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SICK LEAVE PRESCRIBING PRACTICES IN FINLAND

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ABSTRACT

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Sick leave prescribing practices in Finland

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Background

Sick leave prescribing is a common task of doctors and being on sick leave results in notable economic consequences to society. However, there appears to be limited research into this field and the factors affecting sick leave prescribing practices of doctors.

Aims

To examine the prescribing of sick leave by doctors and dentists, the extent of variation in practices, whether clinician-related factors and local structural factors affect variation, and the economic consequences of varying practices.

Materials and methods

Questionnaire studies with 19 or 16 hypothetical patient cases were conducted among 165 primary health care (PHC) physicians, 356 occupational health care (OHC) physicians, 338 surgeons and 1132 dentists.

Results

The difference between the lowest and the highest number of sick leave days prescribed for the 19 patient cases was almost four-fold in PHC physicians and surgeons and eight-fold in OHC physicians, which represents a societal cost of tens of thousands of euros. Some dentists did not prescribe sick leave to any of the 16 patient cases, and some prescribed nearly a hundred days altogether. The overall number of sick leave days OHC physicians prescribed was smaller than in PHC physicians. More days of sick leave were prescribed by those working in smaller municipalities than larger population centres.

Conclusion

There was considerable variation in the sick leave prescribing practices of Finnish health care professionals. This means that patients may not receive equal social benefits. Sick leave carries considerable economic consequences, and unifying prescribing practices could bring significant cost savings to society.

Keywords

sick leave, sickness absence, health services research

TIIVISTELMÄ

Taustaa

Sairauslomien kirjoittaminen on useimmille lääkäreille jokapäiväinen tehtävä, ja sairauslomista aiheutuu yhteiskunnalle huomattavia kustannuksia. Tutkimustietoa sairauslomien kirjoittamisesta ja lääkärien käytännöistä on kuitenkin varsin vähän.

Tavoitteet

Tämän tutkimuksen tavoitteena oli saada tietoa lääkäreiden ja hammaslääkäreiden sairauslomien kirjoituskäytännöistä. Tarkoituksena oli selvittää, miten paljon käytännössä on vaihtelua, vaikuttavatko lääkäriin tai työympäristöön liittyvät tekijät käytäntöihin, ja millaisia taloudellisia seuraamuksia mahdollinen käytäntöjen vaihtelu voisi aiheuttaa.

Aineisto ja menetelmät

Aineisto kerättiin kyselylomakkein, joissa oli 16 tai 19 kuvitteellista potilastapausta, jotka laadittiin yhdessä kunkin alan kokeneen erikoislääkärin kanssa. Lomakkeet lähetettiin 165 yleislääkärille, 356 työterveyslääkärille, 338 kirurgille ja 1132 hammaslääkärille. Lääkärin tehtävänä oli arvioida, montako päivää sairauslomaa he kirjoittaisivat kullekin potilaalle.

Tulokset

Verrattaessa pienintä ja suurinta sairauslomapäivien määrää, jonka yksittäinen lääkäri kirjoitti koko 19 potilastapauksen joukolle yhteensä, ero oli yleislääkäriaineistossa ja kirurgianeistossa lähes nelinkertainen ja työterveyslääkäriaineistossa jopa kahdeksankertainen. Yhteiskunnalle koituvissa kustannuksissa tällainen vaihtelu vastaisi kymmeniä tuhansia euroja. Osa hammaslääkäreistä ei kirjoittanut lainkaan sairauslomaa yhdellekään esitetystä 16 potilastapauksestaan, osa taas kirjoitti yhteensä lähes sata päivää. Työterveyslääkärit kirjoittivat yleislääkäreitä vähemmän sairauslomaa samoille potilastapauksille. Pienissä kunnissa työskentelevät lääkärin kirjoittivat enemmän sairauslomaa kuin suurissa kunnissa työskentelevät.

Johtopäätökset

Suomalaisten terveydenhuollon ammattilaisten sairauslomien kirjoituskäytännöissä oli siis huomattavaa vaihtelua, joten potilaat eivät välttämättä saa tasavertaista kohtelua, eivätkä myöskään pääse tasapuolisesti nauttimaan yhteiskunnan takaamista sosiaalietuuksista. Koska sairauslomista aiheutuu merkittäviä taloudellisia seuraamuksia, käytäntöjen yhtenäistäminen saattaisi pienentää huomattavasti yhteiskunnalle koituvia kustannuksia.

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ABBREVIATIONS AND TERMS

PHC	primary health care
OHC	occupational health care
health care professionals	PHC physicians, OHC physicians, surgeons and dentists
doctors	PHC physicians, OHC physicians and surgeons
physicians	PHC physicians and OHC physicians
surgeons	surgeons with a specialty degree and those still in training for a specialty degree

LIST OF ORIGINAL PUBLICATIONS

- I Kankaanpää AT, Franck JK, Tuominen RJ. Variations in primary care physicians' sick leave prescribing practices. *Eur J Public Health* 2012;22(1):92-6.
- II Kankaanpää AT, Suominen AL, Tuominen RJ. Factors affecting sick leave prescribing by dentists. *Community Dent Oral Epidemiol* 2012;40(6):516-22.
- III Kankaanpää AT, Putus TM, Tuominen RJ. Factors affecting sick leave prescribing in occupational health care: a survey based on hypothetical patient cases. *BMC Health Serv Res* 2014;14:168.
- IV Kankaanpää AT, Laato MK, Tuominen RJ. Prescribing of sick leave by surgeons: a survey based on hypothetical patient cases. *World J Surg* 2013;37(9):2011-7.

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The Roman numerals introduced above are used to refer to these original publications throughout the thesis.

1. INTRODUCTION

Sickness benefits reduce the economic burden on an individual with work capacity reduced because of illness by transferring the cost of lost productivity to third parties such as employers or the state. Thus sickness benefits have considerable economic consequences for society. Doctors have a central role as gatekeepers of the social security system in order to ensure sickness benefit is only provided to those who have a medically acceptable cause of sickness absence. On the other hand, the doctor is also supposed to be the patient's advocate, guaranteeing that the patient obtains his or her rightful part of the common resources. However, assessing the work ability of the patient and prescribing sick leave may not always be easy tasks for a physician. In addition to the patient's health, the nature of the patient's employment is also an important determinant of work ability (1). The significance of different diseases may vary among patients in different occupations, and characteristics of the work of a patient should always be considered when sick leave is prescribed.

In Finland, all people are insured by the public social insurance system that is financed through taxation. The Social Insurance Institution of Finland pays sickness allowance as compensation for loss of earnings caused by an illness or accident. Before receiving sickness allowance, an employee must complete a waiting period, which usually consists of the day of onset of work incapacity and the following 9 weekdays. The wage for this waiting period is covered by the employer (2,3), who may require the employee to

provide a reliable certificate stating that his/her current working ability is impaired. The most common policy in work places (49% of Finnish employees) is that employees are allowed to be absent from work without a sickness certificate up to 3 days, and after that an official sickness certificate is required (4). However, 28% of employees have to offer an official certificate from the first day of sickness absence (4). Self-employed subjects, like entrepreneurs and farmers, may not have any income during the waiting period unless they have special insurance to provide such cover.

After 10 weekdays the Social Insurance Institution covers the wage losses (3,5); this requires a sickness certificate. If the employer pays the employee's salary while on sick leave, the compensation from the tenth day onwards is paid to the employer. To qualify for the sickness allowance, the employee must be between 16 and 67 years of age and unfit for work on medical grounds (3).

It is also possible to have part-time sick leave and thus get partial sickness allowance from the Social Insurance Institution. The purpose of the partial sickness allowance is to make it easier for people who are incapacitated for full-time work to return to work and remain employed. Full-time employees can agree with their employer to return to work on a part-time basis. To obtain partial sickness allowance, an assessment from an occupational health care physician is required stating that the recovery from the illness is not threatened by working part-time. The partial sickness allowance is for

half the amount of the preceding regular sickness allowance. (3)

In Finland, the role of a doctor in the sickness certification process is to be a medical expert, and the sickness certificate is a recommendation rather than an order. On receiving a sickness certificate, an employer or the Social Insurance Institution decides whether or not the patient is qualified for sick leave and sickness allowance. It is possible for the sickness certificate to be rejected.

After graduation all doctors are called general practitioners. Additional qualifications, also called specialties, can be obtained through training programmes that last for 5 or 6 years. Currently there are 50 different training programmes in Finland, for example family medicine, occupational health care and surgery (6). Those who have completed one of these programmes have the degree of Clinical Specialty. Dentists have a separate training programme, and after graduation they can also complete a specialty degree in one or more of four training programmes (7). Although the EU has standardized medical training in a large part of Europe, notable differences still exist between European countries.

In the Finnish health care system all doctors and dentists are equally entitled to prescribe sick leave and it is a part of every doctor's daily clinical practice. However, estimating the need for or adequate length of sick leave is not

included in the curriculum of medical students, and the guidelines for doctors on appropriate prescribing of sick leave are not well-known among doctors. In Finland, most health care professionals are familiar with Current Care Guidelines (CCG) and use these guidelines in their daily practice (8). CCGs are independent, evidence-based clinical practice guidelines that cover important issues related to Finnish health, medical treatment and prevention of diseases. Yet there is no guideline specifically about sick leave, and there is no recommendation on the reasonable amount of sick leave on each disease. Mostly, prescribing of sick leave is solely dependent on the experience, impressions and customs of each individual doctor. Consequently there is a need for research into sick leave prescribing practices in Finland to determine whether there is variation in practices and the extent of any variation. Background information is required to develop and standardize sick leave prescribing practices of health care professionals.

Because in Finland statistical information exists only on social insurance payments for sick leave on the eleventh day of sick leave and onwards, there are no registers or readily available databases on shorter periods of sick leave. Without register data, the best method of studying sick leave prescribing practices is the hypothetical patient case setting. With standardized patient cases, it is possible to estimate reliably the prescribing practices of short sick leave periods.

2. REVIEW OF LITERATURE

Sick leave prescribing is a common task of doctors and being on sick leave results in notable economic consequences to society. However, there appears to be limited research into this field and the factors affecting sick leave prescribing practices of doctors. Most studies concentrate on primary health care and the sick leave prescribing practices of primary health care physicians (9). Some studies also include surgeons, more often orthopaedic surgeons (9). No studies could be found on dentists' sick leave prescribing practices, possibly because the periods of sick leave they prescribe are short. In Finland, only sick leave with duration of 10

weekdays or more is registered in the statistics of the Social Insurance Institution of Finland; consequently, there is no readily available data on shorter periods of sick leave.

Most studies concerning sick leave issues have been conducted in Scandinavia, in Sweden or Norway (9). The area has not been under study in Finland before. The sickness certification system and the national social insurance system are quite similar in Scandinavian countries and in Finland. Thus the comparison between the results of our studies and earlier findings is feasible.

2.1. Factors associated with health and social care systems

2.1.1. The sickness absence rate

The sickness absence rate in Finland appears to have increased in the 21st century (4). According to Statistics Finland, in 2008, 67% of women and 62% of men were absent from work because of sickness at least once during the preceding year (4). In 2011, the average number of sick leave days in Finland was 9.4 per person per year (10). In 2012 in Finland, there was 336,647 new periods of sickness allowance (11). Every month sickness allowance was paid to an average of 56,430 people (11).

It is difficult to create comparable statistics about sickness absence rates in different countries, because the legislation and registration policies of each country differ from each other (12). A systematic literature review conducted in 2007 in European primary care demonstrated that in Europe, the rates of

sickness certification are not routinely recorded (13). The rates of certification in different countries varied widely from 18 certificates per 100 person years in Norway to 239 certificates per 100 person years in Malta (13). According to a population-based database study conducted in UK in 2005, the rate of sickness certification of patients in working age was 10.2 certificates per 100 person years, with the highest rates occurring around 50 years of age, in women (14).

The rate of absence from work because of sickness in a Swedish urban population in 1985 was on average 25.5 days per person per year, with a median of 3 days (15). One third of the population did not have any days of sick leave during the year (15). In Norway in 1985, the number of days lost by sickness certification was estimated to be 19.8 per person years (16).

In a Swedish population-based postal survey questionnaire study approximately 40% of the individuals at work mentioned that they had been absent due to illness sometime during the past year (17). Of those who had been absent 90 days or more, two thirds were women (17). A German questionnaire study found that 40% of patients of working age contacting the doctor because of an illness received a sickness certification (18). In a Swedish study, sick leave certificates were prescribed in 9.0% of the patient-physician contacts (19).

2.1.2. Duration of sick leave

The mean duration of the 5042 episodes of sickness certification prescribed in Buskerud county in Norway in 1985 was 34 calendar days for both sexes (20). Mean duration increased with age, ranging from 16 calendar days in 16-19 year-olds to 57 calendar days in 60-69 year-olds (20). In contrast to duration, the incidence of sickness certification peaked in the 20-29 year-olds, and there was no increase with age (20). In Sweden in 1985, almost 50% of all episodes of sick leave lasted between 1-3 days, 80% lasted up to a week and 3% lasted longer than 90 days (15). A Swedish population based study showed that on average, 31 days were issued in a single certificate (21). Although 60% of the certificates were issued to women, men had more certified sick leave days than women (21). The results were similar in other Swedish population-based studies: the overall mean duration of sick leave per certificate was 32 days, the mean duration was 42 days for psychiatric diseases, 36 days for musculoskeletal diseases, and 9 days for respiratory diseases (19). In another Swedish study, the mean length of the certified sickness period was 25.7 days while the median was 14 days (22).

In a Finnish questionnaire study among 43 chief medical officers, the sick leave prescribing practices after operations of general surgery in different hospitals seemed to be quite uniform. The average length of sick leave was 3-4 weeks. However, after some operations, the variation in the length of sick leave was greater; 1-5 weeks (appendectomy) or 3-9 weeks (mastectomy and the evacuation of axilla). (23)

2.1.3. Economic consequences of sick leave

From a societal perspective, sick leave has been estimated to be the single most expensive component of costs in medical practice, even more expensive than drug prescriptions (24). A Swedish questionnaire study demonstrated that when the costs of prescribed tests, procedures, medication, sick leave and referrals as measures taken by a physician were compared, the costs for sick leave constituted 59% of the total costs, being significantly the most cost creating measure in general practice (24). The amount of sickness benefits the Social Insurance Institution of Finland paid out in year 2012 was over 862 million euro (11). The actual economic consequences of sick leave are even greater, when the costs due to employing the replacement workers and production losses are taken into consideration.

2.1.4. Problems in sickness certification experienced by doctors

A number of Swedish studies have concentrated on the problems that physicians have in sickness certification and work ability assessment (25-35). A survey of all physicians in Sweden showed that sickness certification is a common task for a physician: 67% of physicians had sickness-certification consultations and of those, 83% had at least one such consultation a week (33). However,

the process of prescribing sick leave is often viewed as problematic, particularly by primary care physicians (25,26,30-33) and orthopaedic surgeons (25,32). In a questionnaire study, physicians with longer medical experience and those with support at the clinic were less likely to report of problems with prescribing sick leave (26).

Questionnaire studies conducted with physicians found that issues rated as problematic concern assessing work ability, estimating optimal length and degree of absence, handling situations in which the physician and the patient had different opinions on the need for sick leave and issuing prolongation certificates when the previous certificate was issued by another physician (30-32). Also insurance-associated dilemmas were frequent and concerned the grading of work incapacity, the duration of a sick-leave period and the difficulties in interpreting the sickness insurance legislation (34). Physicians also stated that they found it difficult to provide sickness certificates and expressed frustration over an altered concept of disease, problems in assessing work capacity, lack of time, labour market issues, limited resources for care and rehabilitation, and lack of management and support in their work (35). In a qualitative interview study, many physicians described feelings of fatigue and a lack of pride in their work with sickness certification tasks, as they believed they contributed to unnecessary sickness absence and to medicalization of non-medical problems (29). Many of the problems seem related to inadequate leadership and management of sickness certification issues (29).

The focus on biomedical diagnosis in the sickness certificate was found to complicate the certification routines, since working capacity may be reduced even though a

diagnosis has not been confirmed (34). The main reasons for certifying unnecessarily long sick leave periods were long waiting times in health care and in other organizations (31,32), and younger and male GPs more often reported doing this to avoid conflicts with the patient (31). Furthermore, 10% of primary health care physicians felt threatened by patients, at least once per month, in relation to sickness certification and more than 10% were worried about getting reported to the disciplinary board (25). Some GPs were not comfortable with carrying the full responsibility of deciding whether a patient would get monetary sick leave benefits or not (27).

In a Swedish interview study conducted with GPs, all the participants talked about wanting to reduce sick leave prescribing, though all experienced barriers preventing this change. Barriers within the healthcare system included: the complexity of clinical judgments, the physician's competence – especially, poor skills in handling situations where there are conflicting perceptions of the need for sickness certification, the performance of other healthcare professionals, and deficiencies in the healthcare system itself. Barriers outside the healthcare system included: general attitudes to sick leave and benefits, the labour-market situation, patients' social problems, and the performance of and collaboration with other stakeholders. (28)

2.1.5. The double-role of physician

When sick leave prescribing and the related problems are considered, the issue of the so called double-role of the physician often appears. The double-role means that on the one hand, physicians have a central role as gatekeepers of the social security system in order to provide sickness benefit only to those

who have a medically acceptable cause of sickness absence. On the other hand the physician is supposed to be the patient's advocate, guaranteeing that the patient obtains his or her rightful part of the common resources. (36,9)

According to an interview study, all the GP participants were aware of a possible conflict between the interests of society and patients (27). Many certifying physicians seem also to have been under considerable pressure, owing to the conflicting interests of patients and authorities (31,37). The double role in sickness certification was perceived as more difficult by primary care physicians than hospital physicians, which may be because primary care physicians see themselves as treating the whole person, rather than a sick or injured body part (25).

2.1.6. Sickness certification in connection to work ability assessment

In a British cross-sectional nationwide postal survey, the majority of GPs reported that they always or often asked their patients about their work status to be more informed when making their decision on sickness certification (38). In Finland the information about the occupation of a patient or work description is required in the sickness certificate form.

In Sweden, about 60% of physicians found it problematic to assess the work capacity of patients and provide a prognosis regarding the likely duration of work incapacity (33). Finding these tasks problematic was most common in primary health care, but also physicians in psychiatric, neurologic, and orthopaedic clinics reported problems with these tasks (33). It also seems that patients' assessment of their own work capacity can be useful in sickness certification (39-41). In a Norwegian

questionnaire study, the agreement between work ability assessments made by patients and GPs was high (39). The more stressful or physically strenuous their jobs, the more patients assessed their work ability as reduced (39). The GPs assessed work ability as more reduced the more their assessments were based on clinical findings (39). Norwegian researchers also found that work ability assessed by patients may be a useful prognostic indicator of duration in prolonged episodes of certified sickness absence (40). A Swedish questionnaire study for GPs and their patients showed that the strongest indicators for sickness certification were the assessments of reduced work capacity given by patients and GPs (41). Concordance between physicians and patients on this assessment was notable (41). In a Norwegian study of the doctors' ability to predict the duration of their patients' certified sickness absence, they accurately identified patients with a poor prognosis of returning to work (42). The predictions for return to work were highly accurate in short-lived (< 2 weeks) episodes, but the ability to predict returning to work after longer episodes (3-20 weeks) of sickness absence was weak (42).

2.1.7. Completion of sickness certificates

Swedish researchers have analyzed sickness certificates received at the social insurance offices (43). According to them, when issuing sickness certificates physicians often fail to contribute the information required about functional capacity and other important aspects. Information provided in the certificates was often not sufficient to allow social insurance officers to determine eligibility for sickness benefits. Qualitative analyses of certificates from GPs revealed that 21% contained ambiguous statements about the medical disorder, 30% were unclear regarding

the assessment of functional capacity, and 22% required additional information on both these aspects. Sickness certificates issued by GPs and physicians under specialist training, as compared with other categories of physicians, more often provided essential data, for example concerning the patient's occupational tasks and type of employment. (43)

2.1.8. Training in sickness certification

Lack of training in sickness certification seems to be common (38,44). In Finland, estimating the need for and adequate length of sick leave is not included in the curriculum of medical students. Prescribing of sick leave appears to be solely dependent on the experience, impressions and customs of each individual doctor. According to a British cross-sectional nationwide postal survey, almost three-quarters of GPs reported that they had not received any training in sickness certification (38). Another British questionnaire study demonstrated that the majority of the GPs (63%) had received no training in sickness certification, and the mean length of time for those who had received training was 4.1 hours (44). Nevertheless, training did increase GPs' confidence to issue certificates and encouraged the majority to issue certificates they considered to be more appropriate, but it did not alter the number of certificates issued (38).

In UK, a study has examined whether education can change the behaviour of clinicians (45). It was shown that teaching an evidence-based approach to primary care dentists may not produce readily detectable changes in clinical practice (45). However, another study in diabetes care suggests that local guidelines disseminated via practice-based education of clinicians improved the management of the disease (46). A Cochrane systematic review

indicated that educational meetings alone, or combined with other interventions, can improve professional practice and healthcare outcomes for patients (47).

2.1.9. The effect of providing guidelines for sickness certification

In 2005, the Swedish government asked the National Board of Health and Welfare and the Social Insurance Agency to develop sickness certification guidelines. The efforts of these two agencies resulted in two sets of recommendations: overarching guidelines covering the principles relating to sickness certification and diagnosis-specific guidelines for duration and degree (full or part time) of sick leave for a large number of diagnoses (48,49). Unfortunately, there was (and still is) only a very limited knowledge base regarding the need for, or consequences of being on, sick leave for a certain number of days among people with different conditions and having different work tasks (50).

It appears that the development of the guidelines was not based on scientific evidence or even on particular studies. Instead, groups of clinicians with expertise in handling specific diagnoses were asked to give recommendations about the duration and degree of sickness absence for the most prevalent sick-leave diagnoses. The suggested guidelines were first tested by several GPs and were found to be useful. In October 2007, the guidelines were introduced in the whole country and were made available at the website of the National Board of Health and Welfare (48,49).

According to a questionnaire study, one year after introduction, a majority (76.2%) of the GPs reported that they used the guidelines (49). Two-thirds of the general practitioners reported that

the guidelines had facilitated their patient contacts and one-third that it facilitated their contacts with social insurance, other healthcare staff and employers (49). One-third stated that the guidelines had been helpful in competence development and improved the quality of their management of sickness certification cases (49). In addition, statistics from the Swedish Social Insurance Office show that between 2005 and 2009, there was a sharp decline in the number of days of sick leave benefit, from 82.9 to 43.7 million/year (51).

These Swedish guidelines have also been translated into Finnish and are available for Finnish doctors on the internet pages of Finnish Institute of Occupational Health (52). However, the use of these guidelines is not mandatory, and prescribing different amount of days of sick leave than recommended is possible. The existence of these guidelines may not yet be well-known among Finnish doctors.

2.1.10. Sickness presenteeism

Most people diagnosed with a disease or disorder still go to work and are not sick listed (53). The term "presenteeism" is used to describe situations where the ability to work is impaired due to disease, but yet the person goes to work. A problem is that the term "presenteeism" implies that being present at work is something exceptional if a person is sick, when in reality most people continue to

work despite health problems. On the other hand, in some cases sickness presenteeism and absenteeism can be reverse sides of the same issue: If there is an intention to reduce the amount of sickness absence, the amount of presenteeism can increase at the same time. As presenteeism results in productivity loss, a reduction in the amount of sickness absence may not save costs to the extent expected.

In a Norwegian interview study, car mechanics expressed a strong will to attend work and were reluctant to make the decision of calling in sick for work (54). Three main themes were revealed at stake during the decision-making process of choosing absence or attendance when feeling ill: degree of illness experienced, daily life habits, and the importance of the job (54). In a Swedish postal survey 53% of the respondents reported working despite sickness on more than one occasion during the preceding year (55). Having a health problem is a strong determinant of sickness presenteeism (55). For any given health status, there are certain other factors that impact on the risk of sickness presence, such as difficulties in staff replacement, time pressure, insufficient resources, and poor personal financial situation (55). Among Finnish healthcare workers, sickness presenteeism was more common than absenteeism (56). Job satisfaction explained the probability and magnitude of presenteeism, but not absenteeism (56).

2.2. Factors associated with patient

2.2.1. Disease of the patient

Some, mostly population based studies have investigated which are the most common diseases to cause the loss of working ability and thus sick leave. Most studies agree that musculoskeletal conditions (11,14,16,18,21,

22,38,40,45,57-59) and mental disorders (11,14, 16,21,38,40,45,59) accounted for the majority of sick leave days. Respiratory system diseases (16,57,58) and injuries (11,16,21,58) were also common causes of sick leave.

2.2.2. Age of the patient

The results of previous studies concerning the sick leave and the age of the patient are nearly unanimous. Older age was associated with longer periods of sick leave (15,20-22,36,40) or higher sickness absence rate in Scandinavian studies (16,60) and in a British study (14). However, a Swedish population-based study found that the sickness absence incidence decreased by age, although the absence duration increased (15). Also a British study found that the sickness absence rate decreased slightly before retirement (14). The common explanation for these findings is that chronic diseases are more common in older people and the severity of disease also increases with age.

2.2.3. Gender of the patient

Some, mostly population based studies have concerned the relationship between gender and sick leave. Two studies from Scandinavia (15,61) and two from the UK (14,58) suggest that women have higher rates of sickness absence than men. According to a Swedish study, women were more likely than men to have long or multiple sick leave (90 days or more during the past year) (17). Women also seem to receive part-time sickness certification more often than men (22,36,62). Nevertheless, some studies from Scandinavia (20,36) and Germany (18) found no sex differences in sickness absence rates.

2.2.4. Work of the patient

There is no consensus on how the work of the patient affects the amount of sick leave. A Norwegian questionnaire study found no significant association between work demands and the duration of sickness absence (40), and a questionnaire study from Germany suggested that only small differences could be detected in sick leave rates of patients with different

occupations (18). On the other hand, a prospective follow-up study from Finland found that sickness absence was roughly three times more common among manual workers than among managers and professionals, and physical working conditions were the strongest explanatory factors for this difference (63). Also a population-based study from the UK found an inverse association between employment status and sickness absence (the lower the status the higher the rate of absence) (58). In addition, blue-collar occupations have been reported to have the highest sick leave rates in a Swedish longitudinal study (61).

2.2.5. Social and occupational factors

Social and other factors seem to influence the decisions on whether or not to prescribe sick leave (64). In a Norwegian questionnaire study for patients and their doctors, the doctors reported that social and occupational factors influenced their decision to issue a medical certificate in 22% of the patients they had certified sick (in 16% of the patients occupational problems were stated as the reason, in 2% non-occupational problems, and in 4% a combination of the two) (65). According to the doctors, social problems were rarely the only reason for issuing medical certificates for sick leave (65). In a Swedish case-crossover study an increased risk of sick leave was found after the respondents had been exposed to problems in their relationship with a superior or colleagues in the previous 2 workdays (66). Furthermore, respondents were more inclined to report themselves sick on days when they expected a very stressful work situation, than on days when they did not (66).

In a Finnish 7-year follow-up study, the changes in the job characteristics of the workers during the recession predicted their subsequent sick

leave (67). Lowered job control increased the risk of sick leave. Decreased social support and increased job demands had similar effects. The highest risk of sick leave was associated with the combined effects of low job control, negative changes in job control, job demands and low social support (67). A French 6-year prospective study demonstrated that low decision latitude, low social support, and low satisfaction with social relations increased the incidence of sickness absence (68). Job satisfaction and the stability of working conditions were also strongly related to sickness absence with higher amounts in those who reported low job satisfaction (69) or unstable working conditions (22).

In Finland it is not possible to certify a patient sick for social or occupational factors. The sickness certificate can be issued, and the sickness benefits paid only when the loss of the working ability is caused by an illness or an injury (3).

2.2.6. The history of sickness absence

The history of sickness absence of the patient has been found to predict future sickness absence (70,71). The results obtained from a cohort study in Brazil provide evidence that the higher the number of prior sick leave episodes, the greater is the hazard of presenting a new episode (71). A retrospective study from Netherlands suggests that the employees who are more likely to have an above average sickness absence can be identified from their history of sickness absence in

the past 2 years (70). Episodes of sickness absence in the past year predicted up to 25% of future episodes of sickness absence, and the predictability of episodes of sickness absence increased to 30% when the past 2 years of sickness absence were analyzed (70).

2.2.7. Patient influence on sick leave

Patients appear to have a strong influence on sick-listing practice: even in cases where the GP would not recommend sick-listing a certificate was issued in 87% in a Swedish medical audit study (22). Also in a Swedish case vignette study, physicians sick-listed patients who wanted sick leave to a greater extent than those who were reluctant to have absence from work (72). A Norwegian questionnaire study showed that if the patients took the first initiative for certification, 95% received a certificate, while 84% were certified sick when the doctors took the first initiative (73). However, in another questionnaire study from the UK most general practitioners felt that patients and physicians have equal influence on the duration of sickness certification (44).

The physician's previous knowledge about patient increased the likelihood of writing sickness certificates. In a Norwegian cross-sectional study patients had 53 times greater chance of getting a sickness certificate if the physician knew them well than if he/she did not (74).

2.3. Factors associated with physician

The role of the physician in the sick-listing process has been debated, with physicians' attitudes and pattern of sick leave certification prescription reported (9,75,76). Sick leave prescribing practices of physicians have been

shown to vary considerably (23,24,64). A Swedish case vignette study found a six-fold difference in total cost between the "cheapest" and "most expensive" physician based on their practices for prescribing sick leave (24).

2.3.1. Gender of the physician

The effect of the gender of a physician on sick leave prescribing practices appears to be ambiguous. In most Scandinavian studies - both case vignette studies and cross-sectional surveys with real patients - male and female physicians prescribed equal amounts of sick leave (19,24,77). Neither the completion of sickness certificates was dependent of the gender of the certifying physician (78).

A Swedish case vignette study suggests that female doctors sick-listed a patient more often than male doctors (72) and a Swedish questionnaire study showed that female doctors sick-listed a larger proportion of their patients than male doctors (22). However, opposite findings have also been reported: in questionnaire studies from Sweden and the UK, female physicians reported issuing fewer sickness certificates than male physicians (26,38).

A British study based on collected copies of sickness certificates found that the gender interaction between physician and patient may affect the sick leave prescribing. Certification of male patients by male GPs was significantly associated with increased prevalence of intermediate length (6-28 week) sickness certification, compared with females certified by females. This result was replicated in the subgroup of patients with mild mental disorder-related sickness absence. However, the gender interaction was not associated with the prevalence of long-term (>28 week) sickness certification. (79)

2.3.2. Age of the physician

Earlier studies suggest that there is positive correlation between the age of the physician and the amount of sick leave (24,60,77): In

Scandinavian cross-sectional questionnaire studies, older physicians issued more sickness certificates (77), and the duration of episodes of sickness certification was longer than those issued by younger physicians (24,60). However, a Swedish case vignette study showed no association between the age of the physician and the duration of sick leave (72). The quality of the sickness certificates was not dependent on the age of the certifying physician (78).

2.3.3. Working experience of the physician

Some Swedish studies have assessed the effect of the working experience of the physician on the amount of sick leave prescribed. The results of these studies seem consistent: physicians with long experience issued more sickness certificates in a questionnaire study (77), and sick leave of longer duration in a population-based study (19). In addition to sick leave, physicians who had worked more years also tended to prescribe more diagnostic tests and drugs in a case vignette study (24). However, another case vignette study did not observe any correlation between the duration of sick leave and the working experience of the physician (72).

2.3.4. Specialty of the physician

The effect of the specialty degree of the physician on sick leave prescribing practices has been evaluated in different studies. In two Swedish case vignette studies no association was found (24,72). In a British questionnaire study GPs with no additional qualifications reported issuing fewer certificates than those with an additional qualification (38). In a Swedish retrospective population-based study the duration of the sick leave was significantly different in physicians with different levels of professional experience: the mean duration of

sick leave period prescribed by GPs was 37 days, and by GP trainees 26 days (19). However, a Norwegian cross-sectional study showed opposite results, with the patients of specialists in general practice having significantly shorter episodes of sickness certification than those of GPs with no specialty degree (60).

The area of specialty seems to have an influence on the length of sick leave. In a Swedish case vignette study GPs sick-listed a patient more often than orthopaedic surgeons, with psychiatrists sick-listing more than GPs (72). On the other hand, a Swedish population-based study showed that GPs sick-listed patients for shorter periods than other physicians (36). Occupational health care physicians used partial sick-listing more than other physicians (36). These findings have been explained by the possibility that the various categories of physicians take different views on the pros and cons of sick-listing and use of the certification instrument with different degrees of skill (36).

2.3.5. Other physician-related factors

A Swedish questionnaire study showed that physicians working part time issued more sickness certificates than those working full time (77). Another Swedish questionnaire study found that neither the presence of a sick-listing policy nor participation in insurance medicine education were associated with the number of prescribed sickness certificates (26). Furthermore, there was no association between doctors' attitudes (the degree of liberality or restrictiveness) towards sickness certification and the duration of the episodes in a population-based study in Norway (60).

2.3.6. Local structural factors

There is limited information from Swedish studies on the influence of local structural factors on physicians' sick-listing practices. Postal code, local community population size, presence of a hospital in the area and the distance to a nearest hospital were used as indicators of local structural factors. Considerable variation in the length of the sick-listing certificates and of the amount of sick-listing episodes was found between counties, between communities of various sizes and between communities with or without a hospital in the area (21). Certificates from small municipalities tended to be shorter than those from large municipalities in a population-based study (21). Also the physicians working in municipalities with no hospital issued shorter certificates than physicians working in areas with a hospital (21). However, a case vignette study found that longer sick leave was prescribed by doctors working at some distance from hospitals, compared with those working near a hospital (24).

2.3.7. Concluding remarks from the review of literature

There are numerous studies about long term sickness absence, and with register data it is possible to evaluate the factors related to this issue. However, short term sickness absence is also common but the knowledge of these absence periods is very limited and the findings of the few studies on this topic are inconsistent. The results of studies conducted in one country are difficult to generalize to other countries. However, the impression remains that there is variation to some extent in the length of sickness absence periods as well as in the sick leave prescribing practices of health care professionals.

3. AIMS

The purpose of this thesis was to examine the prescribing of sick leave by doctors and dentists, the extent of any variation in practices, whether clinician-related factors and local structural factors affect any variation, and the economic consequences of varying practices. The specific aims were:

1. To study prescribing of sick leave by primary health care physicians in response to hypothetical patient cases (I).
2. To study actual prescribing of sick leave by dentists and in response to hypothetical patient cases (II).
3. To study prescribing of sick leave by occupational health care physicians in response to hypothetical patient cases, and to compare the prescribing practices of occupational health care physicians and primary health care physicians (III).
4. To study prescribing of sick leave by surgeons in response to hypothetical patient cases, and to find out whether earlier training in prescribing sick leave affects the practices, and whether the surgeons take the nature of the work of the patient into account while prescribing sick leave (IV).

4. MATERIALS AND METHODS

Postal survey setting was chosen to examine sick leave prescribing practices. Four questionnaire studies with hypothetical patient

cases were conducted among primary health care physicians, occupational health care physicians, surgeons and dentists.

4.1. Sampling

Details of the four samples are described in Table 1.

Table 1. Descriptive characteristics of the health care professionals of all 4 samples.

	Primary health care physicians	Occupational health care physicians	Surgeons	Dentists
Sample	300	683	762	1894
Participants, n	165	356	338	1132
Participation, %	55.0	52.1	44.4	59.8
Women, %	74.8	63.1	36.1	67.5
Having a specialty degree, %	50.6	69.7	82.7	15.5
Age in years (SD)	45.2 (11.2)	49.3 (8.4)	46.6 (10.1)	49.5 (8.4)

4.1.1. Primary health care (PHC) physicians (I)

According to statistics of the Finnish Medical Association, the number of physicians working in primary health care in Finland in 2009 was approximately 3500. A sample of 300 physicians was randomly selected from the register of the Finnish Medical Association, representing approximately 10% of all such physicians. The sample was proportional to the number of practicing physicians in the five health care districts of Finland.

4.1.2. Occupational health care (OHC) physicians (III)

In 2011, there were 1365 physicians in Finland who worked mainly in occupational health care, according to the membership register of

the Finnish Medical Association. Alternate names on the register were selected, so the survey was based on a sample of 683 physicians working in occupational health care.

4.1.3. Surgeons (IV)

The survey was based on a sample of 762 actively working surgeons drawn from the membership register of the Finnish Medical Association. The sample was proportional to the number of practicing surgeons in different subspecialties so that alternate surgeons in each subspecialty were included in the sample. The following subspecialties were included: general, gastroenterological, hand, plastic, thorax, vascular and urological surgery. The following subspecialties were excluded:

pediatric, orthopedic, oral and maxillofacial, and neurosurgeons. The surgeons of the included subspecialties usually perform operations of general surgery while on-call, thus they were expected to be familiar with most of the patient cases to be used in our study.

4.1.4. Dentists (II)

A sample of actively working dentists was drawn from the membership register of the Finnish Dental Association. The sample was

stratified according to principal work place: public dental services (PDS) or private sector. For dentists working in PDS, the sampling was conducted so that in small hospital districts (30 dentists or less working in PDS) all the dentists were sampled, and in the large hospital districts (more than 30 dentists working in PDS) alternate dentists listed were selected. For dentists working in the private sector, a similar sampling approach was used. All dentists working in hospitals were included in the sample.

4.2. Data collection

4.2.1. PHC physicians (I)

A questionnaire together with a prepaid return envelope was sent in the spring of 2009 to the sample physicians. The return envelopes were marked to detect participants in order to enable repeated mailings to non-participants only, although the questionnaires were anonymous. Three attempts were made to contact the non-participants by phone. If reached, they were encouraged to participate, and new questionnaire forms with prepaid return envelopes were mailed.

4.2.2. OHC physicians (III) and surgeons (IV)

A questionnaire was sent to the sample physicians and surgeons in February 2011. The prepaid return envelopes were marked to detect participants in order to enable repeated mailings to non-participants only, although the

questionnaires were anonymous. Two months after the dead-line for returning the first questionnaire, non-respondents were sent a second questionnaire with prepaid return envelopes and a letter from the professor of occupational health care or surgery, encouraging them to participate.

4.2.3. Dentists (II)

A questionnaire was sent to the sample dentists in the Autumn of 2010 together with a prepaid return envelope. The questionnaires were anonymous though the return envelopes were marked to detect respondents so that repeated mailings could be sent to non-respondents only. Non-respondents were sent an e-mail reminder to participate, and a second questionnaire was mailed two months after the dead-line for returning the first questionnaire.

4.3. Questionnaire

At the beginning of all questionnaires, the purpose of the study was described and the recipients were told that participation was

voluntary and anonymous. It was emphasized, that all responses would stay confidential and the responses would only be processed and

published as mean values and percentages. The participants were informed that results were to be published in an appropriate international scientific journal. This introduction was signed by a professor or an experienced educator in each specialty, and a professor of public health. The questionnaire form was altered and improved during the research project, so the background questions were slightly different in each group of health care professionals. For example, possible earlier training in prescribing sick leave was evaluated only in the questionnaire to surgeons, and only dentists were asked about their actual prescribing practices. The patient cases were also different in surveys with surgeons, dentists and physicians.

4.3.1. PHC physicians (I)

The first set of questions covered socio-demographic background such as age, sex and the physician's working municipality. This was followed by questions dealing with years worked as a physician, whether under training or having a degree in a medical specialty, area of specialty and whether employed directly by the health authority.

4.3.2. OHC physicians (III)

The first set of questions covered socio-demographic background information: age, sex and the postal code of the municipality where the physician mainly worked. This was followed by questions dealing with factors related to work and training: years worked in occupational health care, possible degrees in a medical specialty, specialty areas, main working sector, numbers of working hours per week as a physician in general and in the occupational health care, and the size of any hospital in the municipality where the physician mainly worked.

4.3.3. PHC physicians and OHC physicians (I,III)

PHC physicians and OHC physicians received the same 19 hypothetical case simulations representing typical primary health care and occupational health care patients (Appendix 1). The cases were created in co-operation with experienced specialists in primary health care. A pilot study with five experienced PHC physicians was conducted to make sure that the cases were relevant and easy to understand. The relevancy of the patient cases in occupational health care was confirmed by a professor of OHC. The pilot study was not repeated among OHC physicians.

All cases included information about the patient's age, sex, occupation, brief description of symptoms and the ICD-10 diagnosis, for example: *Patient: 23-year-old female, barmaid. Symptoms: Typical common cold, no fever. Diagnosis: J06.9 Acute upper respiratory infection.* The physicians were asked to consider each case as a typical non-complicated patient attending an initial visit on a Monday morning, and to evaluate how many days of sick leave he/she would prescribe to each patient according to his/her usual practice. Eighteen different diagnoses were chosen for the cases; two patients had the diagnosis of depression: a 26-year-old woman and a 45-year-old man.

4.3.4. Surgeons (IV)

The first set of questions covered socio-demographic background information: age, sex and the postal code of the catchment area of the municipality where the surgeon mainly worked. This was followed by questions dealing with factors related to work and training: years worked as a surgeon, possible degrees in a medical specialty and specialty areas, whether working in the private or public sector, numbers

of weekly working hours as a doctor in general and as a surgeon, and the classification of the hospital where the surgeon mainly worked. The participants were also asked about training in prescribing of sick leave: if they had received training on estimating the amount of sick leave days for a patient, and if they feel they need such training.

Next, respondents were presented with 19 hypothetical case simulations representing typical patients of a surgeon (Appendix 2). The cases were created in co-operation with an experienced specialist in surgery, who works in university hospital and is involved in running training programme of surgery. A small pilot study was conducted to make sure that the cases were relevant and easy to understand. All cases included information about the patient's age, sex, occupation, brief description of symptoms or the diagnosis, and the treatment conducted, for example: *Patient: 45-year-old female, secretary. Diagnosis: Cholelithiasis. Operation: Excision of gall bladder (laparoscopy)*. The surgeons were asked to consider each case as a typical non-complicated patient on a Monday morning, and to evaluate how many days of sick-leave he/she would prescribe for each patient according to his/her usual practice. Twelve different diagnoses were chosen for the cases. A number of the patient cases included identical diagnosis or treatment so that only the occupation of the patient was altered (office work versus physical work).

4.3.5. Dentists (II)

The first set of questions covered socio-demographic background information; age, sex and the population in the catchment area of the municipality where the dentist mainly worked. This was followed by questions dealing

with factors related to dental work and training; years worked as a dentist, degrees in a dental specialty, specialty areas, and whether working in the private or public sector. Because prescribing sick leave is not a part of every dentist's daily practice and dentists prescribe sick leave less frequently than doctors, the participants were also asked if they had ever prescribed sick leave, when was the last time they prescribed sick leave, how many patients had been prescribed sick leave during the preceding year, and estimated duration of sick leave most commonly prescribed.

Next followed 16 hypothetical case simulations representing typical dental patients (Appendix 3). The cases were created in co-operation with experienced specialists in periodontology, restorative care, prosthodontics and oral rehabilitation, and oral and maxillofacial surgery. A pilot study among experienced dentists was conducted to make sure that the cases were relevant and easy to understand. All cases included information about the patient's age, sex, occupation, brief description of symptoms, the ICD-10 diagnosis and the treatment required, for example: *Patient: 23-year-old male, electrician. Symptoms: Extraction of right upper wisdom tooth D18, no complications. Diagnosis: Partly erupted upper wisdom tooth D18, ICD K01.0. Procedure: Ordinary extraction*. Nine different diagnoses or treatments were chosen for the cases. A single diagnosis or treatment was used in multiple patient cases so that the age, sex and occupation of the patient could be altered. The dentists were asked to consider each case as a typical non-complicated patient attending an initial visit on a Monday morning, and to evaluate how many days of sick-leave he/she would prescribe to each patient according to his/her usual practice.

4.4. Categorization of the variables

4.4.1. PHC physicians (I)

The physician's specialty status was classified (no specialty degree, i.e. general practitioner, or having a specialty degree). The physician's clinical working experience in years was used both as a continuous variable and dichotomized (under 20 years, or 20 years or more). The dichotomy of working experience was used in the final analyses. The population of physician's working municipality was collected from the Statistics Finland based on the postal code. This was used as such and also a dichotomy was formed (municipality under 100,000 inhabitants, or 100,000 inhabitants and over). For each municipality the type of available health care facilities were classified (university hospital, central hospital, district hospital, health center hospital, or none) and a dichotomy was formed (central hospital or university hospital, or no central hospital or university hospital). The physician's employment status was used to form a dichotomy (not employed directly by a health authority, or direct employment).

Diagnoses were also classified into groups. The musculoskeletal group included the cases of lumbago, tension neck, tennis elbow and sprain of the ankle. The psychiatric group included two depression cases, burn out and hangover. The trauma group included wound, sprain of the ankle and burn cases. The infection group included common cold, pneumonia, gastroenteritis, shingles and urethritis. The chronic diseases group included tension neck, vertigo, eczema and chronic obstructive pulmonary disease (COPD). The number of days of sick leave for each simulated case was studied separately, and an overall variable was formed by summing up the days of sick leave for all 19 cases.

4.4.2. OHC physicians (III)

The physician's specialty status was classified (having a specialty degree, or not) and also (having a specialty degree in OHC, or other). The physician's clinical working experience in occupational health care in years was used both as a continuous variable and dichotomized (20 years or less, or more than 20 years). The population of the main working municipality was collected from the Statistics Finland based on the postal code. This was used as such, and categorized (20,000 inhabitants or less, 21,000 to 50,000 inhabitants, 51,000 to 100,000 inhabitants, or more than 100,000 inhabitants). A dichotomy was also formed (small area of 100,000 or less inhabitants, or large area of more than 100,000). For each municipality the type of available health care facilities were classified (university hospital, central hospital, district hospital, health center hospital, or none). The main working sector of the physician was classified (public health center, private practice, employer clinic, or other) and a dichotomy was formed (working in public health center, or other). Diagnoses were also classified into groups as in the study with PHC physicians. The number of days of sick leave for each simulated case was studied separately, and an overall variable was formed by summing up the days of sick leave for all 19 cases.

4.4.3. Surgeons (IV)

The surgeons were dichotomized to those who had the degree of clinical specialty in surgery, and to those who had not (i.e. were still in the surgical training programme). The surgeon's clinical working experience as a surgeon in years was used both as a continuous variable and

dichotomized (15 years or less, or more than 15 years). The surgeon's age was used both as continuous variable and dichotomized (45 years or less, or more than 45 years). The population of the main working municipality was collected from Statistics Finland based on the postal code. This was used as such, and dichotomized (200,000 inhabitants or less, or more than 200,000 inhabitants). The classification of the hospital where the surgeon mainly worked was categorized (university hospital, central hospital, district hospital, health center, and private practice). This was also dichotomized (large hospital i.e. university or central hospital, or other). The number of days of sick leave for each simulated case was studied separately, and an overall variable was formed by summing up the days of sick leave for all 19 cases.

4.4.4. Dentists (II)

The dentist's specialty degree was dichotomized (having a specialty degree, or not) with further dichotomies for the different specialties (having the specialty, or not). The dentist's clinical working experience in years was used both as a continuous variable and dichotomized (under 20 years, or 20 years or more). The population of the main working municipality was categorized (less than 20,000 inhabitants, 20,000 to 49,000 inhabitants, 50,000 to 99,000 inhabitants, and 100,000 inhabitants or more). A dichotomy was also formed (small area of < 100.000 inhabitants, or

large area of 100.000 or more). The dentist's employment status was dichotomized (direct employment by the public health authority, or not). The main working sector of the dentist was dichotomized (private practice, or PDS). A dentist working in PDS can also have part time employment in e.g. private practice, employer clinic, charity clinic or foundation, and thus these dentists were also dichotomized (working only in PDS, or others). A dichotomy of sick leave prescribing during a previous year was made (had prescribed sick leave, or had not). The number of days of sick leave for each simulated case was studied separately, and an overall variable was formed by summing up the days of sick leave for all 16 cases.

4.4.5. All studies (I-IV)

To estimate the possible economic consequence of sick leave prescribing practices from the societal perspective, the age, sex and occupation specific mean salaries from official statistics were used for each patient case. Because all costs were estimated from the societal perspective, the role of social security reimbursements was not considered. These are transfer costs, and do not affect the overall cost estimates. The production losses of the sick leave prescribing practices were estimated by applying the computation formula of the Finnish Employers' Association: total societal productivity loss of a day of sick leave equals three times the daily gross salary (80).

4.5. Statistical methods

4.5.1. PHC physicians (I)

The statistical evaluation of the data was based on chi-square test for proportions and Student's t-test for means. The distributions of sick leave days of all cases together were close to normal.

Univariate linear regression models were used for each patient case, and both fixed and stepwise ordinary least square multiple linear regression models with selected background variables were fitted for the overall number of

sick leave days the physician prescribed for the 19 hypothetical patient cases.

4.5.2. OHC physicians (III)

The statistical evaluation of the data was based on chi-square test for proportions and Student's t-test for means. The distribution of sick leave days of all cases together was close to normal. Multiple ordinary least square linear regression models were fitted in a fixed and stepwise manner to study the effects of the selected background variables on the overall number of sick leave days the physician prescribed for the 19 hypothetical patient cases, while simultaneously controlling for the effects of other background variables.

4.5.3. Surgeons (IV)

The statistical evaluation of the data was based on chi-square test for proportions and Student's t-test and paired sample t-test for means. The distribution of sick leave days of all cases together was close to normal. Many of the studied background variables correlated significantly with others. Univariate analyses showed significant associations with the numbers of sick leave days, also in situations where the variable under study was actually reflecting the effect of another, correlating variable. Multiple ordinary least square linear

regression models were fitted in a fixed and stepwise manner to study the effects of the selected background variables on the overall number of sick leave days the physician prescribed for the 19 hypothetical patient cases, while simultaneously controlling for the effects of other background variables. Collinearity testing was conducted to ensure that multicollinearity did not disturb the multivariate analyses.

4.5.4. Dentists (II)

The statistical evaluation of the data was based on chi-square test for proportions and Student's t-test for means. The distributions of sick leave days of each of the 16 cases and of all cases together were close to normal. Multiple logistic regression models were fitted in fixed and stepwise manner to study the effects of the selected background variables on the probability that the dentist prescribed sick leave during the preceding year, while simultaneously controlling for the effects of other background variables. Similarly, multiple ordinary least square linear regression models with collinearity testing were fitted in a fixed and stepwise manner with the same background variables for the overall number of sick leave days the dentists prescribed for the 16 hypothetical patient cases.

4.6. Ethical considerations

Because the questionnaires were directed to practicing health care professionals and hypothetical patient cases were described, the ethical committee of University of Turku and the Hospital District of Southwest Finland decided that their approval was not required. The data collection was based on samples drawn from membership registers of the

Finnish Medical Association and the Finnish Dental Association. The permissions for sampling and delivering the addresses of health care professionals were granted by the executive director and the vice executive director of the Finnish Medical Association and the Finnish Dental Association. (I-IV)

5. RESULTS

5.1. Respondents

The effective sample sizes comprised 300-1894 health care professionals. The response rate was highest among dentists, close to 60%, with response rates over 50% for PHC and OHC physicians. The response rate was lowest among surgeons (44%). (Table 1)

Approximately two-thirds of the physicians and dentists who participated in these studies were

female, while approximately two-thirds of the surgeons who participated were male. The average age varied between 45 and 50 years, with PHC physicians and surgeons being slightly younger than OHC physicians and dentists. In all health care professional groups except the dentists, a majority of the respondents had a specialty degree; only 16% of the dentists had a specialty degree.

5.2. Prescribing in response to hypothetical patient cases

5.2.1. The amount of the sick leave and economic consequences

The total responses to hypothetical cases are presented in Table 2.

Table 2. The amount of prescribed sick leave days to all hypothetical cases together by all 4 samples and economic consequences of these sick leave days.

	Primary health care physicians	Occupational health care physicians	Surgeons	Dentists
	Same 19 patient cases for PHC and OHC physicians (Appendix 1)	19 surgical cases (Appendix 2)	16 dental cases (Appendix 3)	
Mean	97.4	85.8	281.4	31.6
Minimum	42	21	134	0
Maximum	165	170	490	98
Lowest quartile mean	66.5	58.5	207.2	16.9
Highest quartile mean	130.8	115.3	364.2	47.4
Economic consequence, mean	29,400	25,600	117,600	12,000
Economic consequence, minimum	11,800	5,700	56,000	0
Economic consequence, maximum	51,600	51,400	214,500	38,600
Economic consequence, lowest quartile mean	19,800	17,100	85,600	6,300
Economic consequence, highest quartile mean	40,100	34,800	152,500	18,200

On average, PHC physicians prescribed a total of 97.4 sick leave days for the entire group of 19 hypothetical primary care patient cases (I). The difference between the lowest and the highest number of sick leave days prescribed by PHC physicians was almost four-fold. OHC physicians also assessed the same 19 patient cases as PHC physicians. The overall number of sick leave days they prescribed was significantly ($p<0.001$) smaller (85.8 days), but the variation was even greater, with an eight-fold difference noted between the lowest and the highest number of sick leave days (III). In the study with surgeons, the average overall number of days of sick leave prescribed for the group of 19 hypothetical surgical patient cases was 281.4 days with almost four-fold variation (IV). In response to the 16 hypothetical dental patient cases, dentists prescribed a mean of 31.6 days of sick leave. Some dentist did not prescribe any sick leave to any of the patients, and some prescribed nearly a hundred days of sick leave altogether.

Using the evaluation formula of The Finnish Employers' Association the economic consequences to the society of the sick leaves prescribed to all 19 cases by one PHC physician would be 29,400 euro on average, varying between 12,000 and 52,000 euro (I). Among OHC physicians the average consequences would be 25,600 euro, varying between 6,000 and 51,000 euro (III). Among surgeons the consequences would be 117,600 euro, varying between 56,000 and 215,000 euro (IV), and among dentists 12,000 euro, varying between 0 and 39,000 euro (II).

5.2.2. Impact of local structural factors

Significantly more days of sick leave were prescribed by those working in smaller municipalities than larger population centres

(I,III,IV). Among PHC physicians, those working in smaller (<100,000 inhabitants) municipalities prescribed 101.6 days of sick leave to all the patient cases together while those working in larger municipalities prescribed 92.4 days ($p<0.05$). The difference was also statistically significant in the diagnostic group of injuries ($p<0.01$). The presence of a central hospital or a university hospital in the municipality also had an effect on the length of sick leave: those working in a municipality with such hospital prescribed an average total of 94.3 days of sick leave, while those working in a municipality without such hospital prescribed 103.2 days ($p<0.05$). (I)

Among OHC physicians an average total of 88.2 days was prescribed by participants in smaller (<100,000 inhabitants) municipalities and 83.0 days in larger population centres (NS). Four individual patient cases (sprain of the ankle, both depression cases and adaptation disorder) and the diagnostic group of psychiatric diseases also received significantly more days of sick leave in smaller municipalities than in larger ones. Whether or not there was a central hospital or university hospital in the municipality did not affect the length of sick leave. (III)

The surgeons working in smaller (<200,000 inhabitants) municipalities prescribed on average 290.1 days of sick leave to all the surgical cases together, while those working in larger municipalities prescribed 273.4 days ($p<0.05$). Three individual patient cases (lateral epicondylitis and both cases of excision of a lobe of thyroid gland) also received significantly more days of sick leave in smaller municipalities than in larger ones. Among surgeons, the size of the hospital had even greater effect on the length of sick leave than

the size of the working municipality: those working in larger hospitals (university or central hospital) prescribed on average 277.5 days of sick leave while those working in smaller hospitals prescribed 294.9 days ($p < 0.05$). The surgeons working in smaller hospitals also prescribed significantly more days of sick leave than those working in larger hospitals to four individual cases (both cases of excision of a lobe of thyroid gland, radical operation of haemorrhoids and hernioplastia). (IV)

Among the dentists, no correlation between the length of sick leave and the size of the municipality was found (II).

5.2.3. Impact of a specialty degree

There was no consistent impact of a specialty degree of a health care professional on sick leave prescribing. Among primary care physicians, those with a specialty degree prescribed a significantly smaller number of days of sick leave than those without such degree for all cases together and for six individual cases (lumbago, lateral epicondylitis, gastroenteritis, atopic eczema and both depression cases). The same pattern was also observed in most of the other cases, though it the difference did not reach statistical significance. When the cases were sorted in the diagnostic groups, the greatest differences between specialists (27.0 days) and those with no specialty degree (33.1 days) occurred in psychiatric diagnoses ($p < 0.05$), which was the group with the longest sick leaves overall. In other diagnostic groups no statistically significant differences were noticed (I).

In occupational health care, having a specialty degree did not have an effect on the amount of sick leave prescribed. Among the physicians working in OHC, 42% had the specialty degree in OHC and 24% had the specialty degree in

some other area, most commonly in family medicine. Prescribing practices of the OHC specialists did not differ from those of other specialists (III).

In contrast, among surgeons having a specialty degree was associated with a higher number of sick leave days overall, but this did not reach statistical significance. For individual cases, clinical specialists prescribed longer sick leave in 12 out of the 19 cases with the difference reaching statistical significance in six cases (appendectomy, both cases of mastectomy and clearance of axilla, both cases of excision of a lobe of thyroid gland and hernioplastia). (IV)

The dentists who had a specialty degree in oral and maxillofacial surgery prescribed longer sick leave than the dentists with no specialty degree or the dentists with a specialty degree in some other area. The differences were statistically significant for all the cases. (II)

5.2.4. Impact of working experience of the health care professional

The amount of years worked as an occupational health physician correlated positively with the amount of sick leave days prescribed to all the 19 cases together ($p < 0.05$). For individual cases, the correlation was positive in 15 cases with the correlation reaching statistical significance in three cases (shingles, vertigo and sprain of the ankle). In occupational health care the physicians with 20 years or less working experience prescribed 83.9 days of sick leave to all the patients together, while the physicians with more than 20 years of experience prescribed 91.5 days ($p < 0.05$). (III)

Among surgeons, having a longer working experience as a surgeon was associated with a higher number of sick leave days overall, but

this did not reach statistical significance (IV). Among PHC physicians or dentists no correlation between working experience and the length of sick leave was found (I,II).

5.2.5. Impact of age of the health care professional

The age of a surgeon had a positive correlation with the average amount of prescribed sick leave days. The correlation was statistically significant in five individual cases (sprain of the ankle, first grade burn of lower extremity, appendectomy, mastectomy and clearance of axilla, and excision of a lobe of thyroid gland) and for all cases together. Older surgeons (age > 45 years) prescribed on average 289.6 days of sick leave to all the cases together while younger ones prescribed 273.0 days ($p < 0.05$). (IV)

Among dentist the results were the opposite to the finding with surgeons; older dentists prescribed significantly less sick leave than younger ones. However, this finding was statistically significant only in some stepwise linear regression models; the correlation between age and the amount of sick leave remained non-significant. (II)

Among PHC physicians and OHC physicians, the age of the physician did not have an effect on the amount of sick leave prescribed (I,III).

5.2.6. Impact of patient-related factors

In the surgeon questionnaire, some diagnoses/operations were presented in two otherwise similar patient cases but the occupation of the patient was altered. Surgeons prescribed more days of sick leave for patients in physical work than for the same patient working in an office, which was unaffected by background variables of the

surgeons. For the group of six patients (appendectomy, cholecystectomy, mastectomy, hernioplastia, excision of basalioma and excision of a lobe of thyroid gland) in physical work, surgeons prescribed on average 108.9 days of sick leave, while the same patient cases in office work were prescribed an average of 87.8 days of sick leave ($p < 0.001$). (IV)

Among dentists, the cases with same clinical status but varying age, sex or occupation were prescribed sick leave of very similar duration (II). In the PHC and OHC questionnaire, there was a case of moderate depression with two different patients: a 26-year-old woman and a 45-year-old man. In the study with PHC physicians, the male patient was prescribed on average longer sick leave than the female patient (14.4 days vs 12.7 days, $p < 0.001$). In the study with OHC physicians the male patient also received significantly longer sick leave than the female patient (10.6 days vs 9.9 days, $p < 0.001$). (I,III)

5.2.7. Impact of gender of the health care professional

Mostly, there was no impact of gender of the health care professional on prescribing of sick leave. The mean duration of prescribed sick leave for all cases together was the same for female and male PHC, surgeons and dentists (I,II,IV). Among occupational health care physicians, there was a tendency for male physicians to prescribe slightly more sick leave days (88.4) to all the 19 patient cases together than female physicians (84.3), though this did not reach statistical significance (III).

Among PHC physicians, when single patient cases were analysed, male physicians prescribed significantly ($p < 0.05$) longer sick leave for cases of wound of the hand (7.7 days)

and burn of lower extremity (5.7 days) than female physicians, (6.8 days and 4.5 days, respectively). Male physicians also prescribed significantly ($p < 0.05$) longer sick leave to trauma diagnoses than female physicians (20.1 days vs 17.9 days). (I)

For male patients, there was no difference in prescribing by male and female physicians, and likewise for female patients (I,IV). Neither there was difference in the mean duration of sick leave prescribed by female dentists for female and male patients, and likewise for prescribing by male dentists for male and female patients (II). Among occupational health care physicians, for male patients, male physicians did not prescribe shorter or longer sick leave than female physicians, but for female patients, male physicians tended to prescribe slightly longer sick leave (49.5 days) than female physicians (46.8 days), though this difference did not reach statistical significance (III).

5.2.8. Impact of employment status of the health care professional

The occupational health care physicians working at a public health center prescribed significantly more sick leave (94.1 days) to all the 19 patient cases together than those working in private practice (84.1 days) or at an employer owned clinic (83.7 days) (III). In the multiple linear regression model, working in a public health center showed significant ($p < 0.05$) association with the prescribing of a high number of sick leave days (III).

Dentists who were working only in public dental services prescribed significantly ($p < 0.01$) less sick leave (30.3 days) to all the 16 patient cases together than those who were working in private sector or both in private and public (32.8 days) (II).

5.2.9. Training in sick leave prescribing

Only surgeons were asked about training in sick leave prescribing. Most of the surgeons (87%) had not received training on estimating the amount of sick leave days for patients, and 24% felt they needed such training. Training on prescribing sick leave did not affect the length of sick leave prescribed; those who had received training prescribed 1.8% less sick leave to all cases together than those without training. There was no difference in duration of sick leave prescribed by those surgeons who felt they needed training compared with other respondents. (IV)

5.2.10. The effect of the background variables on the amount of sick leave prescribed

The background variables which were under examination in these studies explained only a small proportion of the variation in health care professionals' sick leave prescribing practices. According to multiple linear regression models, the background variables analyzed explained 11.1% of the variation in the amount of sick leave in PHC physicians (I), 6.1% in OHC physicians (III), 4.0% in surgeons (IV) and 5.7% in dentists (II). There is still considerable variation in the sick leave prescribing practices which could not be explained with the background variables available for these analyses.

5.3. Actual prescribing practices of the dentists

In Finland, physicians and dentists have equal entitlement to prescribe sick leave but sick

leave prescribing is not as common among dentists as among physicians. Hence the

dentists were also asked about their actual sick leave prescribing practices.

During the preceding year, the participants estimated that they prescribed sick leave to a mean of 22 patients, varying between 0 and 1000 patients. The most common duration of sick leave prescribed was 1 day. During the preceding year, 14.9% of the dentists had not prescribed sick leave to any of their patients. (II)

When the other studied factors were simultaneously controlled, the probability of prescribing any sick leave during the preceding year was significantly and positively associated with younger age ($p<0.001$), having more experience in clinical work ($p<0.001$) and male

gender ($p<0.01$). Of male dentists, 89.0% had prescribed sick leave during a preceding year, and of female 82.5%. The probability of prescribing was negatively associated with municipal populations $> 100,000$, so that in larger municipalities 76.9% of the dentists had prescribed sick leave during a preceding year and in smaller municipalities 89.1% ($p<0.001$). Having a specialty degree in oral and maxillofacial surgery, and working only in public dental services were also associated with a higher probability of having prescribed sick leave during the preceding year (NS). Furthermore, those specialists in oral and maxillofacial surgery who had prescribed sick leave had prescribed significantly ($p<0.001$) more days of sick leave (mean 3.24) than other dentists (mean 1.47). (II)

6. DISCUSSION

6.1.1. The variation in the amount of sick leave prescribed

The prescribing of sick leave and its economic consequences varied considerably between health care professionals, which has also been shown in earlier studies (23,24,64). The difference between the least and most costly practice by doctors was almost four-fold to eight-fold in our samples, which represents a societal cost of tens of thousands of euros in only the 19 or 16 patient cases presented to health care professionals. This estimate corroborates the earlier finding that sick leave prescribing causes significant economic consequences to the society (24). This may also indicate that, in some cases, patients are prescribed sick leave for a significantly longer period of time than other patients with identical status, suggesting that patients may not receive equal social benefits.

6.1.2. Local structural factors

Our results among PHC and OHC physicians and surgeons indicate that doctors working in large municipalities prescribe shorter duration of sick leave than doctors working in small municipalities. The result is contrary to the result of a Swedish population-based study, which might be due to the different study settings (21). The size of the hospital in the municipality also had an effect on the length of sick leave: those working in larger hospitals (university or central hospital) prescribed shorter sick leave than those working in smaller hospitals. The effect of the hospital on sick leave prescribing has also been studied in Sweden: a case vignette study found that sick leave duration increased with distance from hospitals (24).

One reason for the difference might be that physicians working in larger municipalities have more opportunities to consult colleagues of various specialties. Furthermore, in densely populated areas, patients live near health centers, have access to care, and may be able to access reappointments. Emergency health care is also readily available in large municipalities. Such structural factors could influence the physicians' practice to prescribe sick leave in large municipalities. Among surgical patients, it may be that patients of large hospitals live in smaller surrounding municipalities and follow-up appointments may be arranged in the patient's home municipality and thus there is no need for prolonged sick leave after an operation. In small municipalities or in district hospitals it may be more common for the surgeon to arrange the follow-up appointment for him/herself if additional sick leave is required.

6.1.3. Specialty degree and area

In our studies we used the same 19 patient cases to examine the sick leave prescribing practices of PHC physicians and OHC physicians. The average number of sick leave days prescribed by PHC physicians was clearly more than in OHC physicians. In addition, among PHC physicians those with no specialty degree prescribed longer sick leave than the clinical specialists. Similar results have also been shown previously (60). It may be that OHC physicians might handle the sick leave prescribing situation better than primary care physicians because of their knowledge of and contact with work places, which might give

them a possibility to alter or lighten the patient's work tasks and thus allow the patient to return to work earlier. On the other hand, the cost containment of occupational health physicians may arise from their co-operation with employers.

In contrast to our findings, two earlier Swedish studies found that general practitioners prescribe shorter sick leave than occupational health physicians (21,36). A different study setting may be the explanation. In the Swedish studies register data was used and also long-term sick leave was included, contrary to our setting.

6.1.4. Age and working experience

In earlier studies, older age and further working experience of a physician correlated with increased duration of sick leave (19,24,60,77). Our results confirm these findings only in part: among surgeons, an increase in both of these factors correlated with increased duration of sick leave; among OHC physicians, those with longer working experience prescribed longer sick leave than OHC physicians with less experience. However, in our other samples no difference was found, or the results were opposite. Although the current study does not allow exploration of the reasons behind sick leave prescribing decisions, one possible explanation for the finding among surgeons is that younger surgeons with less experience prescribe short sick leave but direct the patient to book a reappointment at primary health care or occupational health care to ensure that the recovery from the operation is further controlled by medical professionals. Neither does this study setting allow conclusions to be drawn about the appropriateness of the duration of sick leave prescribed by younger and older doctors.

6.1.5. Patient employment

The surgeons considered the occupation of the patient when they prescribed sick leave, so that the patients in physical work received more days of sick leave than office workers with all other characteristics identical. Such an approach does not seem to be widely prevalent among doctors, and a questionnaire study among general practitioners suggested that there were no significant associations between work demands of the patient and the duration of sickness absence (40). This contradiction may be due to different study settings; most surgical diseases and operations impair the work ability more than those diseases treated in general practice. Furthermore, in the earlier study, the researchers examined actual episodes of sickness absence and thus the comparability between patients was not as exact as in our hypothetical patient case setting, which may better depict the actions of doctors. Our results imply that surgeons take into consideration the patients' clinical status and working situations when prescribing sick leave.

6.1.6. Physician employment status

Among OHC physicians, the most significant physician-related factor affecting the variation in prescribing of sick leave was the main working sector. Physicians working in employer clinics and in the private sector prescribed shorter sick leaves to the hypothetical patient cases than those working in public health centers. One reason for the difference might be that OHC physicians working in employer clinics or in the private sector may be able to modify and lighten the patient's work tasks or to arrange work rehabilitation, so that the patient can return to work promptly. Furthermore, those working in employer clinics or in the private sector may feel that employers expect

them to try to obviate employees' absence from work when possible. Also in public health centers, access to care and possible reappointment may be more difficult to arrange than in the private sector. This might affect the treatment practices of physicians in the public sector, as they may prescribe longer sick leaves for good measure.

However, among dentists the results were opposite: those working in public dental services tended to prescribe less sick leave than those working in private practice. The difference may be due to the different nature of dental and occupational health diseases; dental diseases often cause pain and inconvenience but with recovery in a couple of days, whereas occupational health diseases might take longer time to recover and may affect the working ability in different ways. Another possible explanation for the difference is that dentists working in the private sector are mostly entrepreneurs and thus they may consider prescribing sick leave as good customer care to their patients. For the patients of the OHC physicians, the employer usually covers the costs of consultation and thus the patients do not have a similar status as customer as for the patients of dental services.

6.1.7. Training in prescribing sick leave

The lack of training in sickness certification seems to be common. Most of our respondents had not received training on estimating the amount of sick leave days for patients. Previous studies from the UK show similar results; a majority of doctors had never received training in prescribing sick leave (38,44). Whether or not our respondents had received training in sick leave prescribing did not affect the amount of sick leave they prescribed to hypothetical patient cases. The quality or quantity of earlier

training was not investigated and it might vary a lot in different areas. In addition, it is not clear how long sick leave would be appropriate in each case, thus arranging the training may be difficult. This could explain why earlier training did not have an effect on the length of sick leave. Likewise, in the UK study, training did not alter the amount of sick leave prescribed, although it increased physicians' confidence to issue certificates (38). Other studies suggest that educational meetings alone, or combined with other interventions, can improve professional practice and healthcare outcomes for patients (45-47,81,82). However, these studies did not concentrate on sick leave prescribing but on other aspects of clinical practice. Increased education on the use of sick leave, together with defined guidelines, could produce more appropriate and uniform practices, improve equality among patients, and also bring considerable cost savings to society.

6.1.8. The effect of the background variables on the amount of sick leave prescribed

Although we found several factors that influenced the sick leave prescribing practices of health care professionals, these factors explain only a small fraction of all the variation in the amount of sick leave prescribed. Other factors that could explain at least part of the remaining variation include the attitudes of health care professionals and the extent they are risk prone or risk averse (60,83), or the customs and habits of health care professionals' work places. However, such factors were not evaluated in the present study. In the daily work of health care professionals, the variation might be even larger than we measured, as patient-related factors may also have an impact on the amount of sick leave prescribed. Such factors could include previous diseases and sick leave periods

experienced by the patient (70,71), the personality of the patient and whether the patient is willing to have sick leave or not (72).

Clearly, sick leave prescribing is a complex decision making process that requires further investigation.

6.2. Methodological aspects

Essentially all Finnish doctors and dentists involved in clinical work are members of the Finnish Medical Association or Finnish Dental Association, the sources of the samples. The samples covered the whole country and were large enough to ensure the reliability of the results. Age, sex and occupational characteristics of the samples reflected those of all practicing doctors and dentists in Finland. Thus, these study findings can be expected to represent the views, opinions and actions of all Finnish doctors and dentists. Among all other groups of health care professionals but surgeons the response rate was over 50%, which could be considered as satisfactory in postal surveys. However, only 44% of the sample surgeons returned the questionnaire and therefore the generalization of the results should be made with caution.

Because the Finnish Social Insurance Institution registers sick leave only after the tenth weekday, there was no readily available data source for short term sick leave. A case simulation study design was chosen to investigate shorter sick leave prescribing practices. This study design allows standardization of the descriptions of the symptoms and patient characteristics. Thus the findings with different groups of health care professionals could be compared with each other. Perhaps using register data or copies of sickness certificates of real patients would have given better picture of actual prescribing practices of health care

professionals, but this approach would have precluded reliable comparison between the sick leave prescribing practices of different types of health care professionals. Another possible study setting could have been questionnaires to employees. However, the recall bias inherent in any approach using retrospective questionnaires could weaken the reliability of such findings, and a setting with prospective sickness absence diaries requires good motivation of employees hence the response rate could be low. Further investigation of short term sick leave could be carried out by collecting data on sick leave periods prescribed to employees of large, nationwide corporations. This could enable comparison between the amount of short term and long term sick leave.

The cases were developed in co-operation with experienced specialists in order to choose the most common diagnoses and operations likely to be encountered by each group of health care professionals. The respondents were asked to assume each patient case was uncomplicated and seen at an initial visit on a Monday morning, so that the basis for the assessments would be as similar as possible. These actions were taken to increase the reliability in depicting the variations in sick leave prescribing practices of health care professionals, as for example, patients with comorbidities or obese patients may require longer sick leave. For the same reason, some patient characteristics (age, sex and occupation) were also described. These

patient-related factors were given to standardize the cases and to find out whether health care professionals take these factors into account when prescribing sick leave. However, detailed analyses of the effect of patient-related factors on the amount of sick leave was excluded from the scope of this study.

Using hypothetical cases has been criticized because it records intention to behave instead of actual behaviour, and may overstate or distort the effect seen (84). However, a number

of studies have confirmed that hypothetical patient cases are a valid tool for measuring the quality of clinical practice, although sick leave was not the actual focus of these studies (85-87). It was noticed in a study of physicians that case vignettes provided a consistently better measurement of the quality of clinical care than medical record abstraction, compared with standardized patients (86). The findings with case vignettes were robust across different clinical cases, levels of physician training and study site (86).

7. CONCLUSIONS

There was considerable variation in the sick leave prescribing practices of Finnish health care professionals. This suggests that patients may not receive equal social benefits. Sick leave carries considerable economic consequences, and unifying prescribing practices could bring significant cost savings to society.

Although we found several factors that influenced the sick leave prescribing practices of health care professionals, these factors explain only a small fraction of the variation in the amount of sick leave prescribed. Thus sick leave prescribing seems to be a complex decision making process that requires further scientific evidence of different diseases and work. Some questions that warrant further investigation include: how diseases affect the working ability of the patient, how sick leave affects the recovery process, how long patients should stay on sick leave, and in which kind of patient cases it is better to stay at work instead of taking sick leave. With this knowledge, it could be possible to develop structured guidelines on sick leave prescribing. Another option might be to increase health economic education both in undergraduate and postgraduate training using practical examples or patient cases.

In Sweden, health care professionals have guidelines for the amount of sick leave in various common diseases. After publication of the guidelines, the annual amount of prescribed sick leave days decreased in Sweden. This finding from a neighbouring country supports the idea that it could be beneficial for the Finnish health care system to develop similar national guidelines too. The Swedish guidelines have been translated into Finnish and are available for Finnish health care professionals on the internet pages of the Finnish Institute of Occupational Health. However the use of these guidelines is not currently wide spread in Finland. Although the Swedish health service system is in many ways similar to ours, significant differences also exist. Thus it could be appropriate to develop specific Finnish sick leave prescribing guidelines instead of using a translation. In Finland the guidelines for sick leave prescribing could be integrated with the Current Care Guidelines, or be published separately; either way the guidelines should be promoted effectively in order to ensure health care professionals use them as a part of their daily practice. These actions could produce more appropriate and uniform practices, improve equality between patients and bring notable cost savings to society.

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APPENDICES

Appendix 1. Hypothetical patient cases presented to primary care physicians and occupational health care physicians (I,III).

1. 50-year-old man, carpenter. Symptoms: Sudden severe backache, no abnormal neurological findings. Diagnosis: M54.5 Lumbago.
2. 36-year-old man, bus driver. Symptoms: Headache. Diagnosis: G44.2 Tension neck.
3. 45-year-old woman, seamstress. Symptoms: Pain in an elbow. Diagnosis: M 77.1 Lateral epicondylitis.
4. 22-year-old woman, bar tender. Symptoms: Typical flu, no fever. Diagnosis: J06.9 Common cold.
5. 25-year-old man, shop assistant in a home appliance shop. Symptoms: Fever and cough, typical pneumonia-signs in thorax x-ray. You decide to treat the patient with antibiotics at home. Diagnosis: J18.9 Pneumonia.
6. 31-year-old woman, salesperson. Symptoms: Vomiting and diarrhea. Patient's children have just been vomiting too. No travelling in foreign countries. Diagnosis: A08.4 Gastroenteritis caused by a virus.
7. 40-year-old woman, cleaner. Symptoms: Achy blistering rash at waist. Diagnosis: B02.9 Shingles.
8. 39-year-old man, teacher. Symptoms: Formerly diagnosed benign vertigo with neurological examination. Now similar vertigo as before. Diagnosis: H81.1 Vertigo.
9. 33-year-old man, car mechanic. Symptoms: Got a 4 cm long wound in the palm while working, not related muscle or tendon lesion. You close the wound with 3 stitches. Diagnosis: S61.8 Wound of the hand.
10. 24-year-old woman, waitress. Symptoms: Ankle twisted while jogging, now painful and cannot endure standing on it. No fractures. Diagnosis: S93.4 Sprain of the ankle.
11. 44-year-old woman, cook. Symptoms: Spilled frying fat on a thigh. You grade the burn as superficial and it covers about 5% of the surface of the body. Diagnosis: T24.1 First grade burn of lower extremity.
12. 32-year-old man, asphalt worker. Symptoms: Itching rash in elbow folds. Wears an overall while working. Diagnosis: L20.0 Atopic eczema.

13. 27-year-old woman, cashier. Symptoms: Uterine contractions, 20. week of pregnancy. No concerns. Diagnosis: O47.0 Contractions not related to labour.
14. 55-year-old woman, secretary. Symptoms: Formerly diagnosed chronic obstructive pulmonary disease. Now has a flu and difficulty of breathing. You prescribe medication. Diagnosis: J44.0 Worsening of COPD.
15. 26-year-old woman, student, works in commercial sector. Symptoms: No former diagnosis of depression, now the criteria of moderate depression are fulfilled. You decide to treat her as an outpatient. Diagnosis: F32.1 Moderate depression.
16. 45-year-old man, office manager. Symptoms: No former diagnosis of depression, now the criteria of moderate depression are fulfilled. You decide to treat him as an outpatient. Diagnosis: F32.1 Moderate depression.
17. 43-year-old woman, nurse. Symptoms: Long history of short-term jobs and now that the recession is beginning, she is worried about the continuity of her career. Diagnosis: F43, Z73 Adaptation disorder.
18. 54-year-old man, forklift driver. Symptoms: He has been drinking heavily but now the annual holiday is over. Patient comes to appointment at Monday (first working day after the holiday). Alcometer shows 0.6 permilles. Diagnosis: R11 Nausea.
19. 22-year-old woman, hairdresser. Symptoms: Typical symptoms of urethritis, no fever. Urine sample shows signs of infection. Diagnosis: N39.0 Urethritis.

Appendix 2. Hypothetical patient cases presented to surgeons (IV).

1. 50-year-old man, carpenter. Symptoms: Sudden severe backache, no abnormal neurological findings. M54.5 Lumbago.
2. 45-year-old woman, seamstress. Symptoms: Pain in an elbow. M 77.1 Lateral epicondylitis.
3. 33-year-old man, car mechanic. Symptoms: Got a 4 cm long wound in the palm while working, not related muscle or tendon lesion. You close the wound with 3 stitches. S61.8 Wound of the hand.
4. 24-year-old woman, waitress. Symptoms: Ankle twisted while jogging, now painful and cannot endure standing on it. No fractures. S93.4 Sprain of the ankle.
5. 44-year-old woman, cook. Symptoms: Spilled frying fat on a thigh. You grade the burn as superficial and it covers about 5% of the surface of the body. T24.1 First grade burn of lower extremity.
6. 24-year-old man, fireman. Diagnosis: Appendicitis diagnosed by typical abdominal pain. Operation: Appendectomy (open).
7. 24-year-old man, revenue officer. Diagnosis: Appendicitis diagnosed by typical abdominal pain. Operation: Appendectomy (open).
8. 45-year-old woman, secretary. Diagnosis: Cholelithiasis. Operation: Cholecystectomy (laparoscopy).
9. 45-year-old woman, physical exercise teacher. Diagnosis: Cholelithiasis. Operation: Cholecystectomy (laparoscopy).
10. 40-year-old woman, waitress. Diagnosis: Breast cancer. Operation: Mastectomy and clearance of axilla.
11. 40-year-old woman, CEO. Diagnosis: Breast cancer. Operation: Mastectomy and clearance of axilla.
12. 30-year-old woman, postwoman. Diagnosis: Adenoma of thyroid gland causing hyperthyreosis. Operation: Excision of a lobe of thyroid gland.
13. 30-year-old female, bookkeeper. Diagnosis: Adenoma of thyroid gland causing hyperthyreosis. Operation: Excision of a lobe of thyroid gland.
14. 35-year-old man, bus driver. Diagnosis: Bleeding haemorrhoids. Operation: Radical operation of haemorrhoids (Milligan).

15. 35-year-old man, sales representative. Diagnosis: Bleeding haemorrhoids. Operation: Radical operation of haemorrhoids (Milligan).
16. 60-year-old man, car mechanic. Diagnosis: Inguinal hernia. Operation: Hernioplastia (open, with mesh).
17. 60-year-old man, journalist. Diagnosis: Inguinal hernia. Operation: Hernioplastia (open, with mesh).
18. 57-year-old man, farmer. Diagnosis: Basalioma of forehead, diameter 1cm. Operation: Excision of basalioma.
19. 57-year-old man, bank clerk. Diagnosis: Basalioma of forehead, diameter 1cm. Operation: Excision of basalioma.

Appendix 3. Hypothetical patient cases presented to dentists (II).

1. 56-year-old man, carpenter. Case description: Patient requires operative extraction of tooth D48, no need for removal of alveolar bone around the tooth, 2 sutures. Diagnosis: Partly erupted wisdom tooth. Operation: Surgical extraction of tooth D48 without complications.
2. 47-year-old woman, bank clerk. Case description: Patient requires operative extraction of tooth D48, no need for removal of alveolar bone around the tooth, 2 sutures. Diagnosis: Partly erupted wisdom tooth. Operation: Surgical extraction of tooth D48 without complications.
3. 23-year-old woman, hairdresser. Case description: Patient requires operative extraction of tooth D48, requires removal of alveolar bone around the tooth, 4 sutures. Diagnosis: Impacted wisdom tooth. Operation: Surgical extraction of tooth D48.
4. 25-year-old man, forklift driver. Case description: Patient requires operative extraction of tooth D48, requires removal of alveolar bone around the tooth, 4 sutures. Diagnosis: Impacted wisdom tooth. Operation: Surgical extraction of tooth D48.
5. 58-year-old woman, teacher. Case description: Fell down the previous evening. Both upper central incisors DD 11, 12 cracked along gum line, requires extraction of both remaining roots. Lip swollen, does not require sutures. Temporary protective crown will be placed on the fifth day, the coming Friday. Diagnosis: Loss of teeth and extraction of remaining roots due to an accident. Operation: Extraction of roots DD 11,12.
6. 29-year-old man, architect, not in customer service. Case description: Fell down the previous evening. Both upper central incisors DD 11, 12 cracked along gum line, requires extraction of both remaining roots. Lip swollen, does not require sutures. Temporary protective crown will be placed on the fifth day, the coming Friday. Diagnosis: Loss of teeth and extraction of remaining roots due to an accident. Operation: Extraction of roots DD 11,12.
7. 34-year-old woman, secretary. Case description: Fell down the previous evening. Both upper central incisors DD 11, 12 cracked along gum line, requires extraction of both remaining roots. Lip swollen, does not require sutures. Patient still slightly drunk. Temporary protective crown will be placed on the fifth day, the coming Friday. Diagnosis: Loss of teeth and extraction of remaining roots due to an accident. Operation: Extraction of roots DD 11,12.
8. 60-year-old man, road construction worker, tarmac layer. Case description: Fell down the previous evening. Both upper central incisors DD 11, 12 cracked along gum line, requires extraction of both remaining roots. Lip swollen, does not require sutures.

- Patient still slightly drunk. Temporary protective crown will be placed on the fifth day, the coming Friday. Diagnosis: Loss of teeth and extraction of remaining roots due to an accident. Operation: Extraction of roots DD 11,12.
9. 31-year-old man, car mechanic. Case description: Lower wisdom tooth D38 extracted on previous Friday. Pain started to intensify during weekend and on Sunday got fever, 37.8 degrees Celsius. Diagnosis: Sicca syndrome. Operation: Emergency treatment, placement of Glumsky-tampon.
 10. 21-year-old man, salesman in electronics store. Case description: Lower wisdom tooth D38 extracted on previous Friday. Pain started to intensify during weekend and on Sunday got fever, 37.8 degrees Celsius. Diagnosis: Sicca syndrome. Operation: Emergency treatment, placement of Glumsky-tampon.
 11. 50-year-old woman, sales representative. Case description: Lower wisdom tooth D38 extracted on previous Friday. Pain started to intensify during weekend and on Sunday got fever, 37.8 degrees Celsius. Diagnosis: Sicca syndrome. Operation: Emergency treatment, placement of Glumsky-tampon.
 12. 50-year-old woman, cook. Case description: Lower wisdom tooth D38 extracted on previous Friday. Pain started to intensify during weekend and on Sunday got fever, 37.8 degrees Celsius. Diagnosis: Sicca syndrome. Operation: Emergency treatment, placement of Glumsky-tampon.
 13. 23-year-old man, electrician. Case description: Ordinary extraction of upper right hand side wisdom tooth D18, no complications. Diagnosis: Partly erupted upper wisdom tooth D18. Operation: Extraction D18.
 14. 35-year-old man, dentist in public dental service. Case description: Patient has full dentition, but due to a previous accident in soccer match has lost both upper left hand side premolars DD 24, 25. Extraction cavities healed normally and alveolar bone structure normal. Placement of two implants, no complications. Diagnosis: Loss of two teeth due to an earlier accident. Operation: Placement of two implants.
 15. 50-year-old woman, singer/singing instructor. Case description: Previous evening (Sunday) in singing training irreversible temporomandibular joint discus displacement on right hand side. Diagnose: Discus displacement. Operation: Reposition of temporomandibular joint discus.
 16. 55-year-old man, truck driver. Case description: Previous evening (Sunday) intensifying pain in facial muscles on the left hand side. Pain relief requires anti-inflammatory pain killer medication. Diagnose: Muscle pain. Operation: Emergency treatment, medication prescription.