less acceptable solution than the rest of the population, even in times of great personal suffering.

In Norway, the Penal Act of 1842 repealed the provision that persons who committed suicide could not be buried in consecrated soil. The prohibition on throwing earth onto the body was repealed by a law of 1897. The prohibition of funeral services for those who had committed suicide was lifted by a law of 1902. Since 1902, legislation has been restricted to imposing penalties for assisting suicide, as is the case in most countries (Retterstøl, 1993).

2.3 Research questions

The main problems that this thesis tries to answer, are:

- What is the *prevalence* of suicidal behaviour among physicians and police? (Papers I and II)
 - To which factors do physicians and police attribute their suicide planning?
- What are the *predictors* of suicide planning among physicians and police? (Papers I and II)
- What are the predictors among medical students of suicide planning in the first postgraduate years, and what are the predictors that promote the transition from suicidal thoughts to suicide planning among young physicians? (Paper III)
- What is the reported level of suicide risk for police in the international research literature compared to that for the general population and other groups? (Paper IV)
- What is the suicide rate among physicians, police, nurses, dentists and theologians in Norway during the period 1960–2000?
 - compared with the suicide rate among graduates
 - compared with the suicide rate among the general population
 - according to age, gender and time period(Paper V)

3. MATERIAL AND METHODS

3.1 Materials

Four different samples are studied in this thesis (papers I, II, III and V).

Table 2. Samples in papers I, II and III

Subjects	Year	N	Response rate	Women	Design	Paper
Physicians	1993	1,063	72%	29%	Cross-sectional	I
Police	2000	3,272	51% ¹⁰	16%	Cross-sectional	II
Medical students: T1 (Graduating semester)	1993/94	522	83%	57%	Prospective	III
Young physicians: T2 (first postgraduate year)	1 year after T1	371	58%	56%	Prospective	III
Young physicians: T3 (fourth postgraduate year)	2.5–3 years after T2	396	63%	56%	Prospective	III

3.1.1 Paper I: Physicians

In 1992, The Norwegian Medical Association initiated a research programme to study the Norwegian physicians' health, illness, working and living conditions. All members of the organisation were asked to participate in one way or another. The project's organisation has been described in detail elsewhere (Aasland & Falkum, 1992; Aasland et al., 1997) and will be briefly presented here.

One part of the research programme included a nationwide questionnaire study. In 1993, questionnaires were distributed by mail to 9,266 of the 11,367 active members of the Norwegian Medical Association. The excluded physicians were those

¹⁰ The true response rate was most likely closer to 69% than 51%, see paper II

who had participated in a pilot study (N = 101) and a random sample of 2,000 who were invited to take part in a longitudinal study. Passive members of the Norwegian Medical Association (students and retired) were also excluded from the survey. Both these groups were, however, included in separate surveys. The answers were anonymous.

The design of the study was cross-sectional. Data were collected by means of overlapping questionnaires. Out of 16 different questionnaires, each physician received one primary questionnaire (Questionnaire A) and three randomly selected secondary ones (B to Q, minus O). These three secondary questionnaires were distributed randomly according to the following principle: each physician received at least one of Questionnaires B, C or D, which all dealt with working conditions, and not more than one of F, G or I. The latter questionnaires included personality inventories, which in a pilot study had proved to be quite provocative and therefore could prevent a high response rate (Aasland et al., 1997). This technique was developed to reduce the workload for the respondents, and at the same time increase the number of estimable cross-relations by making it possible to use imputed values in multivariate analyses, due to the fact that most of the missing data were missing completely at random. In the present study, however, this possibility of the overlapping questionnaire design was not used. The present study includes variables from three of the questionnaires:

- Questionnaire A, which all physicians answered, included background data, General Health Questionnaire, Job Satisfaction Scale, Subjective Health Complaints, illnesses (according to International Classification of Primary Care (here: feeling depressed/depressive disorder)) and medical specialty.
- Questionnaire G included a personality inventory (Basic Character Inventory).
- Questionnaire M included Paykel et al.'s Questionnaire (Paykel et al., 1974).

Questionnaire A was completed and returned by 6,652 physicians (71.8%), the great majority of whom also returned three secondary questionnaires which they were asked to fill out, whereas Questionnaire G was completed by 896 physicians (72.9%).

Questionnaire M was completed by 1,063 of 1,476 physicians (72%), of which 298 (28.6%) were women. The response rate was higher among female (80%) than male physicians (69%). Age ranged from 25 to 70, mean 43 years: mean age for men

44.9 (SD = 9.6), for women 38.4 (SD = 8.5). Total response rate was highest among young physicians. The response rate was lowest among specialists in private practice (50%), and highest among physicians in administrative positions (83%).

3.1.2 Paper II: Police

In 2000, a comprehensive questionnaire was distributed by the Norwegian Police Union. Approximately 95% of all police officers are members of this organisation. The questionnaire was sent presumably to all the 6,398 members who were trained police officers. The questionnaire included 396 questions on background information, physical and mental health, working condition, job dissatisfaction, burnout, coping, personality, and suicidal ideation. It was an anonymous questionnaire, and it was distributed once. Several reminders were distributed through trade union representatives, and the internal data system within the police force (G-mail). At the same time it became clear that many members had not received the questionnaire. It is unclear whether this was due to chance or systematic mistakes. Thus, the final response rate was 51%, which represents a total of 3,272 persons who completed and returned the questionnaire.

Due to the problems in distributing the questionnaire, the project manager distributed 680 letters to randomly selected police in November 2001. The letters included two questions: first, "Did you receive the questionnaire?", and second, "If you received it, did you answer it?". The responses were "yes" and "no". A total of 475 persons responded to the letter, which was a response rate of 70%. The results showed that 26 % never received the questionnaire. Based on this figure, the true response rate would be $51/74 * 100 = 69\%$. Since this is an indirect measure, we will not be too conclusive about this figure. However, we are sure that the true response rate is closer to 69% than to 51%. Of those who originally received the questionnaire, there is reason to believe that approximately two-thirds have answered the questionnaire.

Of the police who responded to the questionnaire, 16% were female, which is a fairly accurate reflection of the distribution of women in the police force (17.9%, information collected from The Department of Justice). A total of 79 persons did not answer the question about gender, 51 persons did not answer the question regarding civil status, and 14 persons did not answer the question about position; these individuals were excluded from the analyses. The age of participants ranged from 20

to 66 years of age, with a mean age of 38.9 years (SD = 8.7); the mean age of men was 39.7 (SD = 7.0), and for women 34.0 years (SD = 8.7) ($p < .001$). The mean age of all members of The Norwegian Police Union is 40.2; with males and females having a mean age of 41.0 and 35.0 years, respectively. The sample in this study is about one year younger than the whole population according to the mean age. Officers are overrepresented in the study in proportion to the general police population (65.3% vs. 56.1%), while managers are underrepresented (2.9% vs. 9.6%).

3.1.3 Paper III: Medical students and young physicians

The study cohort consisted of students graduating in 1993 and 1994 from all four medical schools in Norway (N = 631). They received postal questionnaires in their last term of medical school (T1), at the end of the internship year (T2), and two to three years later (T3). The sampling procedure and problems with loss of follow-up have been reported and discussed elsewhere (Tyssen et al., 2000, 2001a,b).

At T1, 522 students responded (response rate 83%), and had a mean age of 28 years (2.8), with 57% women; at T2, 371 responded (58%), aged 29 years (2.8), with 56% women; and at T3, 396 responded (63%), aged 31.4 years (2.4), with 56% women.

The mean observational time was 3.6 years (0.5); the majority of the participants were at the end of the third or at the beginning of the fourth postgraduate year by T3.

3.1.4 Paper IV: Literature review

In the literature review on suicide in police, we examined the literature relating to suicide and attempted suicide in police, emphasising nationwide studies. The search was done by cross-referencing the keywords: police, law enforcement, suicide, attempted suicide, and mortality. We conducted a search of several databases. The first was a non-computerised bibliography (Farberow, 1972) covering the periods 1897–1957 and 1958–70. The other sources were the following electronic databases: Medline (1966–99), Psyclit (1974–99), Embase (1980–99), Criminal Justice Abstracts (1968–99), and Social Sciences Citation Index (1987–99). The search covered literature cited in the databases until December 1999. Languages were not limited. Additionally, relevant sources were identified through reference lists.

The inclusion criteria for an article were:

- An original study in which suicide mortality rates for a well-defined police population in comparison to a relevant well-defined reference population were given
- The study area and period were not overlapping substantially (more than 50%) with those of another study
- The study referred to suicide after 1950
- The study involved at least 10 suicides

3.1.5 Paper V: Human service occupations

By combining census data on education and cause-of-death statistics, Statistics Norway constructed a table of suicide as a cause of death. The matching was based on the national 11-digit personal identification number. Information on education was taken from Population Censuses conducted in 1960, 1970, 1980, and 1990. In the Censuses 1960 and 1970, education was coded based on information from personal visits to each household. In the Censuses 1980 and 1990, register data for highest education was used to determine education. In the Census 1960, education was grouped on the basis of an internal list of coding worked out by Statistics Norway (Børke, 1983). From Census 1970 onwards, education was coded according to Norwegian Standard Classification of Education that is compatible with the International Standard Classification of Education (ISCED, 1997).

Individuals identified at each Census were followed up for two 5-year periods, and the number of suicides and person-years were calculated. In total, eight 5-year periods were included, from November 1, 1960 until November 2, 2000. The groups were differentiated by gender, and 5-year age categories above the age of 20. The total number of person-years among men was 46,744,079 and for women 49,965,874.

The groups were divided into trained physicians, dentists, nurses, theologians, and police; other academicians (except from physicians, dentists, and theologians); and others (i.e. all other inhabitants in Norway > 20 years). Based on earlier studies demonstrating high suicide rates, we included also two related occupations, veterinarians and pharmacists, in the initial analyses. In the final analyses, however, veterinarians and pharmacists were included among other academicians.

In the Censuses, occupation is also registered. However, in the Census 1990, only about 25% of the population was asked about their present occupation. Thus, the education database is used in this study.

3.2 Methods

3.2.1 Design of the studies

Paper I and II are cross-sectional nationwide studies. Paper III is a prospective, longitudinal and nationwide study. Paper IV is a systematic literature review. Paper V is a register-based nationwide study.

3.2.2 Variables

Table 3. Variables included in papers I, II and III

	Paper I	Paper II	Paper III
Age	X	X	X
Gender	X	X	X
Civil status	X	X	X
Paykel et al.'s questionnaire	X	X	X
Basic Character Inventory	X	X	X
Job Satisfaction Scale	X	X	
Subjective Health Complaints	X	X	
General Health Questionnaire-30	X		
International Classification of Primary Care (feeling depressed/depressive disorder)	X		
Medical specialty	X		
Hospital Anxiety and Depression Scale		X	
Maslach Burnout Inventory		X	
General Health Questionnaire-28: depression subscale			X
Sought professional care			X
Life events			X
Perceived Medical School Stress			X

Table 4. Dependent variables in papers I, II and III

Dependent variables	Papers		
	I	II	III
Suicide planning	X	X	X
Transition from suicidal thoughts to suicide planning			X

3.2.3 Description of variables

Sociodemographic variables (age, gender, civil status)

Age was divided into 10-year groups in papers I and II (those who were younger than 40 years were the reference category among physicians, and those who were younger than 30 years were the reference category among police). In paper III, age was measured as a continuous variable (Tyssen et al., 2000). In paper V, three age categories were chosen: those under 40 years, 40–59 years and those older than 60 years.

In paper I, civil status was dichotomised into married/cohabitant, 0, single/divorced/separated/widow(er), 1. In paper II, single civil status was kept as a separate category, whereas widow(er) was omitted from the analyses due to the low number (N = 11). In paper III, civil status was measured by the variable “not married/cohabitant” (Tyssen 2001a).

Suicidal ideation and attempts

In papers I, II and III, the prevalence of suicidal ideation and suicide attempts was measured by a modified questionnaire, originally introduced by Paykel et al. (1974).

Paykel et al.’s questionnaire consists of five questions:

1. Have you ever felt that life was not worth living?
2. Have you ever wished you were dead?—for instance, that you could go to sleep and not wake up?
3. Have you ever thought of taking your life, even if you would not really do it?

These questions had the four following response categories: often, sometimes, hardly ever, never. Before the statistical analyses, the responses were dichotomised into never, 0, any frequency, 1, according to Paykel et al.'s original work.

4. Have you ever reached the point where you seriously considered taking your life, or perhaps made plans how you would go about doing it?

This question had the six following responses: never, 1 time, 2–3 times, 4–5 times, 6–9 times, and at least 10 times.

5. Have you ever made an attempt to take your life?

This question had the four following responses: never, 1 time, 2 times, 3 times or more. Before the statistical analyses for the last two questions, the responses were dichotomised into never, 0, any frequency, 1.

Questions number 4 and 5 had an additional question: “To what extent do you think the following factors influenced you to consider taking your life”, with the following responses: personal problems, family problems, social problems, problems connected with medical/police profession, and other problems. The responses were: not at all, a little, somewhat, rather much, and very much.

Suicide planning was measured using question 4 from Paykel et al. (1974): “Have you ever during the last year reached the point where you seriously considered taking your own life and even made plans how you would go about doing it?” This is slightly reinforced compared to Paykel et al.'s original wording mentioned above (“or perhaps made plans”) (Tyssen et al., 2001a)¹¹. We dichotomised this variable in the same way as the original authors (Paykel et al., 1974) into no (never), yes (hardly ever, sometimes, and often). In paper III, the variable “postgraduate suicide planning” represents suicide planning reported at T2 and/or T3 as 1, otherwise this was scored as 0.

We also studied the “transition from thoughts to planning”. We selected all participants who had reported lifetime suicidal thoughts, but not lifetime suicide

¹¹ Different wording, even of the same instrument, is a well known problem. Small changes are confusing and of unknown importance. In the nationwide survey among physicians (Paper I) and at T1 in the survey among medical students (paper III), the wording of question 4 was: “*even made plans*” which differs from the original wording “*or perhaps made plans*”. Originally, I was not aware of this difference, and it is not noted in paper I. In the police survey (paper II) and at T2 and T3 (paper III), the wording was “*and even made plans*”. Also, in a Swedish study, the sample was asked: “*perhaps even made plans*” (Renberg et al., 1986). In another study, the author underlined that the wording was exactly the same as Paykel et al.'s original questionnaire (Renberg, 2001).

planning at T1, and then analysed postgraduate suicide planning as an outcome in this subsample.

The instrument has been used in several studies, both among general and specific populations (Paykel et al., 1974; Okasha et al., 1981; Renberg et al., 1986; Sveriges läkarförbund, 1988; Skoog et al., 1996; Samuelsson et al., 1997; Gustavsson et al., 1997; Waern et al., 1999; Renberg, 2001; Scocco & De Leo, 2002; Rancans et al., 2003), which increases the validity of the instrument.

Sought professional care

In paper III, at the three observational time points, the subjects were asked if they had experienced mental health problems, followed by five response alternatives: “Had mental health problems of no importance”, “Have not sought help, though I have been in need of this”, “Have consulted general practitioner”, “Have consulted psychologist/psychiatrist” or “Have been admitted to mental hospital” (Tyssen et al., 2000). At T1, the subjects were asked for lifetime prevalence, at T2 they were asked for problems during internship, and at T3, they were asked for last year prevalence.

The categories indicate an increase in severity of mental health problems that accompanies increasing values of the variable. Nevertheless, this variable cannot be regarded as continuous, since the intervals between the steps are not necessarily equivalent. We regarded self-reported need of help as a reasonable threshold for becoming a “case” in our sample. So, before statistical analysis, the variable was dichotomised as follows: the groups including those who had been in need of or sought help (response alternatives 2–5) were collapsed, and given a score of 1; and those with insignificant problems (response alternative 1) were added to those who had a negative response to the initial question, and given a score of 0 (Tyssen et al., 2000).

Life events

In paper III, life events during the preceding year were measured by 13 items of supposed stressful events:

- Serious disease/accident/hospital admission
- Divorce/separation/broken relationship
- Have got married/started living with cohabitant

- Have had children
- Death of family member/close friends
- Other difficulties in nearest family
- Serious financial problems
- Serious problems with your residence/dwelling
- Partner being unemployed/granted leave
- You, or someone in nearest family, have been involved in serious violation of the law
- Problems with your partner
- Moved away from parents
- Other serious event (self-specified)

All items were coded 0 or 1 and the variable comprised the sum score of all items (Tyssen et al., 2000).

Since first studied by Holmes and Rahe (1967), several studies have shown that stressful life events are predictors of mental health problems, especially depression (see Tyssen, 2001). Since similar items have been used in numerous studies, which increases the validity of the instrument.

Personality

In papers I, II and III, personality was measured by the 36-item version of the Basic Character Inventory (BCI-36) which is based on an original questionnaire constructed by Lazare et al. (1966) and modified by Torgersen (1980). BCI is based on the “big three” personality dimensions (neuroticism, extroversion and control), with an additional fourth dimension (reality weakness). “Vulnerability” closely resembles the classic neuroticism scales and includes questions about sensitivity to other people’s opinion, criticism, etc. “Intensity” is a measure of extroversion/introversion, and “control” describes the degree of compulsiveness. “Reality weakness” measures perceptions and ideations on the borderline between reality and fantasy (chronic illusions, paranoid traits, and problems with identity-insecurity and relations), not only psychotic distortions – traits that are associated with severe personality disorders (Torgersen & Alnæs, 1989). Each dimension is based on nine questions with a dichotomous response (0 = not apply, 1 = apply), allowing each dimension a range of scores between 0 (low) and 1 (high).

In order to limit the size of the comprehensive questionnaires, and since the personality measure was presumptively consistent over time, every second person in a randomly numbered mailing list received the BCI at T1, and the remainder at T2. These subsamples were compared for any differences in the BCI scores; no significant differences were found (*t* tests). The items “I experience myself as being totally different at different points in time” and “Sometimes I seem to live in a fog” were highest correlated with postgraduate suicide planning (both comprising reality weakness dimension).

Since the BCI has been used and given meaningful results in previous studies, it may be considered to be fairly valid (Torgersen, 1980; Torgersen & Alnæs, 1989; Tyssen, 2001). The subscales also resemble those of personality inventories used in several other studies (Torgersen, 1995), such as those described by Eysenck (1967), Cloninger (1987) and Costa & McCrae (1990), and this further increases the validity of the instrument.

As regards reliability, the vulnerability and intensity subscales showed data with highest reliability, while control and reality weakness had lower alphas (Tyssen, 2001).

Perceived medical school stress

In paper III, “perceived medical school stress” measured pressures experienced at medical school (Tyssen et al., 2001b). This 13-item measure is based on a slightly modified version of Vitaliano’s instrument (Vitaliano et al., 1984). The modification, which relates to only one of the items, has been previously described (Bramness et al., 1991). The modification was the omission of item 11 regarding electives and clerkship because it had little relevance to Norwegian students. Instead, an item about stress concerning accommodation was added.

The instrument consists of stressor items such as: “medical training controls my life and leaves too little time for other activities”, “medical school fosters a sense of anonymity and feelings of isolation among the students”. We used the total score from the 13 items (with five-point scales: strongly disagree = 1, to strongly agree = 5) of this instrument to indicate high stress. As regards validity, it has previously been associated with measures on anxiety and depression among medical students in USA and Norway (Vitaliano et al., 1984; Bramness et al., 1991). The Cronbach’s alpha was 0.78 (Tyssen et al., 2000).

Perceived recording skills

In paper III, “perceived recording skills” measured perceived clinical competence based upon items used in a previous Norwegian study (Bramness et al., 1992). It was measured by six items covering the preceding six patient interviews. The response alternatives were on a Likert scale from low (1) to high (7), and the six items were added up to a sum score (Tyssen et al., 2000):

- It is difficult/easy to get a summary when the patient’s past medical history is long
- It is difficult/easy to formulate the present illness in the medical record

These items were scored from “difficult” (1) to “easy” (7).

- I manage to direct the interview so that I get the relevant information about the past medical history
- I easily get an overview of the progress of the present illness
- I manage to get the necessary information about the present illness

These items were scored from “uncertain” (1) to “certain” (7).

- I am sure about how to describe my findings from the physical examination

Response alternatives were rated from “never” (1) to “always” (7).

The alphas of this variable were 0.77 at T1 and 0.80 at T2, which indicates a high reliability despite only six items (Tyssen, 2001).

Specialty groups

In paper I, physicians were divided into six groups according to the specialty: surgery¹², internal medicine¹³, general practice, anaesthesiology, psychiatry¹⁴, other or no specialty. Only those who had finished their postgraduate specialty training were categorised as specialists. Hence, a large group of young physicians still in their training were categorised as non-specialists. We have no information on which specialty these physicians were actually working in (Rosvold, 2002).

¹² Includes: general surgery, gastroenterologic surgery, child surgery, vascular surgery, orthopaedic surgery, thoracic surgery, urology, maxillofacial surgery, neurosurgery, plastic surgery.

¹³ Includes: internal medicine, haematology, endocrinology, gastroenterology, geriatrics, cardiology, infectious diseases, pneumology, nephrology, rheumatology, oncology.

¹⁴ Includes: psychiatry, child and adolescent psychiatry.

The General Health Questionnaire

General Health Questionnaire (GHQ) exists in several varieties and lengths measuring different aspects of mental health and emotional distress. Both GHQ-28 and GHQ-30 were included in Questionnaire A. GHQ-30 was used in paper I. It consists of 30 questions on items related to positive life qualities occurring for the last two weeks, scored on a four point Likert scale: 1, more than usual; 2, as usual; 3, less than usual, and 4, much less than usual (Goldberg & Williams, 1988). In paper I, GHQ-30 values were standardised with zero mean and the standard deviation as units (z-scores).

Severe depressive symptoms

In paper III, severe depressive symptoms were measured by the 7-item subscale of the General Health Questionnaire's 28-item version (GHQ-28) (Goldberg & Williams, 1988). GHQ-28 is a scaled version comprising questions taken from the original General Health Questionnaire that comprises of 60 questions. The scale is divided into four sub-scales: Somatic symptoms, Anxiety and Insomnia, Social Dysfunction and Severe Depression.

Job Satisfaction Scale

In papers I and II, job satisfaction was measured by Job Satisfaction Scale (JSS), which consists of ten questions on various aspects of working conditions: responsibility, variation, collaborators, salary, working hours, etc. (Warr et al., 1979). All items are scored on a scale from 1 (extremely satisfied) to 7 (extremely dissatisfied) and combined in a sum score ranging from 10 (high satisfaction) to 70 (low satisfaction). The JSS was translated to Norwegian by one group of translators, and then back into English by another group to reassure the validity (Aasland et al., 1997). For the purpose of this study, the JSS values were standardised, with zero mean and the standard deviation as unit (z-scores).

Subjective Health Complaints

In papers I and II, the subjective experience of health was assessed by a ten-item version of the Subjective Health Complaint (SHC) questionnaire, previously referred to as the Ursin Health Inventory (UHI). This questionnaire consists of questions examining the occurrence, extroversion and duration of pain in the neck, back, feet,

arms and shoulders, pain in the chest, migraine and headache, digestive problems and vertigo for the last 30 days (Ursin et al., 1988; Eriksen et al., 1999).

The items are scored on a four-point rating scale ranging from no complaints (0) to serious complaints (3). In papers I and II, the SHC sum score was transformed to a dichotomous variable. Consistent with a previous study (Aasland et al., 1997), those who had a response of 2 or 3 on at least one of the ten items were scored as 'cases'.

International Classification of Primary Care

In paper I, the respondents were asked to list retrospectively all sick-leaves of at least two weeks duration since medical school, with reasons coded according to the ICPC convention (Lamberts et al., 1993). Based on this list, one dichotomous variable was constructed, distinguishing between those who had experienced this and used the codes P03 (feeling depressed) or P76 (depressive disorder), and all others.

Hospital Anxiety and Depression Scale

In paper II, the Hospital Anxiety and Depression Scale (HADS) was utilised. HADS includes 14 questions, divided into two subscales: An anxiety subscale, and a depression subscale (Zigmond & Snaith, 1983). Each subscale contains seven items, and is scored on a four-point scale. HADS has been found to perform well in assessing the prevalence and symptom severity of anxiety disorders and depression in both somatic, psychiatric, and primary care patients, as well as in the general population (Bjelland et al., 2002).

Burnout

Burnout was measured with a twenty-two-item version of the Maslach Burnout Inventory (MBI). MBI has been shown to provide reliable data and valid findings and is generally considered the gold standard measure for burnout (Maslach et al., 2001). The inventory contains questions regarding three factors that specify burnout: emotional exhaustion, depersonalisation (cynicism) and personal accomplishment. The items are scored on a five-point scale.

Statistical analyses

The χ^2 test was used to examine group differences, and the t-test was used to test differences on continuous data. Simultaneous effects were analysed through logistic regression models.

The suicide rate was computed per 100,000 person-years. Ninety-five percent confidence intervals (CI) were computed by approximate Wald limits (Greenland & Rothman, 1998). Trends across categories were tested by assigning equidistant scores and including them as numerical covariates using Poisson regression.

$P < .05$ was considered statistically significant. Confidence interval (CI) was set at 95%.

4. SUMMARY OF RESULTS

4.1 Paper I

Hem E, Grønvold NT, Aasland OG, Ekeberg Ø.

The prevalence of suicide attempts and suicidal ideation among Norwegian physicians. Results from a cross-sectional survey of a nation-wide sample

European Psychiatry 2000; 15: 183–9

This paper presents the results from a cross-sectional survey of a nationwide sample of Norwegian physicians (N = 1,063/1,476 active Norwegian physicians; response rate 72%). The survey was conducted in 1993.

The aim of this article was threefold:

- to explore the prevalence of suicidal behaviour
- to explore the predictors for suicide planning
- to explore to which factors physicians attribute their suicide planning

Lifetime prevalences were 51.1% for feelings that life was not worth living, 10.4% for suicide planning and 1.6% for a suicide attempt. The corresponding last year prevalences were 16.6%, 2.6% and 0.3%. Female physicians reported significantly higher prevalence of suicidal behaviour than male physicians.

Adjusted predictors for suicide planning were being female, living alone, sick leave due to depression, subjective health complaints, emotional distress and being a specialist in anaesthesiology.

Suicide planning was mainly attributed to personal and family problems, and to a lesser extent to social, work-related or other problems. There were no gender differences.

4.2 Paper II

Berg AM, Hem E, Lau B, Loeb M, Ekeberg Ø.

Suicidal ideation and attempts in Norwegian police

Suicide and Life-Threatening Behavior 2003; 33: 302–12

The present paper is the first nationwide study on suicidal ideation and attempts among police. A questionnaire was completed by a nationwide sample of 3,272 Norwegian police. The survey was conducted in 2000.

The aim of this article was threefold:

- to explore the prevalence of suicidal behaviour
- to explore the predictors for suicide planning
- to explore to which factors police attribute their suicide planning

Lifetime prevalences were 24% for feelings that life was not worth living, 6.4% for suicide planning and 0.7% for a suicide attempt. The corresponding last year prevalences were 8.9%, 1.7% and 0.1%.

Adjusted predictors for suicide planning were living alone, anxiety and depression, subjective health complaints, and the reality weakness personality trait.

Suicide planning was mainly attributed to personal and family problems, and to a lesser extent to social, work-related or other problems. Male police rated work problems significantly higher in importance than females, whereas female police considered personal and social problems to impact more significantly on suicide planning than male police.

4.3 Paper III

Tyssen R, Hem E, Vaglum P, Grønvold NT, Ekeberg Ø.

The process to suicide planning among medical doctors: Predictors in a longitudinal Norwegian sample

Accepted for publication Journal of Affective Disorders

The suicidal process is a common underlying perspective on suicidal behaviour, but the process has hardly been empirically studied. The present study investigates the process from suicidal thoughts to suicide planning among physicians; an occupational group with a raised risk of suicide.

The suicidal process is studied in two ways:

- Predictors at medical school of postgraduate suicide planning are identified
- The transition from suicidal thoughts to planning over three to four years is explored

A nationwide cohort of Norwegian medical students (N = 631) were approached initially in their final semester (T1), and then again in the first (T2) and fourth (T3) postgraduate years. The average period of observation was 3.6 years.

Twenty-eight subjects (6%) reported suicide planning in the postgraduate years. Adjusted predictors at T1 were vulnerability trait (neuroticism), severe depressive symptoms and life events.

Among those with previous suicidal thoughts at T1, 13 (8%) reported suicide planning at T2 or T3. Adjusted predictors of transition from thoughts to planning were reality weakness trait, severe depressive symptoms and a low level of perceived medical school stress. Eighteen (64%) of the postgraduate planners had not sought professional care.

Common predictors for both postgraduate suicide planning and transition from thoughts to planning were depressive symptoms and personality traits. Reality weakness was the most decisive trait for aggravation in suicidal ideation.

4.4 Paper IV

Hem E, Berg AM, Ekeberg Ø.

Suicide in police – a critical review

Suicide and Life-Threatening Behavior 2001; 31: 224–33

Police officers are commonly referred to as a high-risk group for suicide. However, the empirical basis for this assumption is dubious. This paper is the first comprehensive review that systematically explores the worldwide literature on suicide in police.

A search in several databases was done by cross-referencing the keywords police, law enforcement, suicide, attempted suicide and mortality. The search covered literature cited in the databases and reference lists until December 1999. Languages were not limited.

The search gave 41 original studies, whereof 20 studies fulfilled the inclusion criteria. Most studies were excluded due to substantial overlap in study area and period with other studies (12 papers). Of the 20 studies included, eight covered only the period before 1980. All studies were from North America (13 studies), Europe (six studies), and Australia (one study).

None of the recent nationwide studies (England and Wales, Germany and France) showed elevated suicide rates among police. Other studies showed inconsistent results. Conclusively, it was not documented that there is an elevated suicide rate in police.

A particular problem in previous research has been methodological shortcomings. There is need for further systematic research, and the paper points out some research strategies.

4.5 Paper V

Hem E, Haldorsen T, Aasland OG, Tyssen R, Vaglum P, Ekeberg Ø.

Suicide rates according to education with a particular focus on physicians in Norway 1960–2000

Submitted for publication

The objective of this paper was to compare the suicide rates among trained physicians, dentists, nurses, police and theologians with other graduates and the general population according to sex, age, and time period.

Census data from 1960, 1970, 1980, and 1990 on education were combined with suicide as cause-of-death from Statistics Norway, and followed up during 1960–2000. All inhabitants in Norway above the age of 20 registered at the censuses, comprising 46 and 49 million person-years among men and women, respectively.

Physicians still have a higher rate compared with other graduates and the general population, both among males (43.0; 95% confidence interval, 35.3–52.5) and females (26.1; 95% confidence interval, 15.1–44.9). The suicide rate among female nurses was also elevated, whereas police seemed to have an intermediate suicide risk. The rate among theologians was low (7.0; 95% CI, 2.9–16.9). Suicide rates increased steeply by age among physicians and other graduates, whereas for non-graduates, the rate was highest in the age group 40–60 years. The suicide rates among the general population and graduates in the 1990s were significantly lower than in the 1980s.

The high suicide rates among physicians and elderly graduates are of concern. The reasons why graduates are more vulnerable than others when getting older and the low rate among theologians warrant further study.

5. DISCUSSION

5.1. Prevalence of suicidal behaviour among physicians and police

The prevalence of suicidal behaviour in previous studies varies widely. First, the concept of suicidal behaviour includes very different aspects of life. It varies from fleeting thoughts that life is not worth living, to very concrete, well-thought-plans for killing oneself, to an intense delusional preoccupation with self-destruction and the attempted and completed suicide (Goldney et al., 1989). Many, perhaps most, of us have had suicidal thoughts on one or more occasion in our lives (Retterstøl, 1993). In the present study, 51% of the physicians reported life-weariness some time in their lives. However, the clinical significance of such fleeting thoughts that life is not worth living remains insufficiently explored. An analysis of agreement (Cohen's kappa) in paper III showed that the first three questions in Paykel et al.'s questionnaire were associated, but they all showed low agreement with suicide planning (Question 4). It seems reasonable that suicide planning is used as a dependent variable in two of the papers in the present thesis.

Second, comparisons between studies of suicidal behaviour are difficult, because most general population studies have developed their own questions to measure suicidality (Burless & De Leo, 2001). Moreover, Paykel et al.'s classic work was based on interviews, while the present thesis is based on postal surveys. The varying prevalence rates in previous studies are not surprising given the different settings, populations, age groups, definitions of suicidal behaviour, measuring instruments, and retrospective time frame for presence of suicidal behaviour. Nevertheless, when comparing the results of the present thesis, it may be concluded that the prevalence of suicide attempts is low among physicians and police. Moreover, among physicians the results are comparable to findings among physicians in other countries, such as Sweden (Sveriges läkarförbund, 1988), Denmark (Nordentoft et al., 1991), Finland (Olkinuora et al., 1990) and female physicians in the USA (Frank & Dingle, 1999).

Physicians report higher prevalences of suicidal ideation and attempts than police (paper I and II), and the suicide rate among trained physicians is also higher than among trained police (paper V). Since the same methodology is applied for both occupational groups, these findings are most likely valid, even though there are methodological limitations, which will be discussed later.

5.2 Predictors of suicide planning among physicians and police

Epidemiological data show some differences in characteristics between those who communicate suicidal ideation, those who attempt suicide and suicide completers (van Heeringen, 2001). For example, predictors of suicidal ideation are not quite the same as predictors of suicide. However, data suggest that suicidal ideation is the best predictor of suicidal acts (Ahrens et al., 2000). Further, suicide attempts and suicide are two overlapping phenomena with a very similar pattern of risk factors (Beautrais, 2001). Some of the present results represent expected predictors, such as civil status, anxiety and depressive symptoms. These findings have been replicated in a large number of studies.

5.2.1 Civil status

A well established fact in suicidology is the higher risk among those who are unmarried and divorced. Accordingly, in the present thesis, those who are married or cohabitant report less suicidal impulses. Problems in interpersonal relations may increase the “risk” of not being married. It is noteworthy that about 90% of male physicians are married or cohabitant, while 78% of their female colleagues are so (Aasland et al., 2001). The same observations have been made in Finland and Denmark (Olkinuora et al., 1990; Nordentoft et al., 1991). In Norway, the risk for a single male physician to commit suicide was almost 16 times that of a married or cohabitant female colleague (Aasland et al., 2001). If the physician is well “supported” at home, job stress may be tolerated better. Therefore, it is a reasonable finding that personal and partly family problems are mentioned as most important among those who reported suicide planning or suicide attempt.

Our data show that being unmarried is a risk factor. This may imply that the suggested explanation of the double strain of work and family for female physicians who commit suicide may be overestimated (Retterstøl, 1993). Most likely, this risk factor is about to diminish, as female physicians nowadays more often are married or cohabitant (Aasland et al., 2001).

5.2.2 Specific occupational risk factors

Risk factors for suicide among professionals are most likely similar to those of other groups. Several of the predictors identified in the present thesis concur with the risk factors of suicide and suicidal ideation in the general population. However, there may

also be specific reasons for higher rates. Among physicians, numerous reasons for the high rate have been proposed, including the various problems of being a patient-physician (Hendin et al., 2003). These include the physicians' tendency not to recognise depression in their patients or themselves, less frequent identification of depression among physicians because of their lower use of a regular source of health care, and institutional barriers to help-seeking in the form of restrictions regarding medical licensing, hospital privileges, and health and malpractice insurance placed on physicians after a psychiatric diagnosis (Hendin et al., 2003). An additional factor that has been noted is the deference psychiatrists may show their medical colleagues who do seek help, which compromises the treatment process and may render it ineffective to prevent the patient's suicide. Trying to be too "nice" to colleagues is sometimes not nice at all. Hendin et al. (2003) put it this way: "Other doctors deserve the best of our skill and judgment, even when insisting on good treatment annoys them or causes them pain. Our surgical brothers and sisters know that a laparotomy is not always welcome, but they do not fail to insist on it when the indications are clear. The patient may choose whether or not to have the operation but does not decide how the procedure is conducted, and the family is not invited into the operating room" (Hendin et al., 2003). Retterstøl (1993) has also pointed at the same phenomenon: "One of the reasons why doctors and other health-care personnel probably have a high suicide rate is that it is a group which is more difficult to treat. Physicians in particular find it more difficult to identify themselves with the role of patient and will tend to reject treatment or discontinue it" (Retterstøl, 1993).

Interestingly, people with a history of mental illness and a high income may be at greater risk of committing suicide than their counterparts with a lower income. This may be relevant to physicians, because it is hypothesised that they have to be more suicidal before they are admitted to hospital or they may feel more stigmatised, vulnerable, and shameful about having a mental illness (Agerbo et al., 2001).

Several other risk factors have been described (Lindeman, 1997). The empirical evidence, however, is scarce. In the present study, there is no data on these factors. However, a recent doctoral thesis based on The Norwegian Physicians' Survey in 1993 has documented that Norwegian physicians' often self-prescribe medications, most physicians practise self-treatment when they are ill, they have problems in accepting their own illness, and they tend to avoid taking sick leave during an illness for which they would have sick-listed their patients (Rosvold, 2002).

5.2.3 Job satisfaction

We found job dissatisfaction among police to predict suicidal ideation bivariately, although this was not the case in the model that controlled for other factors. That job dissatisfaction became non-significant in the multivariate model was mainly due to its association with anxiety and depression. This may imply that low job dissatisfaction increases the risk of suicidal ideation through an increased level of anxiety and depression. In other words, those who are dissatisfied with their job in the police without being depressed or anxious do not have an elevated risk of suicidal ideation. In the same vein, suicide planning was mainly attributed to personal and family problems in both police and physicians. When personal and, partially, family problems can be reasonably coped with, other kinds of stress may be better tolerated. On the other hand, when problems at home become too overwhelming, the risk of suicide may increase. It is interesting, though, that “job stress” is of such little importance, because conditions at work are supposed to be an important factor for well-being.

Compared with females, male police more often attributed suicidal planning to work problems. In addition, female police had a higher number of attributions. With respect to gender differences, physicians made similar attribution, although female physicians are more like male police.

5.2.4 Subjective health complaints

The finding that “subjective health complaints” predicted suicide planning among both physicians and police was a novel finding. The current literature addressing the issue of an association between subjective health complaints and suicidal ideation remains limited (Nakao et al., 2002). In a recent study from a psychosomatic clinic in Japan, suicidal ideation was statistically and independently associated with 15 major somatic symptoms (Nakao et al., 2002). Our results are in accordance with this study, showing a relationship between suicidal ideation and subjective health complaints, when controlled for well known predictors like anxiety and depression. This indicates that for some persons, suicidal ideation occurs without an accompanying subjective experience of anxiety or depression, but is associated with somatic complaints. Our findings show that the subjective health condition is of importance; alternatively, it demonstrates that this condition is all part of a general distress syndrome. Consequently, somatic complaints should be taken seriously among police and

physicians, also with respect to potential suicidality. It may also support the finding that a majority of those who attempt as well as commit suicide have contact with health care providers some time before the incident (Michel et al., 1997; Luoma et al., 2002; Suominen et al., 2002). However, most often the suicidality is not a topic during the visit. Moreover, suicidal behaviour is associated with physical illness (Stenager & Stenager, 2000).

5.2.5 Personality

Among police, the reality weakness personality trait was a significant predictor in the multivariate model (paper II). This was also found to predict the transition from suicidal thoughts to plans among young physicians (paper III). Among physicians (paper I), no personality factor was associated with suicidal behaviour. This analysis, however, was based on only 87 subjects who answered both the questionnaires G (Basic Character Inventory) and M (Paykel et al.'s questionnaire) (Aasland et al., 1997).

Reality weakness might represent a risk factor for suicidal behaviour because it is related to personality disorders. An association between personality disorders and suicidal behaviour is well established (Mehlum, 2001). Among different categories of personality disorders, the borderline personality disorder (DSM-IV) has a particularly high suicide rate, although antisocial, avoidant and dependent types also have been shown to be independent risk factors for suicide (Mehlum, 2001). Consequently, reality weakness is an important personality trait to be considered in further studies of suicidality. However, reality weakness is a personality trait, which is different from personality disorders. According to Williams and Pollock, the search for personality variables that are associated with suicidal behaviour has a somewhat chequered history (Williams & Pollock, 2000). They conclude that of all personality features, impulsivity is the one that has been found to be associated with suicidal behaviour in both research studies and in the clinical setting. Access to means may be enough to trigger an attempt by an impulsive person who feels defeated, hopeless about the future, and that there is no escape (Williams & Pollock, 2000). Pendse et al. (1999), however, state that suicide attempters in general do not seem to be very impulsive. It is nevertheless possible, that impulsiveness could be associated with some aspects of suicidal behaviour, e.g. repeated suicide attempts or attempts with low intent to die (see Pendse et al., 1999).

Patients who have attempted suicide form a very heterogeneous group, and one of the most important tasks in the field of psychiatric research is to find a better way to classify the suicide attempters in order to improve treatment and the ability to predict future suicidal behaviour (Engström et al., 1997). In a recent Swedish study, six mutually exclusive clusters of subjects with different temperament profiles were found among suicide attempters (Engström et al., 1996).

The traits of extraversion and neuroticism have often been studied. Higher levels of neuroticism have been found to correlate with more suicide attempts, with more suicidal ideation, or with both ideation and attempts (see Kerby, 2003). We found that vulnerability trait (neuroticism) was an adjusted predictor for suicide planning in the final semester at medical school. Low extraversion has been correlated with suicidal ideation and with a history of suicide attempts. Several studies have also found that the trait of psychoticism from Eysenck's personality system is significantly related to suicide. Higher psychoticism scores may also be correlated with more positive attitudes toward suicide (see Kerby, 2003). Temperament studies on suicide attempters have also described associations between suicidal behaviour and high anxiety, low socialisation and high hostility and rigidity (see Pendse et al., 1999).

In the 1980s, the main objectives of many studies among physicians were to discover why physicians commit suicide or develop mental disorders. It was claimed that certain types of personality tended to seek the medical profession. Physicians were often thought to have obsessive-compulsive traits and perfectionism, which continuously pushed them towards new professional challenges (Lindeman, 1997). The American Medical Association and the American Psychiatric Association made a case-control study in 1980–81 using the psychological autopsy method, in which the background, personality and psychosocial circumstances of the deceased were described. Interviews were successfully completed on 61 (27%) of the deaths selected for follow-up. The differences between the cases and controls were in the social problems due to drinking and drug addiction, and in personality. Suicide victims had been very critical in their personal relationships and dissatisfied with their professional abilities and their family. Self-accusations as well as social isolation and working overtime had been common among suicide cases (see Lindeman, 1997 and Silverman, 2000). Silverman concludes that although the findings based on a small sample size are easily criticised, the study did provide some findings that

counterbalanced those previously published, suggesting that a more rigorous project to study this problem is required (Silverman, 2000).

Subjects with severe personality disorders are unlikely to be admitted to for example medical school or police studies, let alone complete them. Hence, the prevalence of subjects with these disorders will be lower in these occupations than in the general population. However, whether certain personality traits are more prevalent in certain occupations are not sufficiently explored.

5.2.6 Medical specialties

Being a specialist in anaesthesiology was an adjusted predictor for suicide planning among physicians. The specialists were divided rather arbitrary into six groups: surgical disciplines, internal medicine, general practice, anaesthesiology and psychiatry. Anaesthetists and psychiatrists have often been associated with suicidal behaviour among physicians.

Recently, anaesthetists have been of particular interest. A recent article in *Anesthesiology* explored the cause-specific mortality risks among more than 40,000 US anaesthesiologists. Anaesthetists were compared with a similar number of internists during the years 1979–95 and with the general population (Alexander et al., 2000). Compared with internists, anaesthesiologists had a high risk of death by suicide, particularly suicide by drug overdose, and drug-related death.

In the November issue 2002 of the journal *Acta Anaesthesiologica Scandinavica*, mortality rates among anaesthesiologists in the Nordic countries were analysed in four original papers. No higher risks were found in Denmark, Norway or Finland (Juel et al., 2002; Aasland, 2002; Ohtonen & Alahuhta, 2002). In Sweden, however, a slight excess mortality was reported for Swedish anaesthesiologists compared with other specialists (Svärdsudd et al., 2002).

In a recent review, the authors were reluctant to conclude firmly a higher suicide rate among anaesthesiologists (Swanson et al., 2003). However, with the exception of some papers with the methodological shortcoming of using average age at death as the main measure of differences in mortality (Wright & Roberts, 1996), existing literature gives little support for the notion that anaesthesiology, or any other medical specialty, has a higher suicide mortality than that of physicians in general. As noted in chapter 2.2.1.3, the empirical basis for making statements about raised suicide rates in specific specialties is uncertain.

The analysis of suicide risk by specialty is most often limited by there being relatively small numbers of deaths in most categories. In a recent UK study, the risk estimates among psychiatrists and anaesthetists were based on 9 and 13 suicides, respectively (Hawton et al., 2001). In the present study, the mortality file was linked to the specialisation register for Norwegian physicians. The current number of medical specialities in Norway is 43. Hence, the number of physicians registered as specialists who had committed suicide was too low to be able to carry out any reliable analysis (n = 21).

5.2.7 Methodological issues

In epidemiological studies, one source of bias is that the sample is, at its best, only an approximation of the population from which it is derived (Hintikka, 1998).

The Norwegian Medical Association and the Police Union cover most of the two professions. Nearly 95% of all practising physicians and active law enforcement personnel are voluntary members in the organisations. Those who choose not to be members may differ from the members, but unfortunately we have no information about them. In the physicians' survey, it was initially attempted to include the non-members in the survey. However, the register held by the National Board of Health was incomplete. The high rate of members in the Norwegian Medical Association among Norwegian physicians indicates, however, that the study population is representative for physicians practising in Norway. The nationwide design and the inclusion of all specialties along with the high number of participants make the survey quite comprehensive as compared to other studies of physicians (Rosvold, 2002).

The design and promotion of the physicians' survey may have introduced a risk for selection bias (Rosvold, 2002). First, the studies among both police and physicians were linked to the organisations. The physicians' survey was initiated as a result of a growing concern about physicians' health and welfare. Hence, there is a risk that the response is biased in the direction of respondents who wanted to set focus on their problems, i.e. those who did not feel that they had any problems may have failed to participate. The low response rate among physicians working in private practice may support this view. These physicians generally have the highest income among physicians, and they have also a high autonomy and other benefits. However, these physicians comprise of only 5% of the members of the Norwegian Medical Association, and were not analysed separately. They were included in the various

groups of medical specialists. On the other hand, fear of e.g. lack of anonymity may have led to a lower response rate among physicians with a higher rate of suicidal behaviour.

It also remains unclear whether the respondents provided honest answers in the questionnaire, which includes personal questions on suicidal ideation and attempts (Renberg, 2001). It is recognised that respondents tend toward more socially desirable responses in interviews than with self-administered questionnaires (Okamoto et al., 2002). Hence, since suicidal behaviour clearly is a socially undesirable topic, anonymous questionnaires may reduce response bias. Moreover, the respondents may have forgotten or neglected that they have had suicidal thoughts, because these items are connected with shame and guilt. This is in accordance with previous studies (Goldney et al., 1991). Thus, in order to increase reliability, it is recommended to emphasise last year prevalences instead of lifetime prevalences.

Since 1993, several changes have occurred both in society and in the health service in Norway. The data in paper I are now approximately ten years old. In some ways, the results may be outdated. However, in 2000, the longitudinal sample of Norwegian physicians recruited in 1993 (see chapter 3.1.1) answered Paykel et al.'s questionnaire. There were hardly any significant differences from the results of the 1993 survey (data not yet published).

A low response rate will tend to reduce the validity of the survey findings, as it is likely that non-responders differ from responders in some ways (Ford, 2003). The response rate among police was lower than among physicians. In an accompanying editorial, Silverman stated that the police sample (paper II) is limited and that the response rate is “approximately 51%” (Silverman, 2003). However, we argue that the true response rate is closer to 69% than 51%. Here also, we were unable to trace those who were not members of the organisation, and no information is available of the non-responders. However, we think that the sample is fairly representative of Norwegian police.

In the cross-sectional design, the independent and dependent variables are recorded simultaneously. Hence, cross-sectional surveys can never provide direct evidence of causality (Ford, 2003).

Although several variables have been included in the multivariate analyses, others could have been added. More than 60 different risk factors for suicide have been described (Plutchik, 2000). Thus, suicide is a multidetermined event, and the

search for a single explanatory factor is too simplistic. Hence, occupation is unlikely to be a sole determinant of suicide. Additionally, although suicidal behaviour is a biopsychosocial phenomenon, this thesis does not include biological or clinical measures. Generally, epidemiological methods describe effects on groups, not individuals (Rogers, 2003).

Physician suicide has been correlated with personal, professional and financial stresses (Center et al., 2003). There are, however, conflicting results as to whether physicians are subject to more occupational stress than other professionals (Firth-Cozens, 1999; 2001; Center et al., 2003). Moreover, the level of stress differs significantly between, for example, residents in the USA working 80 hours per week or more (Oransky, 2003), and Norwegian physicians working an average less than 50 hours per week (Stavem et al., 2003). Nevertheless, the finding that suicide rates among physicians are high, as least among female physicians, has been replicated in a number of studies from several countries. It may represent some common stressors in the medical profession. On the other hand, cultural differences are also important. In Estonia, the majority of physicians are women, and here the suicide risk among both male and female physicians are reported to be low (SMR 0.58 and 0.62, respectively, for the period 1983–98) (Innos et al., 2002). However, we have no specific variables measuring stress. In the same vein, burnout was only included in the analyses of suicidal behaviour among police, not among physicians.

Among police, we found that the burnout components of emotional exhaustion and depersonalisation (cynicism) predicted suicidal ideation in the bivariate analyses, but failed to do so in the adjusted model. This was partly due to their correlations with depression and anxiety. Some of the discussion about burnout has focused on issues of discriminant validity. Is burnout truly a distinctly different phenomenon from depression? The present view is that burnout is a problem that is specific to the work context, which contrasts with depression, which tends to pervade every domain of a person's life (Maslach et al., 2001). However, although burnout and depression are considered distinct constructs, our results indicate that the burnout components of emotional exhaustion and depersonalisation only predict suicidal ideation through depression and anxiety. The finding that personal accomplishment was a significant predictor in the multivariate analyses both for serious suicidal ideation and suicide attempt could not be explained by any single variables. This is a surprising finding,

and may represent an artifact. However, this remains to be investigated more thoroughly in future studies.

Most of the questionnaires have been validated and used in different populations. They have also been tested on reliability. However, Paykel et al.'s questionnaire is only one of many questionnaires tapping information on suicidal behaviour. The formulation of suicide attempt has been criticised (“Have you ever made an attempt to take your life?”) (Meehan et al., 1992). Results of surveys designed to estimate the incidence or prevalence of suicidal behaviour are often difficult to interpret and compare because they simply ask “Have you attempted suicide”? Rarely is an attempt made to elucidate the seriousness of suicidal intent or to ascertain what respondents mean by “suicide attempt” in terms of the severity of outcome. This problem is partly exemplified by the paradoxically higher estimated lifetime prevalences of attempted suicide among younger than for older respondents in some surveys (Meehan et al., 1992). However, physicians may use the wording “suicide attempt” in a rather consistent way, as it is a medical diagnosis.

Moreover, the wording “considered taking your life and even made plans” (Question 4 in Paykel et al.'s questionnaire) may be sub-optimal because of the dual wording (consider vs. make plan). Maybe this question is more adequately described as “serious suicidal ideation”, as used in papers I and II, than “suicide planning” used in paper III.

5.3 Suicide risk in police

Both the literature review (paper IV) and the empirical study (paper V) show that police is not a high-risk group for suicide. After the publication of our review, two studies have emerged demonstrating the same findings (Marzuk et al., 2002; Loo, 2003). Nevertheless, it is still claimed that “police have a greater risk of suicide than other professions and the general population” (Violanti, 2003). This may reflect that old misconceptions and popular myths are hard to eradicate.

Although the suicide risk is not raised in a particular group, this does not mean that the issue is not a problem. In occupational groups, employees with mental problems should be identified and should receive appropriate help. Working conditions contributing to problems of anxiety, depression or suicidal behaviour should be identified and dealt with.

5.3.1 Methodological issues

When summing up the literature, the quality of the literature on which the review is based, may be questionable. This is described in paper IV: Suicide rates have often been calculated from inadequate sample sizes, and inappropriate comparison groups have been used. Different studies have addressed different periods, some of only historic interest today. Several studies have been conducted in limited specific populations, for example from one medical school. The variability in reported suicide has often been attributed to underreporting due to social stigma, religious and insurance reasons, friendship to families, loyalty to the profession, etc. However, whether these factors are more dominant in some groups than in others, has hardly been empirically studied. The applied methodology is also often inadequate. Finally, when scrutinising previous reports, surprisingly often there are misinterpretations of original studies. Moreover, this misreading is repetitively cited, and after some time established in the literature.

The second point is linked to some general problems in writing reviews, for example that negative results are more likely not to be published (publication bias) (Egger et al., 2001). Moreover, in general, a large number of reviews have been conducted in an unsystematic way, thereby leading to invalid conclusions (Sensky, 2003). Lindeman et al. (1996), conducting a similar review as in paper IV, stated that “it is possible that we did not find even the majority of all relevant and eligible original studies in our search”. For example, publications and results from population censuses and other surveys from national statistical bureaus are not indexed in the databases. There may also be several unretrieved reports on mortality caused by occupational groups in which the suicide mortality is just one row or column in the tables. There may also be problems regarding occupational classification.

It is conceivable that some publication or accessibility bias is present in the present thesis (paper IV), but it is improbable that this bias would qualitatively change the overall conclusion.

5.4 Suicide rate in some human service occupations

There are some novel and important findings in the study of suicide rates in some human service occupations (paper V). First, it is shown that the suicide rate among Norwegian physicians was still higher in the 1990s than among other graduates and

the general population. Second, a high suicide rate among elderly graduates and a low risk among theologians were identified.

5.4.1 Access to means

Some groups have easy access to dangerous means of suicide (Hawton et al., 2001), such as weapons for police and military personnel and lethal drugs for health care workers. This is underlined by the fact that a large majority of health care professionals commit suicide by self-poisoning (Hawton et al., 2000; Aasland et al., 2001). For example, among female Norwegian physicians, 85% of the suicides during the period 1960–93 were by poisoning (Aasland et al., 2001). Moreover, the highest suicide rate in the present study was among the veterinarians and physicians. They have the knowledge of and easy access to suicide means. However, the access to weapons in police is not associated with an increased suicide rate, neither in Norway nor in large-scale studies from other countries (Loo, 2003). This is in line with findings among medical and dental assistants (Stack, 2000).

In Norway, there are about 1.4 million firearms in private homes, i.e. firearms are available in 1 of 3 Norwegian homes, the corresponding figure in Britain is 1 in 20 (Retterstøl et al., 2002). In Norway, police is not armed, contrary to most other countries. Thus, the access to firearms among police may not be higher than for other groups in Norway.

5.4.2 Self-selection

There may be a self-selection of vulnerable individuals to certain educations. Some reports indicate a high rate of affective disorders among physicians (Welner et al., 1979; Firth-Cozens, 1997), but also here, results are conflicting (Ford et al., 1998; Frank & Dingle, 1999). In Norway, there is no difference between physicians and other university graduates and those of lower level education when it comes to mental health (Stavem et al., 2001). However, the rate of mental health problems among young physicians may be raised (Tyssen, 2001; Tyssen & Vaglum, 2002).

Notably, recent research indicates that stressful events thought to precipitate suicide are themselves often precipitated by the behaviour of patients with affective disorders. Even when suicidal patients do not engender stressful events, their experience of being intensely affected by them is often a function of their pre-existing depression (Maltsberger et al., 2003).

5.4.3 Status integration

The expression “status integration” is central in suicidology. Durkheim formulated the following postulation: “Suicide varies in inverse proportion to the integration of social groups”. The less status integration, the more suicides (Retterstøl, 1993). The theory is confirmed by the higher suicide rates among refugees, emigrants, those without roots, the divorced and separated. To some extent, the argument can be used to explain differences in suicide rates between occupational groups and religious groups, or parts of a country compared with other parts, and countries in comparison with others (Retterstøl, 1993).

From 1960 to 2000 there was a nearly fourfold increase in the number of physicians in Norway, from less than 4,000 to more than 15,000¹⁵, and also a substantial change in the gender balance, with more women entering medicine. Today more than half of the medical students and 30% of the active physicians are females, as opposed to 10% of the physicians in 1960 (Norwegian Medical Association, 2003).

The theory of status integration suggests that persons in statistically infrequent role sets have higher suicide rates than their counterparts. They may experience additional work stress and social isolation (Stack, 2000). Accordingly, since women in medicine become less and less of a minority, their risk is expected to decline (Hawton et al., 2001). Moreover, the recruitment of women to medicine today is different from earlier times. Now, the majority of medical students in Norway are women. Interestingly, the effect of poor status integration among male nurses does not seem to be present. Males are clearly underrepresented among nurses, and as such may be less status integrated than female nurses. However, as males traditionally have dominated the working life, they probably do not have major problems to be accepted among female colleagues and other health care personnel, which has been the case among female physicians. Accordingly, status integration most likely will be a problem among female police.

¹⁵ 1960: 3,844 (10.0% women). 2000: 15,180 (31.4% women). The proportion of women is increasing: per 15 December 2003, there were 17,347 physicians < 67 years in Norway (34,5% women) (<http://www.legeforeningen.no/index.gan?id=18&subid=0>, accessed December 30, 2003).

5.4.4 Methodological issues

Since paper V is based on educational statistics, we have no information on occupational status. Thus, some of those who have a specific educational training do not work in the corresponding occupation. The data are most reliable among dental and medical professionals, and among other graduates, the findings are robust as well. Other studies have also shown significant associations between courses of study and cause-specific mortality (McCarron et al., 2003). However, among police and nurses the reliability may be more questionable.

In paper V, we have no information on employment status. Unemployed and retired people are considered to be risk groups for suicide. However, unemployment among Norwegian human service occupations and graduates in general was virtually nonexistent during the study period. On the contrary, there has been a lack of available human resources, for example, among physicians and nurses.

In paper V, the file is not 100% complete, because the information is based on the four censuses. For example, if a dentist immigrated to Norway in 1962 and committed suicide in 1969, he is not registered in our database, because he was not included in the Census 1960. Moreover, if a physician graduated in 1978, and committed suicide in 1979, she is also not included because she probably was not registered as a medical student in the Census 1970. However, it is highly unlikely that incomplete data will alter the conclusions of the study, because the incompleteness is limited. For example, until recently immigration to Norway was very low. This factor may, in part, explain different results in the present study compared with previous studies. According to a previous study (Aasland et al., 2001), there were 89 suicides among physicians during the period 1960–1989, and 116 suicides up to 1994. In paper V, 111 suicides were registered for the period 1960–2000. Moreover, these figures are calculated in different ways, so direct comparisons are not possible.

Although paper V comprises a long period of time, some of the confidence intervals are wide. This is a common problem, and can be reduced by increasing the sample size. However, in the present thesis nationwide data are used.

Direct comparisons to other studies may be difficult owing to different definitions of suicide. Several studies include undetermined deaths (980–989, excluding 988.8) among suicide (Stefansson & Wicks, 1991; Hawton et al., 2001). Standard practice in suicide research in the United Kingdom, when using population data, is to include undetermined deaths, because it is claimed that the majority of

these are in fact suicides (Hawton & Vislisel, 1999). Other studies, however, define suicide as we do (Juel et al., 1999).

The validity and reliability of suicide statistics is also a well known problem. In previous studies, there is some indication of under-reporting of suicide among physicians (Rimpelä et al., 1987; Carpenter et al., 1997). In the present study, mortality rates for other cause-of-death groups were calculated (accidents, poisonings, and other violent death), but there was no indication of higher rates among physicians, even compared to other graduates. Norway is one of a very few countries where suicide statistics have been deemed reliable (Ekeberg et al., 1985; Juel-Nielsen et al., 1987), although comparisons between suicide rates in different countries are difficult.

There is no specification of what kind of work is being done. For example, among police a street-oriented, or dangerous, police work may be assumed, but most police officers work in less dangerous roles or confront danger infrequently. The literature suggesting that certain medical specialists are at increased suicide risk is also uncertain (see chapter 5.2.6).

In some types of occupational training, there are strict selection criteria, and some major risk factors for suicide are less common in these groups than in the general population. Subjects with psychiatric disorders like schizophrenia, severe personality disorders, or early-onset drug or alcohol addiction are unlikely to be admitted to these types of occupational training, let alone complete them. Thus, in paper V, individuals with such disorders are found in the general population, but the proportion of these patients is so small that it will most likely not change the main findings.

Despite these methodological considerations, the two novel findings, that the suicide rate among physicians was still raised in the 1990s and the high rate among physicians and low rate among theologians, are supposed to be valid. It is somewhat more uncertain whether the suicide rate among nurses and police reflects the real situation. A higher proportion of those in these specific educational trainings do not work in the corresponding occupations. Thus, it would be useful to investigate the suicide rates based on occupational statistics.

6. FUTURE RESEARCH

Only a small proportion of the large number of major occupations have been the subject of empirical research on suicide (Maris et al., 2000). Much more descriptive work needs to be done even to determine which professions are in fact at risk for suicide. Further, research exploring the causes of high and low suicide risk in specific professions is even more sparse. Finally, longitudinal studies are required to determine causality (Maris et al., 2000). Comprehensive models with several predictor variables in studies of suicidal ideation are necessary, including personality measures. Based on findings in paper V, the reasons why graduates are more vulnerable than others when getting older and the low rate among theologians warrant further study. In general, some studies include only the working-age population. However, findings among physicians and other graduates indicate that exploring suicide rates also among the elderly groups are important.

Violanti (1996) states that perhaps the greatest challenge is the lack of reliable empirical evidence on police suicide. Hence, it is important to conduct systematic studies of suicide among police from nationwide samples. As pointed out in paper IV, there is a need for three types of study among police. These points may be applied on other groups as well. First, a more detailed epidemiology of suicide is needed. Second, attempted suicide and suicidal ideation also have to be investigated. Finally, there is a need for psychological autopsy studies of those who have died by suicide.

Most researchers in the field of suicidology would, upon inquiry, state that their research is relevant to the crucial identification of risk factors in order to point out preventive measures (Mortensen, 1999). However, there appears to be a large gap in the literature on suicide. On the one hand, there is an extensive literature replicating many of the key findings with regard to risk factors for suicide. Accordingly, the factors influencing suicide planning among young physicians do not appear to be extraordinary. Several of the well known predictors for suicidal behaviour are also present among physicians and police. This highlights the need to tackle stress and mental health problems more effectively (Hawton et al., 2001). On the other hand, there is little empirical knowledge of which preventive interventions may be effective in high-risk groups such as psychiatric patients, those attempting suicide, or the general population. Suicide prevention measures might be better aimed at reducing exposure to risk factors than at targeting any particular high-risk group (Lewis et al., 1997). The most likely target risk factor would be mental disorder. For example,

people who have been admitted to a psychiatric hospital commit half of all suicides in Denmark, and almost 30% were committed by people who had been admitted in the last year (Mortensen et al., 2000; Qin et al., 2003). Since the majority of suicides committed in a population are by people suffering from mental disorder, improved diagnoses and treatment of mental disorders would be a reasonable strategy in order to prevent suicides in the general population (Mortensen, 1999). However, in any high-risk group, only a small proportion of individuals will commit suicide within a given time period, meaning that services should be acceptable, and if possible should also deliver beneficial effects in addition to reducing suicide risk. Suicide may be more productively viewed as the extreme end of a quality-of-life scale, which would mean that suicide prevention could be regarded as an important spin-off from general improvements in mental health services. Suicide research has advanced far enough to guide choices in preventive efforts. The next important step will be to evaluate them (Mortensen, 1999).

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