



Headache and neck or shoulder pain

An analysis of problems in three comprehensive population studies in Northern Norway

Toralf Hasvold

Institute of Community Medicine,

University of Tromsø,

*ISM skriftserie
blir utgitt av Institutt for samfunnsmedisin
Universitetet i Tromsø.*

*Forfatterne er selv ansvarlige for sine funn og
konklusjoner. Innholdet er derfor ikke uttrykk
for ISM's syn.*

*The opinions expressed in this publication are those
of the authors and do not necessarily reflect the
official policy of the institutions supporting this research.*

Headache and neck or shoulder pain.

An analysis of musculoskeletal problems in three comprehensive population studies in Northern Norway

The Bardu Musculoskeletal Study 1989/90

The Tromsø Heart Study 1986/87

The Nordland Health Study 1988/89

CONTENTS

ACKNOWLEDGEMENTS.....	page 3
PREFACE.....	page 4
INTRODUCTION.....	page 6
OBJECTIVES.....	page 9
TERMS AND DEFINITIONS.....	page 9
DESIGN OF STUDY.....	page 13
PAPERS.....	page 17
DISCUSSION.....	page 18
MAIN FINDINGS.....	page 21
TABLES.....	page 28
REFERENCES.....	page 37
APPENDIX.....	page 47

ACKNOWLEDGEMENTS

This work has been planned and carried out at the Institute of Community Medicine (ISM), University of Tromsø. I am thankful to every one at the Institute, who have all contributed to the atmosphere of humour and hard work. Despite periods of frustration I have appreciated the demand to scientific quality which characterises the Institute.

Thank you Roar, for your never unfailing belief in my work and my ability of accomplishing this theses. Without Roar's guidance and "moral" support through this theses, I would never have been able to finish it. I also thank you Olav Helge, for your enthusiasm and wise and critical comments. I thank you Anders, for your morning chats and your sharp eye for errors and inconsistencies in my papers. Thank you Egil, for your willingness to help at any time. Thank you Bjarne, without your contribution to paper I, that would never have been accomplished.

This is also the occasion to show my great gratitude to my family, - Randi for making all the sacrifices, for taking all the extra burdens and hard work, and not least being my best advisor during these years in Tromsø. And thank you Per and Gry for housing an egocentric father and father in law, Thomas and Hege for your encouragement and support, and Sondre and Hanna for hours of happiness and for exposing the real values of life.

Without financial support from NAVF (National Research Council for Science and the Humanities) this work would have been impossible. I am also thankful to all those unknown people behind the data collection, punching and secretarial work at SHUS and ISM. Without their work I could have accomplished nothing.

The Norwegian Medical Association (Den Norske Lægeforening) gave me financial support and made the "Bardu Musculoskeletal Survey " possible. I am thankful not only for the money, but also for the recognition of my work such a support indicated.

I thank my colleges at the municipality health office in Bardu, for patience and support in the research process, and last but not least I thank the people of Bardu for sharing their health information with me by answering the questionnaires.

PREFACE

After 20 years in general practice, I felt an increasing dissatisfaction in the lack of understanding the numerous patients complaining of body pains and aches without any objective findings. Especially complaints from the head and the neck or shoulder region were common in my practice. I had the feeling that many of those I saw as patients, had decided the time to seek medical help not only due to the symptoms, but were motivated to seek help by several external factors. The help seeking motivation could in addition to the symptoms, be either secondary benefits or that somebody else had told them to seek help or they had been scared by some sensational stories in the media. They could also be a group of people with low threshold of seeking medical care. This told me that the patients I saw in my practice, did not necessarily represent the symptom holders in the general population. In other words the patients I saw were selected.

I knew little about the true nature of headache and neck or shoulder pain in the general population, and even in most of the available literature these conditions had been described and analysed on selected patients data (1, 2). In order to study these conditions as they are found in the population, it was necessary to carry out an epidemiological survey on the general population rather than on selected patients.

I had the feeling that the model used to understand these conditions did not fit well. The saying: “ - these conditions are troublesome for the patients, frustrating for the physicians, and expensive for the society”, became more and more true.

After approaching the Institute of Community Medicine, University of Tromsø, I was offered a 50% - appointment as lecturer in 1989. During the first months, I designed **The Bardu Muscular-Skeletal Study 1989/90**, and formulated the questionnaire. To get comparable data, I used some of the same questions that had been used in "The Tromsø Heart Study 1986/87" and in "The Nordland Health Study 1988/89" in order to describe the target conditions; **headache and neck or shoulder pain.**

The Institute of Community Medicine covered a substantial part of the expenditure of the Bardu Muscular-Skeletal Study, and also gave me the permission to analyse some data collected on headache and neck or shoulder pain in the "Tromsø Heart Study 1986/87 and "The Nordland Health Study 1988/89". In 1990 - 1992 I was granted a research fellowship from the National Research Council for Science and the Humanities (NAVF), and hence I was able to complete my theses.

INTRODUCTION

The majority of the general population experience during their lifetime periods of aches and pains from the muscles or the skeleton (1, 3-7). Especially are aches and pains related to muscles and joints common in high age (8). However, the trend over the last 10 to 15 years has been an increasing number of young people, especial women presenting unspecified muscle and skeletal pain syndromes to the general practitioners. This problem has escalated to a public health problem as well as an economic problem in the western societies because these patients not only utilise the health care services increasingly, but in increasing number are defined as disabled and are for long periods on paid sick leave (9-14).

In the Nordic countries there has been an increase of the musculoskeletal conditions which cannot be diagnosed in an objective and specific way, over the last 5-10 years (15). The characteristics of these conditions are subjectively experienced pain without any organic or objective nociceptive substrate or findings (16). G Brattberg et al found in Sweden that pain related to head, neck or low back regions had the highest prevalences of pain conditions reported in the general population (4). Historically, conditions without a clear ethiological or pathogenetical mechanism were classified or regarded to be psychosomatic, like asthma, hypertension, ulcerative colitis, and duodenal ulcers. The psychosomatic theoretical framework was that the disorders were a result of psychological conflicts. The poverty of this theory, with its lack of consistency, empirical support and predictive power in understanding some of these psychosomatic disorders, led to a shift towards more monocausal models in almost all non-nociceptive disorders (17). The unspecified bodily pain syndromes like, chronic fatigue syndrome, headache, fibromyalgia and repetitive strain injury (RSI) were given external, monocausal explanations (18-22). These model's lack of consistency is also demonstrated by the range in prevalences found in relatively comparable populations in northern Europe (23).

The prevailing model of understanding these conditions is related to exposure to external strain factors like physical strain at work. The

terminology, "Repetition strain injury" (RSI) (18, 20-22) and stress- and strain-conditions, indicates that the sufferers are overstrained at work or by external factors outside the patients influence and responsibility. This model is a paradox since the increase in reporting musculoskeletal pain coincide with a time where the physical strain at work should be less than ever. This paradox indicates that the model is not a proper one. Most of the present epidemiological studies do not clarify whether there is a real increase in the musculoskeletal conditions in the populations or there is a change in sick role behaviour. Are those who experience body pain today more prone to define these sensations as diseases, and seek health care more than previously? In other words, is it the people's threshold for bodily pain and aches which is changing, rather than the "amount musculoskeletal problems with pain" in the population?

In this study, the target conditions, unspecified headache and neck or shoulder pain, are being used as tracer symptoms of more general muscular skeletal complaints. Headache and neck or shoulder pain are subjective conditions without any objective confirming tests. Headache may be classified according to international criteria worked out by the Headache Classification Committee of the International Headache Society (24). Still the doctor's diagnoses in these cases are based on what the patients tell him/her. These self-reported conditions are conditions experienced in the individual, and they are neither more nor less than self-reported conditions, and cannot be validated against any doctor-defined diagnosis. In that sense these target conditions are well suited as "tracer-conditions" in order to study the unspecified musculoskeletal pain conditions. Migraine is a self-reported condition believed to have a specific pathogenesis, and hence is different in nature from general unspecified headache. Some authors question this and regard common headache and migraine as points on a continuous scale of headache (16). We have therefore, in paper IV explored this theory.

In order to understand these illnesses, it is necessary to study how the sick role of these complaints are socialised. The family is the single most

important learning context in the development of the child. This is the context in which the child learns about the nature of illness, qualities of illness expression, rules of expression, and consequences of expression (25-27). And therefore, we found it important to study how the sick role behaviour is learnt within the family, by looking at the pattern of reporting these conditions among the family members.

Several authors have shown that psychological and personality traits are associated with back pain and other musculoskeletal disorders (28-37). Looking upon headache and neck or shoulder pain as complex, multicausal conditions where both external strain factors and personal psychological and social factors are involved, it is important to develop practical inventories to map some of these possible explaining factors. These inventories cannot be too complex and extensive as they have to be used in comprehensive population studies. This is important since most of previous studies have been on selected patient groups, and may be biased by selection on criteria like the threshold of seeking health care rather than the conditions to be studied.

One of the most validated inventories to identify patients with more general psychological unrest, has been Goldberg's "General Health Questionnaire" (38-63). Originally this was a questionnaire of 60 items, but has been modified into a 20 and even a 12-item versions. In cross sectional population screenings there are always a balance between constructing a questionnaire to be precise in catching the dimension or phenomenon wanted, and reducing the volume of the questionnaire in order to achieve an optimal response rate. Based on the GHQ-20 item version, we tested the correlation between this full scale index and a 4-items version.

In order to understand the target conditions, we have analysed the sick role within the family of the target conditions, and a comprehensive analysis of the associations between the target conditions and demographic and personal psychosocial factors, life style factors, health factors, work related psychosocial factors, and physical strain factors related to the work is performed (paper IV and V).

OBJECTIVES

The objectives of this theses have been to develop and explore models of understanding the unspecified musculoskeletal illnesses represented by reported headache and neck or shoulder pain in the general population, by:

1. Identifying a practical measure of mental distress in population surveys, and validating the indicators of mental distress used in the present populations studies.
2. Describing the distribution of reported headache and neck or shoulder pain in the general population in Northern Norway.
3. Studying the sick role within the family structure as to how headache and neck or shoulder pain are reported among the family members.
4. Exploring the association between reported headache and neck or shoulder pain and demographic -, psycho-social -, lifestyle -, and health factors, as well as the association with present or previous work related strain factors.

TERMS AND DEFINITIONS

The conditions studied:

Headache and neck or shoulder pain are conditions in this context selected as “tracer-conditions” of unspecified musculoskeletal illnesses. These conditions are subjective, self-reported conditions in contrast to doctor-defined diagnosis, and there are no objective confirming tests of the conditions. They are conditions experienced in the individual, and they are neither more nor less than self-reported conditions, and cannot be validated against any doctor-defined diagnosis. Migraine is a diagnosis based on defined, internationally accepted criteria (24). In this survey migraine is

based on self-reported diagnosis, substantiated by self-reported use of migraine medicine.

In population based epidemiological studies, there are two basically different approaches, depending on the conditions to be investigated. In the case of a specific defined diagnoses, it is difficult to run self-reported questionnaire surveys, unless there are given certain criteria to be met, or the questions have been validated. This is in contrast to unspecified subjective conditions where there are no specific criteria to be met. Even the clinical assessment of pain depends on the patient's subjective report, which is influenced not only by the objective physical abnormality but also by the patient's attitudes and beliefs, psychological distress, and illness behaviour (32, 63).

The questions used for the target conditions were:

1. "How often do you suffer from headache ?"
2. "How often do you suffer from neck or shoulder pain ?" These questions were given four exclusive possible alternatives: "Seldom or never (1), Monthly (2), Weekly (3),and Daily (4)". The alternatives represented the level of the conditions. In the analysis where these questions have been the outcome variables, the answer alternatives have been recoded to a dichotomous variable, with the cut point between monthly and weekly symptoms (1+2 and 3+4).
3. "Do you suffer or have you ever suffered from migraine ?" Answering "Yes" or "No".

The target conditions to be studied in this theses are chronic conditions, in the sense that the patient report to be suffering from the conditions weekly or more often. But time is only one of several dimensions characterising pain.

Von Korff suggests that chronic pain is graded along three axes: time, severity and impact (64).

The target conditions ; **headache and neck or shoulder pain** are described in the theses by:

- **time:** reported frequencies (monthly - weekly - daily)
(also in the papers called “level”)
The target conditions in this theses are reported **weekly** complaints. The target conditions are therefore chronic in its nature

- **severity:** reported pain on a categorical pain scale (Table I). The table shows that there is an association between time interval and pain severity, the more frequent the condition is reported the more severe is the pain reported.

- **impact:** reported working disability (paper II)
use of different levels of medical care and use of X-ray if suffering from the target conditions
(Table II)

The target conditions in the theses are self-reported chronic conditions, and the sufferers had a high utilisation of health care services (Table II), and they reported severe pain (Table I) which makes a great portion of the sufferer disabled for the ordinary working life (Paper II).

General Health Questionnaire (GHQ):

The General Health Questionnaire (GHQ) was designed to be a self-administered screening test aimed at detecting psychiatric disorders among respondents in community settings and non-psychiatric clinical settings, such as primary care or among general medical out-patients. It has been extensively used and validated. The index can be scored in various ways, dichotomous (GHQ-score) for case identification and continuous (Likert score) to provide information on the degree of mental distress (65-69).

Dissatisfaction index:

This index was originally designed for surveying the quality of American life.

A Norwegian version of the index described by Campbell A, Converse PE, Rodgers W. The quality of American life. Perception, Evaluation and Satisfaction. Russell Sage Foundation, New York 19976 (70).

A version adapted to Norwegian conditions was developed. The index was constructed by seven items of general "life"-factors like satisfaction with:

1. the house or flat, 2. the neighbourhood, 3. the work, 4. the leisure time activity, 5. the relationship to family and friends, 6. the relationship to the spouse, 7. the education.

Each item was given seven-graded answer options (Very satisfied to very unsatisfied) (Table III).

Prevalence

The prevalences used in this theses are point prevalences of reported complaints experienced at the time of the screening (71).

DESIGN OF STUDY

The present theses is based on three cross-sectional population studies, performed during 1986-1990, with mainly the same design.

The Tromsø Heart Study

In a survey of risk factors for diseases in 1986/87, all the subjects between 20 and 56 years of age in the municipality of Tromsø (21,826 persons) were invited to participate. The 18,105 attendees were given a (hand out) questionnaire about lifestyle, health, and psychosocial factors. Of these 18,105 subjects, 8,537 men and 9,162 women, answered the questions about "non-migrainous headache", 8,533 men and 9,117 women answered the questions about neck or shoulder pain, and 8,024 men and 7,690 women the questions about migraine.

The dependent variables were based on the following questions: "How often do you suffer from headache ?" and "How often do you suffer from neck or shoulder pain ?" These questions were given four exclusive alternatives: "Seldom or never (1), Monthly (2), Weekly (3), Daily (4)". The variables in the present analysis were dichotomised by giving "seldom or never symptoms, and monthly symptoms" the value of 0 and "weekly and daily symptoms" the value of 1. "Do you suffer or have you ever suffered from migraine ?" Answering "Yes" or "No".

The Nordland Health Study

In 1988/89, the total population of men and women aged 40-42, altogether 10.497 people were invited to a health survey in the county of Nordland in Northern Norway. (The screening was performed by the National Health Screening Service in Norway). Of the invited, 78 % of men (4.301) and 86 % of women (4.310) attended. The attendees were given a self administered postal questionnaire which covered a broad spectrum of topics like demography, ethnicity, health and illnesses, social network, the use of health

care system, lifestyle, psychological problems, coping abilities and work environment. Of all attendees 87 % men and women responded to the questionnaire (72).

The target conditions of the present analysis are based on the following questions:

"How often do you suffer from headache ?" and "How often do you suffer from neck or shoulder pain ?" Four exclusive response alternatives were given: "Seldom or never (1), Monthly (2), Weekly (3), and Daily (4)". These dependent variables were dichotomised by giving "seldom or never" and "monthly" complaints a value of 0, and "weekly" and "daily" complaints a value of 1.

Further details of the study design is described in paper IV, paper V (8, 72).

The Bardu Musculoskeletal Study 1989/90

In order to achieve the objectives of the survey, the design of a comprehensive population based, cross sectional study was chosen. The unit of analysis was the person. The target populations were all subjects between 20 and 70 years of age (the age limits included) living in the municipality of Bardu by October 1989.

The data were collected by a postal self administered questionnaire. The questionnaire was mostly composed from validated questions used in previous surveys like "The Tromsø Heart Study 1986/87", "The Nordland Health Study 1988/89", a Norwegian version of the satisfaction-/dissatisfaction index (70), and General Health Questionnaire (65). Since the questionnaire was composed from previously validated questions, I did not perform any pilot study.

The questionnaire was divided into seven sections:

1. Personal information:
information about demography and the family connections to the municipality of Bardu
2. Complaints from head, neck and shoulders;
information about both own complaints and complaints within the family
3. Grade of seriousness of the reported complaints;
information about working ability/disability, grading of pain by a categorical scale (1-10), and reported use of painkillers
4. Other psychosomatic complaints;
information about other complaints, self estimated health, and felt need of support from family and working colleges in case of personal problems
5. Health care utilisation:
information about visits to general practitioner, specialist, physiotherapist, chiropractor, zone-therapist and hospitalisation induced by the target complaints
6. Social conditions and satisfaction index:
information about the present economic situation during childhood and, the felt demands at work and at home and the satisfaction-dissatisfaction index
7. The 20-items General Health Questionnaire;
index of mental unrest

Material

The empirical basis of this study is the Bardu Study presented here, and the Tromsø Heart Study 1986/87 (73) and The Nordland Study 1988/89(72).

The three sets of data available for the present study are from surveys conducted during the period 1986-1990. The populations are all from Northern Norway, one being a mainly urban population (Tromsø), the second being a mixed population (Nordland), and the Bardu Study being a rural population.

Bardu is a rural inland municipality in the north of Norway. The population is a little younger than the general population of Norway. But the sex distribution was quite similar to the population of Norway. The questionnaires were sent on the 15th of December 1989 to all citizens aged 20 to 70 years registered in the population records by October 1990 in Bardu municipality. A reminder was sent in April 1990. Punching and corrections were finished by autumn 1990.

Table IV shows the population receiving the questionnaire and the age and sex specific return rate. The total response rate was 80.5 %. The highest response rate was among the eldest, and the lowest among men aged 30-39 with a rate of 73,1%. There were no differences in the response rate between the genders.

In a rural community like Bardu the youth have to leave home to get education, but they tend to remain in the population record where their parents live. Therefore some of the youngest were absent at the time of the survey. However, the timing of the postal was aimed at reaching the students at home on Christmas leave.

The main differences between the three populations studied, were the selection of age groups and rural/urban dwellers.

PAPERS

- Paper I: **The General Health Questionnaire: how many items are really necessary in population surveys?**
Jacobsen BK, Hasvold T, Høyer G, Hansen V.
Psychological Medicine 1995; 25: 957-61.
- Paper II: **Headache and neck or shoulder pain - frequent and disabling complaints in the general population**
Hasvold T, Johnsen R. Scand J Prim Health Care 1993; 11: 219-24.
- Paper III: **Headache and neck or shoulder pain, - family learnt illnesses behaviour?**
Hasvold T, Johnsen R. Accepted for publication in Family Practice, Febr. 1996
- Paper IV: **Non-migraineous headache, neck or shoulder pain and migraine - differences in associations with background factors in a city population**
Hasvold T, Johnsen R, Førde OH.
Accepted for publication in Scand J of Prim Health Care 1996.
- Paper V: **Musculoskeletal problems - result of "mental pain" rather than physical strain?**
Hasvold T, Johnsen R, Førde OH.
Submitted, 1996.

DISCUSSION

Methodological considerations

Bias

Different types of bias must be considered in epidemiological studies. **The selection bias** is a threat when the non-response rate becomes so high that the material may be distorted (71). All the three databases used in the present study exceed 80 % response rate. In both sexes the response rate increases slightly (not significant in females) with age. The gender difference in response rate is not significant in any age group. The selection bias is therefore negligible regarding age and sex.

Information bias refers to a distortion due to measurement errors. That kind of errors may be random or non-random. The non-random information bias is present when there is a difference between what is actually measured and what it purports to measure. In population based epidemiological studies the conditions to be studied are often based on self reporting. In this study the target conditions are unspecified headache and neck or shoulder pain, being used as tracer symptoms of musculoskeletal complaints. Headache and neck or shoulder pain are in principle subjective conditions without any objective confirming tests. The doctors diagnoses are inferences of what the patients tell him/her. Self-reported conditions are conditions experienced in the individual, and they are neither more nor less than self-reported conditions, and cannot be validated against any doctor-defined diagnosis. However, the prevalences are depending on how the questions are formulated and interpreted. The consistency of the questions seemed to be good, as the prevalences of the variables used in the surveys are very similar through the three populations. Therefore, I regard the non-random information bias to be negligible.

In self administered questionnaire surveys, a possible bias is the “yeah-saying “ (74). This has been minimised in this study by giving most questions several answer alternatives, with no common midpoint, forcing the responders to grade themselves in either categorical direction of the

options given. The conditions to be reported were qualified by the questionnaire section of intensity and severity. Exploring this in Bardu, there was a close association between the reported pain level and the reporting complaints level, which does not support that the “yeah-saying” bias should be a major problem in the study. The reporters of the target conditions are utilising the health care system relatively frequently. In Nordland about 70% of the 40-42 years old sufferers are referred to X-ray of the neck the last 5 years (Table II), indicating that they represent a substantial burden to the health care system, and not only yeah-sayers to a questionnaire.

Recall bias may be a problem in questionnaire based surveys. In a cross sectional design, the bias may be a problem if one particular answer of one of the questions lead to a distortion of the answer options of another question. Of course, recall bias is a problem in this kind of questionnaire based study. We have tried to separate questions that might be interlinked in the sense that one answer could lead to a specific answer in the next question (75). The problem of recall bias is discussed more specifically in paper III, as reporting own complaints may lead to an attention towards the same problems among first grade relatives. The fact that there is no association between reported own complaints and reported complaints of spouses may indicate that the recall bias may not be a major one.

Simplifying bias is of the more fundamental bias in most research on social phenomena. The reality’s complexity is almost impossible to penetrate without a series of simplifying assumptions (76, 77). The simplifications of the models are also a considerable methodological problem in the present study, as we are studying complex conditions that may involve psychological, sociological and physiological processes by simplified models.

Global and general conclusions based on cross sectional questionnaire surveys can only be drawn with great caution. The factors or variables

selected in the analysis will always be scanty indicators of the phenomenon to be analysed. There will always be some important aspects or factors lacking in the model of the analysis, making general conclusions difficult.

The representativity of the material

The high response rate, and relatively homogenous distribution of the response rate across age and sexes, make the materials representative of the general population. Table V, VI, VII and VIII show the prevalences of the target conditions found in the three surveys, which are the data basis for this theses. The prevalences of headache and neck or shoulder pain are found very similar in all the three surveys (Bardu 1989/90, Tromsø 1986/87 and Nordland 1988/89). Since the study is based on these three different populations, there was possible to test the generalisation of findings by the external replications (78). The consistency of the dependant variables has been shown by the replication of prevalences through the different populations indicating that the questions used are consistent in measuring the same phenomenon in different populations.

In conclusion there are no indications that there were a systematic selection in the way the target conditions were reported in these populations. The materials are therefore found to be representative for the general population in the communities surveyed at that time.

The methods of analysis

The analysis performed in the papers and in the additional tables are crosstables and multivariate analysis, both multiple linear regression and multiple logistic regression distinguishes between “prediction” or “estimation” analysis and “causal “ analysis with regression equations (79). The present study discuss mainly associations or “predictions” between the dependent variables and the independent variables after taking into account the effect of all the other independent variables in the model. The study does not discuss causality of the target conditions, since the study design is a cross sectional study, however, a none significant association between the

dependent variable and the explaining variables, minimise the probability of causal associations. Therefore, in this study the causal discussions are based on negative causal association between the target conditions and the independent variables analysed.

MAIN FINDINGS

I. The occurrence of reported headache and neck or shoulder pain.

The prevalences of reported headache and neck or shoulder pain were high and similar in the different population surveyed. Women reported about twice as often to be suffering from both headache and neck or shoulder pain as men. There was an increasing prevalence with age in reporting neck or shoulder pain. Such a trend was not found for headache.

The sick role as to headache and neck or shoulder pain seemed to be established within the core family structure, and the brothers and sisters seemed to be just as important in the socialisation of the symptoms of these illnesses as the parents. There were no association between reported own complaints and reporting complaints of the spouses, indicating that the spouses did not contribute much to the sick role conception of the headache and the neck or shoulder pain.

II. The association with psychosocial and physical strain factors.

The most striking result of this survey was the lack of association between the target conditions and the physical strain factors related to the working place, which indicates that there are minimal causal association between headache and neck or shoulder pain and work related physical strenuous factors. The associations between the target conditions and “to be bothered by physical strain factors” were stronger than the actual exposure of the physical strain factors. And the psychosocial factors together with the more global and individual factors like

“self-estimated health” and “depression”, were the main factors associated with both headache and neck or shoulder pain.

III. Practical measure of mental distress.

Four items of GHQ-20 can be applied to measure the degree of mental distress in population surveys. A simple linear sum of Likert scores of 4 random items had a correlation coefficient greater than 0.80 with the full GHQ-20 items. Increasing the number of items beyond four, marginally increased the correlation coefficient. Thus, a simple linear sum of Likert scores based on a few GHQ items can be used to measure the degree of mental distress in population surveys. The few global variables used as indicators of mental distress in the present theses may therefore be valid used in future population studies.

Discussion of main findings

In this theses self-reported weekly headache and neck or shoulder pain are used as indicators or tracer conditions when exploring chronic musculoskeletal illnesses.

Headache and neck or shoulder pain are common conditions in the general population. Except for the Danish report of an increase in musculoskeletal conditions and in health care consumption (15), there are very few reports showing an increase in objective musculoskeletal health problems. It is the reporting of subjectively experienced conditions that are. This observed increase may therefore be a change in the sick role behaviour. Acute and chronic pain are not only different in time scale, but are fundamentally different in kind. Chronic pain become increasingly dissociated from the original physical basis (80) and become more associated with emotional distress (Table IX), depression and adaptation of a sick role (28, 31, 32, 35).

I. The occurrence of reported headache and neck or shoulder pain.

The observed increase in these conditions may therefore partly be a result of change in the sick role modelled in the family structure. In paper III we have shown that the brothers and sisters are just as important as the parents in this sick role modelling process. This may be a part of a process of dissolving the traditional pattern of authoritarian transferral of attitudes and sick roles. This change and the rapid increase of the medicalisation of the society, may contribute to the explanation of the decreasing threshold of defining bodily aches and pains as health problems. The decision to seek medical care is dependent on : a) ability to obtain medical service ; b) predisposition of the individual to use services, which is based on demographic and social characteristics as well as attitudes about medical care and efficacy of treatment: c) perception of severity of illness (81).

It is shown in numerous studies that women report higher rate of symptoms, illnesses, and disability and medical care utilisation than men. When men and women define themselves as having an equivalent level of symptoms, utilisation of medical care is similar (82). Empirical evidence supports the notion that women may be more attendant to physiological changes and interpret them more readily as symptoms than men (83). The female preponderance in the prevalence of these chronic musculoskeletal conditions, and the increase of reported conditions may be a result of improved availability of health care, and a change in interpretation of the experienced bodily aches and pains. Coincided with this increase in reported musculoskeletal illnesses, there has been a dramatic change in women's role from the home-based to the out of home-working status. There are, however, indications that double working women do not report more musculoskeletal problems than the females who's work is home-based (84). The interpretation of this may be that the cultural setting in which these bodily aches and pains are understood has vanished. The mothers, aunts and grandmothers with their own symptom interpretation are no longer a part of the common role culture. The women are more than ever left to their own interpretation and understanding their own role and their own health. In this

lack of “cultural” symptom conception, the fear of diseases leads to health pessimism which in its self enforces the bodily aches and pains and they develop a virtuous circle of pain. Even though the men’s world also has changed during the same period, the social culture men relate to seems to have changed to a lesser degree than women’s relating culture.

II. The association with psychosocial and physical strain factors.

The lack of association between headache and neck or shoulder pain and external strain factors, and the strong association with factors as;

- self estimated health, - psychological unrest and global dissatisfaction, indicates that the medical profession's terminology is inappropriate by implicating that these conditions are strain- and stress injuries. This may strengthen people's understanding of being hit by an injury or a stress disease.

Barsky discuss the paradox that at the same time as the collective health of the American nation has improved dramatically in the past 30 years, surveys reveal declining satisfaction with personal health during the same period (85). In the Nordic countries the paradox is that parallel to extensive effort at the working places in order to ease the physical strain and improve the working environment in general, and the expansion of health care both in primary health care and at the hospitals, people report the same declining of personal health (15).

The consciousness and the information about health seem to have led to greater self-scrutiny and an amplified awareness of bodily symptoms and feelings of illness. The health care takers or the health care system, may in its effort to bring health to people, introduce insecurity and awareness of bodily aches. The medical profession have an increasing anxiety and awareness of not making professional mistakes. This may have led to the tendency of defining "everybody" as a patient.

It is in the cultural context the symptoms are experienced, that defines the pathological from the normal. Illnesses are normative rather than a quantitative deviation from the normal (26). We have shown that self-

estimation of poor health is strongly associated with of headache and neck or shoulder pain (paper IV). Self esteem is connected to a person's introspection, pain response, and health behaviour. The attention to oneself increases the prevalence of reported psychological and physical symptoms and negative self-evaluation. Patients asked to keep detailed illness diaries indicated that the attention to symptoms, required by completing the diary made them feel worse. The fact that people cope much of the time without awareness, is a central point in understanding personal and social adaptation. Introspective people are more prone to define many common, self-limited bodily sensations as symptoms (89).

An extensive health awareness imposed by mass media, and a health care system which is always ready to take over the peoples health responsibility, creates a health culture where the general problems of life are defined as diseases. The consequences of this is that children growing up in this culture learn and adapt a sick role of symptom awareness, making people unhappy and afraid of becoming ill, and spending energy and mental resources in claiming their legal rights in protecting themselves from what they have learnt are health risk factors, and in utilising the diagnostic measures in order to detect injuries to their bodies as early as possible.

The Repetitive Strain Injury (RSI) epidemic in Australia in during the 1980-ies, is a demonstration of how bodily aches and pains can grow into a great health problem both to the suffering individuals and the society, by giving a certain set of symptoms a diagnostic label with certain legal rights (18, 20-22). The diagnosis implied that the sufferers had exceeded their body's capacity and hence had been injured at work. The consciousness and awareness of bodily aches escalated the subjective pain conception to such an extent in some people that they were unable to continue working.

The dilemma is that on the one hand, it is good preventive health care in ergonomically working places, and legal acts that give the workers protection from injuries and abuse. But on the other hand social measures may become a health hazard in focusing on the working places and the use of muscular power as a risk of being injured and develop strain problems.

Such a focus and awareness on risk factors may turn aches and pains into diagnosis beyond the individual's own coping ability. People become afraid of physical use of their body, in order to protect the body and avoid strain injuries to the muscles and joints. This is in contrast to the many indications that use of muscle and joints is beneficial and even ease the pain and aches felt in the muscles. The consequences of this focus on strain injuries to the body, may not only prevent rehabilitation of musculoskeletal illnesses, but may even enhance the subjectively felt symptoms of the illnesses.

Self-estimated health is one of the variables with the strongest association to both headache and neck or shoulder pain. There are studies indicating that self-rated health is a powerful predictor of mortality studies (90-93). Fylkesnes discussed in his theses possible mechanisms involved in explaining this. And Kaplan suggests that the perception of one's health as either poor or excellent engages psychophysiological mechanisms influencing host resistance, or that self-rated health might indicate a subjective state that has its own health consequences (92, 94). This theory opens the lane to improved health in a population by promoting more "health optimism". The present health information strategy seems rather to sensitise people to what might be health hazards and promoting anxiety and "worst risk possible thinking" and consequently "health pessimism". This may in itself have the power to enforce bodily pains and aches and hence be a part of the mechanism behind the Barsky's "paradox of health" (88).

III. Practical measure of mental distress.

In order to explore these possible psychosocial mechanisms in the development of musculoskeletal illnesses, Goldberg's General Health Questionnaire (GHQ) is a valid inventory, but the full-scale index of 20-60 items is not practical in epidemiological studies. We have shown that mental unrest is an important dimension, and the 4-6 items of GHQ may serve as standard in future population studies.

We have in the present studies found a strong association between the target conditions and "self estimated health" (paper IV) and between the target

conditions and GHQ-score (Table IX). Among those reporting “poor health” the GHQ-score is significantly higher than among those reporting a better health, the means being respectively 4.95 and 1.58, with a $p= 0.000$. This indicates that the factor “self-reported health “ in population studies covered more or less the same dimension as GHQ-score. We think that the dimension of psychological unrest and “self-reported health” are impotent factors in epidemiological studies of musculoskeletal problems. Our study has shown that it is possible to explore the “health feeling” and psychological unrest dimension in epidemiological studies, by including a few items from the GHQ-index, supplied by a question of self estimated health.

TABLES

Table I

The relationships between reported headache and neck or shoulder pain and reported intensity of pain (a 1-4 categorical scale) in percents. Bardu 1989/90.

	PAIN							
	No pain		Little pain		Some pain		Severe pain	
	M	F	M	F	M	F	M	F
	%	%	%	%	%	%	%	%
HEADACHE:								
Monthly	23.3	19.6	34.5	32.5	35.4	42.1	6.8	5.8
Weekly	1.5	0.0	18.5	5.4	56.9	56.8	23.1	37.8
NECK OR SH. PAIN								
Monthly	26.8	11.7	42.4	42.4	26.8	40.5	4.0	5.4
Weekly	0.7	0.9	15.7	13.5	64.1	60.0	19.6	23.9

Table II

Sex specific rates of health care consumption the last year, X-ray of the neck the last 5 years, among those reporting weekly headache, and/or neck or shoulder pain. Bardu, 1989/90. Nordland 1988/89. (Confidence intervals in brackets)

Care from:	Bardu (20-70 years)		Nordland (40-42 years)	
	M	F	M	F
	%	%	%	%
G.P.:	36.3 (29.3-43.8)	34.8 (28.9-40.7)	48.3 (44.3-52.2)	54.4 (51.3-57.4)
Specialist:	0.0	0.0	11.3 (7.5-14.9)	7.2 (5.3-9.5)
Chiropractor:	3.4 (1.2-7.1)	3.6 (1.6-6.6)	19.3 (15.5-23.1)	16.4 (13.5-19.2)
Zone/"nature" therapist:	2.2 (0.6-5.6)	5.1 (2.7-8.6)	8.4 (5.8-11.7)	13.9 (11.2-16.5)
Admitted to hospital			3.6 (1.6-5.3)	4.4 (2.9-6.2)
X-ray of neck: (last 5 years)			71.1 (65.7-76.5)	70.8 (66.6-75.0)

Table III

Sex specific index of dissatisfaction in total population, and among those reporting weekly headache and neck or shoulder pain, and those reporting neither headache nor neck or shoulder pain. Bardu 1989/90. (Confidence intervals in brackets)

Complaints	Dissatisfaction index	
	M (N=707) Score	F (N=674) Score
No-complaints	17.4 (17.1-17.7)	17.4 (17.1-17.7)
HEADACHE		
Monthly	18.7 (18.3-19.1)	18.5 (18.2-18.8)
Weekly	19.9 (19.6-20.2)	19.2 (18.8-19.6)
NECK OR SHOULDER PAIN		
Monthly	18.7 (18.3-19.1)	18.6 (18.3-18.9)
Weekly	18.4 (18.1-18.7)	18.9 (18.5-19.3)

Table IV

The response rate of the Bardu Study questionnaire, sex and age specific.
(Two persons did not mark their questionnaires with sex)

Age groups	Population		Return rate in %	
	Male	Female	Male	Female
	N	N	%	%
20-29 years	370	289	76.5	79.6
30-39 years	282	254	73.1	81.5
40-49 years	269	269	76.6	78.4
50-59 years	152	156	88.2	84.4
60-70 years	166	199	90.4	88.4
Total	1239	1167	79.0	81.9

Table V

Sex specific prevalences of reported headache. Tromsø 1986/87, Nordland 1988/89, Bardu 1989/90.

	Tromsø		Nordland		Bardu	
	(20-56 years)		(40-42 years)		(20-70 years)	
	N=8537	N=9162	N=5397	N=3652	N=956	N=934
	M	F	M	F	M	F
	_____	_____	_____	_____	_____	_____
	%	%	%	%	%	%
Seldom/never	72.6	49.2	71.7	46.1	71.3	54.3
Monthly	21.4	37.6	21.7	40.7	21.3	33.8
Weekly	4.9	10.9	5.7	9.6	5.9	10.0
Daily	1.1	2.2	0.9	1.9	1.3	1.9

Table VI

Sex specific prevalences of reported neck or shoulder pain. Tromsø 1986/87, Nordland 1988/87, Bardu 1989/90.

	Tromsø		Nordland		Bardu	
	(20-56 years)		(40-42 years)		(20-70 years)	
	N=8771	N=9334	N=3571	N=3597	N=965	N=933
	M	F	M	F	M	F
	-----		-----		-----	
	%	%	%	%	%	%
Seldom/never	63.5	46.1	60.3	42.3	63.1	49.1
Monthly	21.1	29.0	23.1	30.0	20.8	27.8
Weekly	7.6	12.4	8.4	13.7	8.4	10.8
Daily	7.8	12.5	8.2	14.0	7.6	12.3

Table VII

Age and sex specific prevalence of reported weekly headache. Bardu 1989/90. (Confidence intervals in brackets).

Headache		
Age	M %	F %
20-29	3.5 (1.7-6.3)	7.8 (4.7-12.1)
30-39	5.3 (2.7-9.3)	13.5 (8.8-18.2)
40-49	9.7 (6.0-14.6)	12.8 (8.2-17.3)
50-59	9.7 (5.2-16.0)	12.1 (7.0-18.9)
60-70	10.0 (5.7-16.0)	11.9 (7.5-17.6)
Total	7.0 (5.5-8.8)	11.5 (9.4-13.5)

Table VIII

Age and sex specific prevalences of reported weekly neck or shoulder pain.
Bardu 1989/90. (Confidence intervals in brackets).

Age	Neck or shoulder pain	
	M	F
	%	%
20-29	5.3 (2.9-8.5)	13.9 (9.4-18.4)
30-39	12.6 (8.0-17.2)	19.3 (13.9-24.7)
40-49	19.4 (14.0-24.8)	22.3 (16.7-27.9)
50-59	25.4 (18.3-33.6)	34.1 (26.1-42.8)
60-70	27.3 (20.4-35.2)	28.8 (22.3-36.1)
Total	15.9 (13.6-18.2)	22.4 (19.8-25.1)

Table IX

Sex specific GHQ-scores and Likert-scores among the headache and the neck or shoulder pain reporters, compared to those reporting neither headache nor neck or shoulder pain. Bardu 1989/90. (Confidence intervals in brackets).

GHQ-score		Likert-score	
M (N=890)	F (N=844)	M (N=890)	F (N=844)
Score	Score	Score	Score

NO COMPLAINTS:

	1.8 (1.6-2.0)	1.8 (1.6-2.0)	16.1 (15.7-16.5)	16.3 (15.9-16.7)
--	---------------	---------------	------------------	------------------

HEADACHE:

Monthly	2.9 (2.6-3.1)	3.1 (2.8-3.4)	18.6 (18.1-19.1)	18.9 (18.4-19.4)
Weekly	4.1 (3.7-4.4)	4.8 (4.4-5.1)	21.2 (20.6-21.8)	22.2 (21.6-22.8)

NECK OR SHOULDER PAIN:

Monthly	3.1 (2.8-3.4)	3.2 (2.8-3.5)	18.8 (18.3-19.3)	19.4 (18.8-20.0)
Weekly	3.1 (2.8-3.4)	3.5 (3.1-3.8)	19.3 (18.8-19.8)	20.1 (19.6-20.6)

REFERENCES

1. Linet MS, Stewart W, Celentano DD, Ziegler D, Sprecher M. An epidemiological study of headache among adolescents and young adults. *JAMA* 1989; 261: 2211-16.
2. Waters WE, Campbell MJ, Elwood PC. Migraine, headache and survival in women. *Br Med J* 1983; 287: 1442-43.
3. Rasmussen BK, Jemsem R, Schroll M, Olesen J. Epidemiology of headache in general population-a prevalence study. *J Clin Epidemiol* 1991; 44: 1147-57.
4. Brattberg G, Thorslund M, Wikman A. The prevalence of pain in a general population. The results of a postal survey in a county in Sweden. *Pain* 1989; 37:215-22.
5. Reisboard SL, Greenland S. Factors associated with self-reported back-pain prevalence: a population study. *J Chron Dis* 1985; 38: 691-702.
6. Crook J, Rodeout E and Browne G. The prevalence in a general population. *Pain*. 1984; 18: 299-314.
7. Cunningham LS, Kesley JL. Epidemiology of musculoskeletal impairments and associated disability. *Am J Puplic Health* 1984; 74: 574-79.
8. Hasvold T, Johnsen R. Headache and neck or shoulder pain - frequent and disabling complaints in general population. *Scand J Prim Health Care* 1993; 11: 219-24.
9. Frymoyer JW, Cats-Baril WL. Causes and cure of low back pain and sciatica. An overview of the incidences and cost of low back pain. *Otopedic Clin North Am* 1991; 22: 263-71.

10. Peters D, Davies P, Pietroni P. Musculoskeletal clinic in general practice: study of one year's referrals. *Br J Gen Pract* 1994; 44: 25-9.
11. Ekenback K, Hagberg M. Dålig prognos vid svåra nack-skulderbesvär. *Läkartidningen* 1991; 88: 1120-21.
12. Mastekaasa A. Kjønnforskjeller i sykefravær: Betydningen av omsorgsoppgaver og jobbegenskaper. *Tidsskrift for samfunnsforskning* 1990; 31: 531-54.
13. Johansson B. Backache - current orthopaedic viewpoints. *Nord Med* 1994; 109: 155-6.
14. Carlsson AM. Ryggbesvær - ett svårbehandlat smærtilstånd. {Back pain - a type of pain difficult to treat} *Läkartidningen* 1988; 50: 499-400.
15. Brinck B, Rasmussen NK, Kjølner M, Thomsen LK. Muskel- og skelettsygdom i Danmark. Forekomst and sygdomsadfærd. DIKE, København 1995.
16. Bass JM, McWhinney IR, Dempsey JB, Annen AA, Bocking BD, Bryan WH, et al. Predictors of outcome in headache patients presenting to family physicians - a one year prospective Study. *Headache* 1986; 26: 285-95.
17. Steptoe A. Modern psychosomatic medicine: the emergence of an experimental discipline. Editorial . *J Royal College of General Practitioners* 1985; 115-16.
18. Littlejohn GO. Fibrositis/Fibromyalgia Syndrome in the Workplace. *Rheum Dis Clinics North Am* 1989; 15: 45-60.
19. Reilly PA. Fibromyalgia in the workplace: a "management" problem. *Ann Rheum Dis* 1993; 52: 249-51.

20. Bell DS. Editorial. "Repetition strain injury": an iatrogenic epidemic of simulated injury. *Med J Austral* 1989; 151: 280-4.
21. Ferguson DA. "RSI": putting the epidemic to rest. *Med J Austral* 1987; 147: 213-4.
22. Cleland LG. "RSI": a model of social iatrogenesis. *Med J Austral* 1987; 147: 236-9.
23. Croft P, Rifby AS, Boswell R, Schollum J, Silman A. The prevalence of chronic widespread pain in the general population. *J Rheumatol* 1993; 20: 710-3.
24. Classification and diagnostic criteria for headache disorders, cranial neuralgia's and facial pain. *Cephalalgia* 1988; 8: 19-28.
25. Rossow I, Rise J. Concordance of parental and adolescent health behaviour. *Soc Sci Med* 1994; 38: 1299-1305.
26. Hofmann B. Normalitet og patologi {The normal and the pathological} *Tidsskr Nor Lægeforen* 1995; 115: 3800-2.
27. Larry L. Mullins, Roberta A. Olson. Familial Factors in the Aetiology, Maintenance, and Treatment of Somatoform Disorders in Children. *Fam Systems Med* 1990; 8: 159-75.
28. Bortz WM. The disuse syndrome. *West J Med* 1984; 141: 691-4.
29. Engel GL. Psychogenic pain and the pain prone patient. *Am J Med* 1959; 26: 899-918.
30. Naliboff BD, Cohen MJ, Swanson GA, Bonebakker AD, McArthur DL. Comprehensive assessment of chronic low back pain patients and controls: Physical abilities, level of activities, psychological adjustment and pain perception. *Pain* 1985; 23: 121-34.

31. Szasz TS. The painful person. *Lancet* 1968; 88: 18-22.
32. Waddell G, Main CJ, Morris EW, DiPaola M, Gray ICM. Chronic low back pain, psychological distress and illness behaviour. *Spine* 1984; 9: 209-13.
33. Deyo RA. Conservative therapy for low back pain: Distinguishing useful from useless therapy. *JAMA* 1983; 250: 1057-62.
34. Dolce JJ, Crocker MF, Moletteire C, Doleys DM. Exercise quotas, anticipatory concern and self-efficacy expectancies in chronic pain.: A preliminary report. *Pain* 1986; 24: 365-72.
35. Editorial: Back pain - what can we offer? *Br Med J* 1979; 706.
36. Engel GL. The need for a new medical model: A challenge for biomedicine. *Science* 1977; 196: 129-36.
37. Gray IMC, Main CJ, Waddell G. Illness behavior and the role of psychological assessment in general orthopedic practice. *Clin Orthop* 1984; 184: 258-63.
38. Viinamaki H, Koskela K, Niskanen L, Arnkill R, Tikkanen J. Unemployment and mental wellbeing: a factory closure study in Finland. *Acta Psychiatry Scand* 1993; 88: 429-33.
39. Nagata K, Okubo H, Moji K, Takemoto T. Difference of the 28-item general health questionnaire scores between Japanese high school and university students. *Jpn J Psychiatry Neurol* 1993; 47: 575-83.
40. Kitamura T, Suzuki T, Perceived rearing attitudes and minor psychiatric morbidity among Japanese adolescents. *Jpn J Psychiatry Neurol* 1993; 47: 531-5.

41. Malt UF, Karlehagen S, Hoff H, Herrstromer U, Hildingson K, Tibell E, Leymann H. The effect of major railway accidents on the psychological health of train drivers--I. Acute psychological responses to accident. *J Psychosom Res* 1993; 37: 793-805.
42. Leach J, Ridsdale L, Smeeton N. Is there a relationship between a mother's mental state and consulting the doctor by the family? A study in a military general practice. *Fam Pract* 1993; 10: 305-11.
43. Sato T, Takeichi M. Lifetime prevalence of specific psychiatric disorders in a general medicine clinic: see comments: *Gen Hosp Psychiatry* 1993; 15: 224-33.
44. Piccinelli M, Bisoffi G, Bon MG, Cunico L, Tansella M. Validity and test-retest reliability of the Italian version of the 12-item General Health Questionnaire in general practice: a comparison between three scoring methods. *Compr Psychiatry* 1993; 34: 198-205.
45. Graetz B. Health consequences of employment and unemployment: longitudinal evidence for young men and women. *Soc Sci Med* 1993; 36: 715-24.
46. Spelten E, Smith L, Totterdell P, Barton J, Folkard S, Bohle P. The relationship between coping strategies and GHQ-scores in nurses. *Ergonomics* 1993; 36: 227-32.
47. Parkes KR. Mental health in the oil industry: a comparative study of onshore and offshore employees. *Psychol Med* 1992; 22: 997-1009.
48. Fraser SC, Smith K, Agarwal M, Bates T. Psychological screening for non-specific abdominal pain. *Br J Surg* 1992; 79: 1369-71.
49. Boardman AP, Bilankis N, Zouni M, Bouras N. The detection of psychiatric cases by Greek physicians: report on a study carried out in a Greek primary care setting. *Int J Soc Psychiatry* 1992 ; 38: 235-41.

50. Stansfeld SA, Marmot MG. Social class and minor psychiatric disorder in British Civil Servants: a validated screening survey using the General Health Questionnaire. *Psychol Med* 1992; 22: 739-49.
51. Benjamin J, Maoz B, Shiber A, Antonovsky H, Mark M. Prevalence of psychiatric disorders in three primary-care clinics in Beersheba, Israel. Concurrent assessment by the General Health Questionnaire, General Practitioners, and Research Diagnostic Criteria. *Gen Hosp Psychiatry* 1992; 14: 307-14.
52. Gureje O, Obikoya B, Ikuesan BA. Prevalence of specific psychiatric disorders in an urban primary care setting. *East Afr Med J* 1992; 69: 282-7.
53. Koeter MW . Validity of the GHQ and SCL anxiety and depression scales: a comparative study. *J Affect Disord* 1992; 24: 271-9.
54. Huppert FA, Garcia AW, Qualitative differences in psychiatric symptoms between high risk groups assessed on a screening test (GHQ-30). *Soc Psychiatry Psychiatr Epidemiol* 1991; 26: 252-8.
55. Rosenberg M, Commerford K, Driever M. Identification of psychosocial distress: a comparison of internal medicine and family medicine residents. *J Gen Intern Med* 1991; 6: 529-34.
56. Benjamin S, Lennon S, Gardner G, The validity of the General Health Questionnaire for first-stage screening for mental illness in pain clinic patients. *Pain* 1991; 47: 197-202.
57. Thornley CN, Walton VA, Romans-Clarkson SE, Herbison GP, Mullen PE. Screening for psychiatric morbidity in men and women. *N Z Med J* 1991; 104: 505-7.
58. Redman S, Webb GR, Hennrikus DJ, Gordon JJ, Sanson-Fisher RW. The effects of gender on diagnosis of psychological disturbance. *J Behav Med* 1991; 14: 527-40.

59. Graetz B. Multidimensional properties of the General Health Questionnaire. *Soc Psychiatry Psychiatr Epidemiol* 1991; 26:132-8.
60. Cramer D. Social support and psychological distress in women and men. *Br J Med Psychol* 1991; 64: 147-58.
61. Blakely AA, Howard RC, Sosich RM, Murdoch JC, Menkes DB, Spears GF. Psychiatric symptoms, personality and ways of coping in chronic fatigue syndrome. *Psychol Med* 1991; 21: 347-62.
62. Berwick DM, Murphy JM, Goldman PA, Ware JE Jr, Barsky AJ, Weinstein MC. Performance of a five-item mental health screening test. *Med Care* 1991; 29: 169-76.
63. Melzack R. The McGill pain questionnaire: Major properties and scoring methods. *Pain* 1975; 1: 277-99.
64. Von Korff M, Dworkin S, LeResche L. Graded chronic pain status: an epidemiologic evaluation. *Pain* 1990; 40: 279-91.
65. Goldberg D, Williams P. User's guide to the general health questionnaire. Windsor: NFER-Nelson, 1988.
66. Goldberg D, Bridges K, Duncan-Jones P, Grayson D. Detecting anxiety and depression in general medical setting. *BMJ* 1988; 297: 897-99.
67. Malt UF, Mogstad T-E, Refnin IB. Goldbergs General Health Questionnaire. *Tidskr Nor Lægeforen*. 1989; 109: 1391-4.
68. Goldberg DP, Hillier VF. A scaled version of the general health questionnaire. *Psychol Medicine* 1979; 9:139-45.

69. Boardman AP. The general health questionnaire and the detection of emotional disorder by general practitioners: a replicated study. *Br J Psychiatry* 1987; 151: 373-81.

70. Campbell A, Converse PE, Rodgers W. The quality of American life. Perception, Evaluation and Satisfactions. Russell Sage Foundation, New York 1976. { A Norwegian version }

71. Kleinbaum DG, Kupper LL, Morgenstern H. Epidemiologic Research principles and quantitative methods. Van Nostrand Reinhold, New York 1982.

72. Jacobsen BK, Stensvold I, Fylkesnes K, Kristiansen IS, Thelle DS. The Nordland health study. Design of the study, description of the population, attendance and questionnaire response. *Scand J Soc Med* 1992; 3: 184-7.

73. Jacobsen BK, Thelle DS, T Tromsø heart study: responders and non-responders to a health questionnaire, do they differ? *Scand J Soc Med* 1988; 16: 101-4.

74. Moum T. Yea-saying and mood-of-the-day effects in self-reported quality of life. *Soc Indicators Res* 1988; 20: 117-40.

75. Carey et al. Reporting of acute low back pain in a telephone interview. Identification of potential biases. *Spine* 1995; 20: 787-90.

76. Knut Fylkesnes. Factors affecting self-evaluated general health status - and the use of professional health care service. *ISM skriftserie* 1991; 19.

77. Blalock HM. Causal inferences in nonexperimental research. University of North Carolina Press, 1961.

78. Galtung J. Theory and methods of social research. Oslo, Universitetsforlaget, 1970.

79. Balock HM. Causal inferences in nonexperimental research. University of North Carolina Press, 1961.
80. Philips HC, Jahnanshahi M. The components of pain behaviour report. *Behav Res Ther* 1986; 24: 117-25.
81. Reisboard SL, Greenland S. Factors associated with self-reported back-pain prevalence: a population study. *J Chron Dis* 1985; 38: 691-702.
82. Celentano DD, Linet MS, Stewart WF. Gender differences in the experience of headache. *Soc Sci Med* 1990; 30: 1289-95.
83. Gijbbers van Wijk CMT, van Vliet KP, Everaerd WTAM. Symptom sensitivity and sex differences in physical morbidity: a review of health surveys in the United States and the Netherlands. *Women & Health*. 1991; 17: 91-124.
84. Verbrygge LM. Sex differentials in health. *Public Health Reports* 1982; 97: 417-37.
88. Barsky AJ. The paradox of health. *The New England J Med* 1988; 18: 414-8.
89. Mechanic D. The concept of illness behaviour: culture, situation and personal predisposition. *Psychol Medic* 1986; 16: 1-7.
90. Mossey JM, Shapiro E. Self-rated health: a predictor of mortality among the elderly. *Am J Public Health* 1982; 72: 87-93.
91. Kaplan GA, Camacho T. Perceived health and mortality: A nine-year follow up of the Human population Laboratory cohort. *Am J Epidemiol* 1983; 117: 292-304.

92. Idler EL, Angel RJ. Self-rated health and mortality in the NHANES-I epidemiologic follow-up study. *Am J Public Health* 1990; 80: 446-52.
93. Kaplan G, Barell V, Lusky A. Subjective state of health and survival in elderly adults. *J Geront* 1988; 43: 114-20.

PAPER I

The General Health Questionnaire: how many items are really necessary in population surveys?

B. K. JACOBSEN,¹ T. HASVOLD, G. HØYER AND V. HANSEN

From the Institute of Community Medicine, University of Tromsø, Norway

SYNOPSIS This paper seeks to investigate whether only a few questions selected from the General Health Questionnaire (GHQ) may be used to measure the degree of mental distress in population surveys. Data from 2112 men and women, 18 to 70 years old from two cross-sectional studies conducted in northern Norway and the island of Spitzbergen in the Arctic, were used. Correlation analysis of Likert scores from a 20-item version of GHQ (GHQ-20) with Likert scores based on four and six items selected by multiple regression analysis or by competent physicians was performed. The correlation coefficients between the scores from the subsets of four items and the full GHQ-20 questionnaire were high (greater than 0.80) in all examined subgroups of the populations. Increasing the number of questions from four to six only marginally increased the correlation coefficients. Thus, a simple linear sum of Likert scores based on a few GHQ items can be used to measure the degree of mental distress in population surveys.

INTRODUCTION

The General Health Questionnaire (GHQ) was developed as a screening instrument to identify persons suffering from non-psychotic psychiatric disorders in general populations. It has been extensively used and validated (Goldberg, 1972; Goldberg & Williams, 1988). Various versions of the GHQ have been introduced, ranging from the full scale version of 60 items to the shortest version including only 12 items. The GHQ may be used in various settings (Goldberg & Williams, 1988). It can be scored in various ways, dichotomous for case identification and continuous (i.e. Likert score) to provide information on the degree of mental distress.

Increasing awareness of the relation between mental distress and somatic disorders has made it common to include questions concerning the respondents' mental health in population based surveys. However, most instruments designed to measure mental disorders are often too comprehensive and thus difficult to include in such surveys. Even the shorter versions of the GHQ

may be considered too long to be included in self-administered questionnaires if mental disorders are not the main objective of the study.

In many surveys, the solution has been to include only a few questions concerning mental problems. The selection of such questions is often based on theoretical considerations or simply on assumptions that these questions will work properly. We therefore asked if it is possible to use a subset of questions from the General Health Questionnaire in order to rank the subjects according to mental distress, without losing much of the information obtained by using longer versions.

METHOD

Populations

In 1989, all men and women aged between 20 and 70 years in the municipality of Bardu were sent a questionnaire that mainly focused on common psychosomatic complaints like headache and neck or shoulder pain. The questionnaire included the 20-item version of the GHQ. Bardu is a rural, inland area in the north of Norway with an age-sex distribution similar to the Norwegian population at large. A total of 1733 answered all the 20 GHQ items, representing 73% of the target population.

* Address for correspondence: Dr Bjarne K. Jacobsen, Institute of Community Medicine, University of Tromsø, N-9037, Tromsø, Norway.

In 1988, all Norwegians aged 18 and above living on the Norwegian island of Spitsbergen situated in the Arctic region (78° North) were invited to a health screening. This population is younger, male dominated and generally more healthy than the general Norwegian population. The 612 attenders were subsequently sent a questionnaire with the GHQ-20 version. Altogether, 46% of the invited population (379 subjects) answered all 20 GHQ items.

Scoring of the GHQ

As usual when administering the GHQ, the respondents were asked to indicate to what extent the 20 statements given in the questionnaire (listed in Appendix 1) were true for them. All GHQ questions offer four answer categories indicating an increasing or decreasing level of mental distress, graded from e.g. 'not at all' to 'much more than usual'. We scored the information according to the Likert scoring procedure where the score on each question ranged from 0 to 3 (Goldberg, 1972), thereby obtaining a total score theoretically ranging from 0 to 60. In order to make it possible to evaluate whether the results obtained from the general population could be extended to a subgroup of persons with more severe mental distress, some analysis was restricted to Bardu subjects who were identified as 'cases' according to the traditional GHQ scoring (0, 0, 1, 1). When using the GHQ-20 questionnaire, the cut-off point for cases is scores greater than three (Goldberg, 1972).

Selection of GHQ items

Using the sum of the scores from the 20 items as the dependent variable, multiple regression analysis was performed on Bardu men aged 40 or under (476 men). The best subset (based on R^2) of four GHQ items was selected. Thereafter, the best subset of six GHQ items including these four items was selected. These two subsets explain 86 and 91%, respectively, of the variance of the total score based on the 20-item questionnaire. The selected subsets of 4 and 6 items are displayed in Table 1. We further computed in descending order of R^2 values the 200 best combinations of four items. The difference in R^2 between the best combination of four items and the 'worst' combination was negligible, i.e. less than 5%.

Table 1. Combinations of the four and six best GHQ items selected by multiple regression analysis in men < 41 years old in Bardu, and independently selected by five experienced clinicians. The numbers refer to the GHQ items listed in Appendix 1

	4-item combination	6-item combination
Regression analysis	6+14+15+16	3+6+14+15+16+19
Psychiatrist I	10+14+15+17	2+7+10+14+15+17
Psychiatrist II	3+10+11+19	1+3+8+10+11+19
Psychiatrist III	2+9+15+19	2+6+9+11+15+19
General practitioner I	6+11+15+20	6+10+11+13+15+20
General practitioner II	1+6+10+20	1+5+6+10+11+20

To evaluate how low the correlation coefficient between a score based a combination of six items and the total score based on 20 items could be, we selected the six items with the lowest correlation with the complete scale total sum score. A simple linear combination of the sum of the scores of these six items was computed. This 'poorest' combination of items consisted of items 3, 4, 5, 7, 8 and 13 (see Appendix 1 for item text).

The best-subset analysis based on the multiple regression has the prerequisite that data from a survey using an extensive questionnaire is available, which most often is not the case. Thus, we asked three physicians trained in psychiatry (two of them senior consultants at the local mental hospital) and two experienced general practitioners independently to select the four GHQ items they regarded as the most important indicators of mental distress in a general population. After selecting four items, they were asked to add another two among the remaining 16 items. The five clinicians all selected different combinations. The 10 selected combinations of GHQ items are shown in Table 1.

Statistical analyses

For each individual, we computed scores as the simple linear sum of the answers to the four and six items selected by the regression analysis and by the five clinicians, as well as the score based on all 20 items. Thus, there were altogether 13 scores for each subject. The scores based on four and six items were correlated with the total score based on all 20 items.

As we wanted to take a conservative stand, we have presented Spearman's correlation coefficients throughout. The Pearson correlation coefficients were generally somewhat higher. The SAS analysing program system (1987) was used in all analyses.

RESULTS

Table 2 displays the mean GHQ scores and ranges based on the GHQ-20 in the two populations included in this study. A somewhat lower mean score in the Spitzbergen than the Bardu population was reflected in a much lower prevalence of 'cases' (as defined by a score > 3 when applying the traditional GHQ scoring) in the Spitzbergen population compared with the Bardu population (13% v. 22%). However, as shown in Table 3, the four- and six-item scores based on the multiple regression analysis were highly correlated to the 20-item score in the two populations, ranging from 0.88 to 0.93. The correlation coefficients were also high when the analysis was restricted to the 377 persons living in Bardu who were identified as cases (Table 3).

Furthermore, the correlation coefficients between the score based on 20 items and the items selected by the five clinicians were very high in all examined subgroups and only small differences were found for different combinations of items. For example, in the 889 Bardu men, the Spearman correlation coefficients between the score based on 20 items and the score based on four and six GHQ items selected by the clinicians ranged from 0.83-0.89 and 0.85-0.92, respectively. Corresponding figures for the 844 Bardu women were 0.85-0.89 and 0.87-0.92. Nearly identical results were found both in men and women living on Spitsbergen.

The rank correlation coefficient between a combination of six items selected to give the

Table 3. Spearman correlation coefficients between the score based on 20 items and the score based on 4 and 6 GHQ items, respectively, selected by multiple regression analysis in Bardu men < 41 old

	N	4-item score	6-item score
Bardu men, < 41 years old (reference population)	476	0.90	0.93
Bardu men, > 40 years old	413	0.89	0.92
Bardu women, < 41 years old	428	0.90	0.92
Bardu women, > 40 years old	416	0.90	0.93
Spitzbergen men	238	0.88	0.91
Spitzbergen women	141	0.91	0.93
Bardu male 'cases'	175	0.85	0.91
Bardu female 'cases'	202	0.82	0.88

lowest correlation with the total score based on 20 items, was 0.53 in young Bardu men, 0.50 in older Bardu men (> 40 years old) and 0.63 in Bardu women (irrespective of age group). The Pearson correlation coefficients were between 0.64 and 0.77.

DISCUSSION

In epidemiology, it is of value to have indicators of mental distress that may be correlated with other variables. Our results strongly suggest that relatively few items from a rather comprehensive questionnaire are sufficient to rank persons according to mental distress. The combinations of items selected by multiple regression analysis or clinicians seem to work equally well in different populations. Roughly, any combination is approximately as good as another. Furthermore, the increase in correlation coefficients when the number of GHQ items is increased from four to six is not impressive, implying that little information is gained by increasing the number of items included beyond

Table 2. Mean sum score based on the 20-item version of the GHQ (scored 0, 1, 2, 3) and mean age in the Bardu and Spitzbergen population

	Number of subjects	Mean score	Range	Mean age
Bardu men	889	17.0 (6.9*)	5-60	40.6 (14.4)
Bardu women	844	17.9 (7.6)	4-55	42.0 (14.6)
Spitzbergen men	238	15.4 (5.9)	2-49	39.8 (10.3)
Spitzbergen women	141	15.0 (5.8)	5-39	35.7 (9.1)

* Standard deviation.

four. One should also notice that the correlation between the scores based on four and 20 items was not influenced by whether or not the subsets of four items are balanced for overall agreement set (Goldberg, 1972), i.e. that agreement with two items signals health and agreement with the two other items signals mental distress.

The high correlations also observed in the subgroup labelled as 'cases' suggest that the total scores from the same combinations of items are highly correlated with an increased burden of mental problems within the subgroup of subjects who may be in need of treatment because of mental problems.

By using the Likert score more of the information provided by the responders will be preserved compared with the dichotomous GHQ scoring. In contrast to the GHQ scoring, the Likert scoring pays attention to the distinction between answers like 'Not at all' and 'Not more than usual'. Furthermore, the GHQ scoring may artificially increase the correlation between the sums based on 6 and 20 items, respectively, as many persons will score zero in both versions.

Although we are not able to confirm this from our data, it is reasonable to believe that non-responders to the questionnaire have a higher GHQ score than responders. Thus, the mean values of both the dependent and independent variables in our analyses may be somewhat lower than in the population at large. There is, however, no reason to believe that this will influence the rank correlation coefficients significantly.

Case identification was not the aim of our study. However, it is interesting to note that other studies have found that a subset of a few questions may be as good (or better) than a complete scale also in this respect (Nelson *et al.* 1987; Berwick *et al.* 1991). Furthermore, we have previously shown that in the Tromsø population, the associations between a mental distress score based on only three GHQ-like questions and sociodemographic and life-style variables are relatively strong and plausible (Hansen & Jacobsen, 1989). Thus, to paraphrase Berwick and coworkers (1991), small may be beautiful in psychiatric epidemiology.

Our results are also in accordance with a recently published Norwegian study comparing a subset of five questions from the 25-item

version of the Hopkins Symptom Check List (HSCL-25) with the full 25-item version (Tambs & Moum, 1993). This study demonstrates a high correlation ($r_p = 0.92$) between the score based on five items and the score based on the complete questionnaire. The design of our study and that of Tambs & Moum (1993) differ, however. The most important difference is that we have been able to test the different combinations of GHQ items in different populations. We demonstrate that several different combinations of GHQ items that work well in a traditional rural farming district also all work well in the very selected population of Spitzbergen.

How is it that the score based on any sensible combination of four items from the GHQ-20 is so highly correlated with the scores based on all 20 items? One explanation may be that different kinds of common mental problems (e.g. depression, nervousness, lack of self confidence) generally have similar impacts on the quality of life and every-day life activities. As the GHQ items focus on these activities, it is quite likely that these items will be highly sensitive to many kinds of mental distress. Therefore, the scores of individual GHQ items are positively correlated. The fact that the five clinicians all selected different combinations of items seems to support the idea that many of the GHQ questions are both global and relevant. Even the combination of the six items with the lowest correlation with the total score, indeed very artificially constructed, has a surprisingly high correlation coefficient with the GHQ-20 score ($r_s > 0.5$, $r_p > 0.6$).

Thus, our conclusion is that very short versions of the GHQ questionnaire may be used in population surveys for ranking the subjects according to degree of mental distress. The sum of the scores from a maximum of six GHQ items, selected by competent physicians, provides sufficient information in this regard. This conclusion is, however, dependent on at least two important prerequisites: first that the GHQ-20 questionnaire provides a valid measurement of mental distress among individuals, which is well documented (Goldberg & Williams, 1988); secondly, that the respondents will answer the four- or six-item version in the same manner as when the questions are incorporated in the 20-question version. The latter has still to be shown.

We thank Drs Knut Iversen, Tore Sørli, Anders Forsdahl and Knut Holtedahl for selecting the GHQ items that they regarded to be the most important indicators of mental distress in a general population and Professor Egil Arnesen for help with the analyses.

APPENDIX 1

The following items are included in the 20-item version of the General Health Questionnaire

In the last 2 weeks, have you...

- 1 (7)* Been able to concentrate on whatever you're doing?
- 2 (14) Lost much sleep over worry?
- 3 (21) Been managing to keep yourself busy and occupied?
- 4 (26) Been getting out of the house as much as usual?
- 5 (28) Been feeling on the whole you were doing things well?
- 6 (30) Been satisfied with the way you've carried out your task?
- 7 (35) Felt that you are playing a useful part in things?
- 8 (36) Felt capable of making decisions about things?
- 9 (39) Felt constantly under strain?
- 10 (40) Felt that you couldn't overcome your difficulties?
- 11 (42) Been able to enjoy your normal day-to-day activities?
- 12 (43) Been taking things hard?
- 13 (46) Been able to face up to your problems?

- 14 (47) Found everything getting on top of you?
- 15 (49) Been feeling unhappy and depressed?
- 16 (50) Been losing confidence in yourself?
- 17 (51) Been thinking of yourself as a worthless person?
- 18 (54) Been feeling reasonably happy, all things considered?
- 19 (55) Been feeling nervous and strung up all the time?
- 20 (58) Found at times you couldn't do anything because your nerves were too bad?

* This number indicates the item's position in the 60-item questionnaire (Goldberg, 1972).

REFERENCES

- Berwick, D. M., Murphy, J. M., Goldman, P. A., Ware, Jr. J. E., Barsky, A. J. & Weinstein, M. C. (1991). Performance of a five-item mental health screening test. *Medical Care* 29, 169-176.
- Goldberg, D. P. (1972). *The Detection of Psychiatric Illness by Questionnaire*. Oxford University Press: London.
- Goldberg, D. & Williams, P. (1988). *A Users Guide to the General Health Questionnaire*. NFER-Nelson: Windsor.
- Hansen, V. & Jacobsen, B. K. (1989). Mental distress and social conditions and lifestyle in northern Norway. *British Medical Journal* 299, 85-88.
- Nelson, E., Wasson, J. H., Kirk, J. W., Keller, A., Clark, D., Dietrich, A., Stewart, A. & Zubkoff, M. (1987). Assessment of function in routine clinical practice: description of the COOP Chart method and preliminary findings. *Journal of Chronic Diseases* 40 (suppl. 1), 55-63.
- SAS Institute Inc. (1987). *SAS Users Guide: Basics, 5th Version*. SAS Institute Inc: Cary, New York.
- Tambs, K. & Moum, T. (1993). How well can a few questionnaire items indicate anxiety and depression? *Acta Psychiatrica Scandinavica* 87, 364-367.

PAPER II

Headache and neck or shoulder pain – frequent and disabling complaints in the general population

Toralf Hasvold and Roar Johnsen

Institute of Community Medicine, University of Tromsø, Norway

Hasvold T, Johnsen R. Headache and neck or shoulder pain – frequent and disabling complaints in the general population. *Scand J Prim Health Care* 1993;11:219-24.

Objective – to describe the prevalences of reported headache and neck or shoulder pain as unspecified complaints, and to explore the consequences of these complaints measured as unfitness for work.

Design – self-administered questionnaire as part of a general health screening.

Setting – all persons aged between 20 and 56 years, in the municipality of Tromsø were invited. Of 29026 invited, 21826 attended, and of these 20026 answered the questionnaire. Some 17700 answered the questions on headache, and 17650 on neck or shoulder pain.

Results – 6.0% of the males reported weekly or more frequent headache, and 15.4% reported neck or shoulder pain. The corresponding prevalences in women were 13.1% and 24.9%. This female preponderance was present also among subjects expressing the complaints daily or monthly. The prevalences of reported neck or shoulder pain increased significantly with age, while the prevalences of reported headache were not influenced by age. Of the subjects with weekly headache, as many as 30% of both sexes reported being «seriously hampered or unable to perform ordinary work».

Conclusions – many people in the general population live with disabling complaints, but the numbers seeking medical care for them are far fewer. It is important to demonstrate the high prevalence of headache and neck or shoulder pain, and also to understand the complexity of the causal factors, and the reason why only a proportion of sufferers seek professional help.

Key words: headache, neck or shoulder pain, prevalence, disability.

Toralf Hasvold, MD, Institute of Community Medicine, University of Tromsø, Breivika, N-9000 Tromsø, Norway.

Aches and pains are common complaints among patients in general practice (1). Muscular and skeletal pains have been roughly estimated to be responsible for some 15% of the total expenditure of the health service in Norway (2), and persons complaining of headache and neck or shoulder pains represent a considerable part of the patients in general practice (3-8). Moreover, musculoskeletal disorders account for an increasing part of sickness certifications and disability pensions (9).

Collaboration between clinicians and epidemiologists in the conduct of community surveys of headache has been requested (6,8), since most earlier information from this field has been based on highly selected patient populations. The 1974 Pontypridd Headache Survey by Waters (8) is one of the few population based surveys. Further studies are therefore needed to disclose the occurrence of these complaints in the general population.

The aims of this study were to describe the prevalence of reported headache and neck or shoulder pain among men and women in a general population, and to explore the co-morbidity of the complaints studied. The severity of the complaints was determined by their frequency (monthly, weekly or daily) and the reported lack of fitness to work.

Methods

During 1986/87, all men and women aged 20 to 56 years in the municipality of Tromsø were invited to a screening on risk factors for cardiovascular disease. Of 29026 invited individuals, 21826 (75%) attended the screening, and of these, 20026 (92%) answered a questionnaire on health, lifestyle, psychological and social factors, and coping ability.

The present study was based on the following questions: «How often do you have headache?», and

«How often do you have neck or shoulder pain?» The prevalences were measured by four response alternatives: «Seldom or never, monthly or more often, weekly or more often, and daily».

The severity was also measured by four exclusive alternatives to the question: «Do your ailments reduce your working fitness?» The alternatives were: «Never or only to a slight extent, to some degree, seriously hampered, and unfit to do ordinary work». Neck or shoulder pains will be labelled «neckache» in the tables.

The confidence intervals of the prevalences were estimated from the binominal distribution. The difference in reported prevalence between the sexes was tested by chi-square test; age trends, overall and within sexes, were evaluated by the Cochran-Mantel-Haenszel test for trends. A covariance analysis was used for age adjustments (10).

To describe the relationship between headache and neck or shoulder pains, we constructed a ratio (R) of the concordance between the reported and expected occurrence of the two complaints.

Results

Of the 20 026 people who returned the postal questionnaire, 8 537 men and 9 162 women answered the questions on headache, while 8533 men and 9 117 women reported on neck or shoulder pain.

The prevalences of headache and neck or shoulder pain are given in Table I. There was a decline in the

prevalence of headache with increasing frequency. This same pattern of decline in prevalence was not seen among those with neck or shoulder pain, the prevalence of weekly and the daily sufferers being virtually identical. Females reported headache and neck or shoulder pain significantly more often than males in all age groups and at all levels of complaint frequency ($p < 0.0001$).

The prevalence of neck or shoulder pain showed, in contrast to headache, a significant age trend ($p < 0.0001$) for both sexes (Table II). The reported prevalence of unfitnes for work due to headache and to neck or shoulder pain is shown in Table III. At all complaint frequencies, headache led to more disability than neck or shoulder pain, and these differences were statistically significant at all frequencies and applied to both sexes. The sex difference in reporting unfitnes for work was not significant. The prevalence of reported unfitnes for work was not influenced by age.

Tables IV and V show the ratio between the actually reported simultaneous complaints and the statistically expected simultaneous complaints in men and women. Reporting headache and neck or shoulder pain with the same frequency of complaints had an observed to expected ratio greater than one in both sexes. This ratio increased with increasing frequency of complaints, indicating than chronic (weekly or more often) complaints had a tendency to occur simultaneously more often than periodic complaints.

Table I. The sex specific and age adjusted prevalences of reported headache and neck or shoulder pain (neckache). Tromsø 1986/87. (95% confidence interval in brackets.)

Frequency of complaint	Headache		Neckache	
	Male (N=8537) % (c.i.)	Female (N=9162) % (c.i.)	Male (N=8533) % (c.i.)	Female (N=9117) % (c.i.)
Seldom or never	72.6 (71.7-73.5)	49.2 (48.2-50.2)	63.5 (62.7-64.3)	46.1 (45.0-47.1)
Monthly complaints	21.4 (20.3-22.5)	37.6 (36.0-39.2)	21.1 (20.1-21.9)	29.0 (28.1-29.9)
Weekly complaints	4.9 (4.4-5.9)	10.9 (9.0-12.8)	7.6 (7.0-8.2)	12.4 (11.7-13.2)
Daily complaints	1.1 (0.9-1.3)	2.2 (1.7-2.6)	7.8 (7.2-8.4)	12.5 (11.8-13.2)

Table II. The age and sex specific prevalences of reported headache and neck or shoulder pain (neckache), weekly or more often. Tromsø 1986/87.

Age	Headache				Neckache			
	Male N	%	Female N	%	Male N	%	Female N	%
20-29	2178	6.1	2565	14.2	2173	10.8	2557	19.0
30-39	2962	5.7	3224	12.1	2953	13.1	3200	21.5
40-49	2300	5.1	2309	12.9	2308	17.0	2297	30.9
50-56	1097	7.8	1064	13.8	1099	26.9	1063	36.3
Total	8537	6.0	9162	13.1	8533	15.4	9117	24.9

Table III. The sex specific and age adjusted frequencies of reported disability (seriously hampered or unable to perform ordinary work) due to reported headache and neck or shoulder pain (neckache) at different frequencies of complaints. Tromsø 1986/87.

Frequency of complaint	DISABLED DUE TO:							
	Headache				Neckache			
	Male N	%	Female N	%	Male N	%	Female N	%
Seldom or never Complaints	6198	4.8	4512	5.2	5422	2.1	4204	3.5
Monthly compl.	1826	9.9	3448	12.6	1798	6.4	2643	7.1
Weekly compl.	418	27.6	997	29.4	648	19.6	1129	19.2
Daily compl.	95	53.5	205	44.7	665	38.5	1141	41.6
Total	8537	7.5	9162	11.4	8533	7.1	9117	10.5

Discussion

Musculoskeletal disorders are becoming a great and increasing burden on the social welfare system causing a dominant part of sickness certification (10). We wanted to explore the prevalence of headache and neck or shoulder pain in the general population, since most previous headache prevalence studies have been based on selected patient groups.

This questionnaire study of the prevalences of reported headache and neck or shoulder pain was part of a comprehensive population study. The health conditions studied are non-specific symptom reported as complaints, disregarding aetiology and pathogenesis. We are therefore not dealing with diagnoses that have to be validated. In an attempt to qualify the severity of the complaints, we decided to explore the consequences of the symptoms on self reported fitness to do ordinary work.

Non-responders to health screenings differ from

the responders in a number of respects, but we know less about those who attend a screening, but do not respond to a questionnaire (11). Bønnaa (12) analysed the non-responding group in the present study, and he found a slight preponderance of young unmarried men in that group. We believe that this selection bias does not invalidate our general conclusions.

The prevalences of both reported headache and neck or shoulder pain were surprisingly high. These fairly disabled people who do not consult a doctor obviously represent the tip of the iceberg, since the health service demand due to such complaints is relatively much less (1,3,4). Several other studies of complaints (13-15) have revealed that doctors see only a small fraction of the health problems experienced by the population at large. Our study did not analyse the health service seeking due to these complaints. The mechanisms of decisions in seeking health care are one of the main topics of research in general practice. We know that there are cultural differences

Table IV. The association between reported headache and neck or shoulder pain (neckache) in 8435 men, by the ratio (R), between reported and expected occurrence of the two complaints. (95% confidence intervals in brackets.)

Frequency of complaints		REPORTED NECKACHE			
		Seldom/ never	Monthly	Weekly	Daily
R E P O	Seldom/ never	4539 R = 13.0 (11.8-14.3)	990 R = 1.8 (1.6-2.0)	290 R = 1.1 (0.9-1.3)	312 R = 1.3 (1.1-1.5)
	Monthly	763 R = 1.2 (1.1-1.3)	657 R = 4.0 (3.6-4.5)	195 R = 2.2 (1.9-2.7)	181 R = 2.0 (3.4-5.7)
	Weekly	80 R = 0.3 (0.2-0.4)	107 R = 1.8 (1.3-2.1)	135 R = 7.9 (6.3-10.0)	94 R = 3.9 (3.4-5.7)
	Daily	10 R = 0.9 (0.09-0.3)	10 R = 0.5 (0.2-1.1)	15 R = 2.7 (1.4-4.8)	56 R = 22.8 (14.5-35.9)

Table V. The association between reported headache and neck or shoulder pain (neckache) in 9040 women, by the ratio (R) between reported and expected occurrence of the two complaints. (95% confidence intervals in brackets.)

Frequency of complaints		REPORTED NECKACHE			
		Seldom/ never	Monthly	Weekly	Daily
R E P O	Seldom/ never	2862 R = 8.4 (7.7-9.1)	1017 R = 1.4 (1.3-1.6)	2970 R = 0.7 (0.6-0.8)	273 R = 0.6 (0.5-0.7)
	Monthly	1149 R = 1.3 (1.2-1.4)	1360 R = 4.0 (3.7-4.4)	472 R = 2.1 (1.8-2.4)	418 R = 0.2 (0.2-0.3)
	Weekly	156 R = 0.4 (0.3-0.4)	217 R = 1.0 (0.8-1.2)	318 R = 5.1 (4.4-6.0)	297 R = 4.5 (3.8-5.3)
	Daily	16 R = 0.1 (0.1-0.3)	22 R = 0.4 (0.2-0.6)	28 R = 1.3 (0.8-2.0)	138 R = 22.8 (13.8-25.7)

in what are regarded as problems in need of professional health care (13), but our knowledge on individual mechanisms behind decisions seeking professional help or not, are sparse. We know from other

studies (3,4,16) that women seek health services more than men. In the present study women also reported significantly more headache and neck or shoulder pain than men. The sex ratio of women to men was

almost 2 to 1 both for headache and for neck or shoulder pains at all complaint frequencies. This sex pattern is seen in most bodily pain (17), and several theories are offered in explanation. Since there is no adequate biological basis for this difference, it is logical to look for explanations among sociological- or cultural contrasts (18). Nathanson suggested that women reported more complaints than men because it was culturally more acceptable for women to do so. The ethics of health are masculine (19).

Crook et al. (20) have shown that general body pain increases with age, and we found that the same applies for neck or shoulder pain. However, our finding that this trend was absent with respect to headache supports Waters (21), who showed that the prevalences of both mild and severe headache do not change with age. In other words neck or shoulder pain seems to follow the pattern of general body pain, while headache has a somewhat different association with age. Headache may be a rather transitory result of stress stimuli, while neck or shoulder pain seem to be the result of accumulation of stress reactions; the pain tends to become more chronic with increasing age of the patient. Headache seems to be more transitory than neck or shoulder pain, and there was a high concordance between reporting headache and neck or shoulder pain, especially when the complaint frequency is high (Tables IV and V). It is therefore more likely that headache would initiate neck or shoulder pain rather than vice versa. The questions about headache and neck or shoulder pain were consecutive in the questionnaire; this might have been an invitation to give the same answer to both questions, with the risk of reporter bias. But this bias cannot be very strong because the two complaints differed in daily and weekly prevalences.

The close relationship between the frequency of complaints and disability indicates that the complaint frequency is a useful measure of intensity or burden of complaint. Besides being disabling, the complaints are strongly associated with self reported health status (22). Headache is experienced as a more agonizing complaint than neck or shoulder pain, since the severity of reporting headache weekly or daily was significantly greater than having neck or shoulder pain with the same frequency. However more prevalent, neck or shoulder pain is responsible for the majority of the disability.

In conclusion, this study has confirmed that in the general population many people are living with disabling complaints. The numbers seeking medical

care for the same complaints are far fewer (1). We know little about factors that prevent people from defining their complaints as being in need of health care. A person who understands the reason for and the factors causing the complaints, and feels able to control the complaints by putting them into an understandable and acceptable context, will not define the complaints as health problems. Therefore, it is important not only to demonstrate the high prevalence of headache and neck or shoulder pain, but also to understand the complexity of the causal factors of headache and neck or shoulder pain, and of the reasons why some people seek professional help while others do not.

References

1. Rutle O. Pasienten fram i lyset – analyse av legekontraktar i primærhelsetenesta (Focusing the patient – Analysis of the use of general practitioners). Oslo: The Society of Health Services Research. Report 1, 1983.
2. Department of Social Affairs. Health policies towards the year 2000. Oslo: Norwegian National Health Plan. 1987.
3. Rafnsson V, Steingrimsdottir OA, Olafsson MH, Sveinsdottir T. Muskuloskeletalala besvær bland íslendingar (Musculoskeletal symptoms in the Icelandic population.) *Nord Med* 1989; 104: 104-7.
4. Becker LA. A study of headache in North American primary care. *J R Coll Gen Pract* 1987; 37: 400-3.
5. Phizackee S. The prevalence and diagnosis of headache in an urban practice. *J R Coll Gen Pract* 1978; 28: 594-6.
6. Nikiforow R, Hokkanen E. An epidemiological study of headache in an urban and rural population in Northern Finland. *Headache* 1978; 18: 137-45.
7. Waters WE. Editorial. The prevalence of headache. *Headache* 1978; 18: 53-4.
8. Waters WE. The Pontypridd headache survey. *Headache* 1974; 14: 81-9.
9. Tellnes G. Days lost by sickness certification. *Scand J Prim Health Care* 1989; 7: 245-51.
10. Nie HH, Hull CH, Jenkins JG, Steinbrenner K, Bent DH. *Statistical package for the social sciences*. 2nd ed. New York: McGraw Hill, 1975.
11. Jacobsen BK, Thelle DS. The Tromsø Heart Study: responders and non-responders to a health questionnaire, do they differ? *Scand J Soc Med* 1988; 16: 101-4.
12. Bønaa K. Relationship between hemodynamics and blood lipids in population surveys, and effects of n-3 fatty acids. ISM skriftserie Nr 25. Tromsø: Institute of Community Medicine University of Tromsø. 1992.
13. McWhinney I. *A Textbook of Family Medicine*. New York: Oxford University Press, 1989.

14. Dunnell K, Cartwright A. *Medicine takers, prescribers and hoarders*. London: Routledge and Kegan Paul, 1978.
15. Wadsworth MEJ, Butterfield WJH, Blaney R. *Health and sickness: the choice of treatment*. London: Tavistock, 1971.
16. Nathanson C. Sex, illness, and medical care, a review of data, theory, and method. *Soc Sci Med* 1977; 11: 13-25.
17. Philips C. Headache in general practice. *Headache* 1977; 16: 322-9.
18. Fordyce WE. A behavioural perspective of chronic pain. *Br J Clin Psychol* 1982; 21: 313-20.
19. Nathanson C. Illness and the famine role: a theoretical review. *Soc Sci Med* 1975; 9: 57-62.
20. Crook J, Rideout E, Browne G. The prevalence of pain complaints in a general population. *Pain* 1984; 18: 299-314.
21. Waters WE. Community studies of the prevalence of headache. *Headache* 1979; 1: 178-86.
22. Fylkesnes K, Førde OH. The Tromsø Study: predictors of self-evaluated health - has society adopted the expanded health concept? *Soc Sci Med* 1991; 32: 141-6.

Received October 1992

Accepted April 1993

PAPER III

Headache and neck or shoulder pain—family learnt illnesses behaviour? The Bardu Musculoskeletal Study, 1989–1990

Toralf Hasvold and Roar Johnsen

Hasvold T and Johnsen R. Headache and neck or shoulder pain—family learnt illnesses behaviour? The Bardu Musculoskeletal Study, 1989–1990. *Family Practice* 1996; **13**: 242–246.

Objective. To explore the gender difference in reporting headache and neck or shoulder pain, we analysed the association between reported own headache and reporting the same complaints among first grade relatives. Based on these associations we discuss 'learning' of illnesses within the family structures.

Method. A cross-sectional study based on a self-administered postal questionnaire of musculoskeletal complaints in the total population aged 20–70 years was carried out. A population based study was conducted in the municipality of Bardu, northern Norway. A total population of men and women aged 20–70, altogether 2409 people, were sent a questionnaire. After one postal reminder 1939 questionnaires were returned, a response rate of 80.5%. The return rate was slightly higher among the eldest. The sex distribution was the same in both the responders and the non-responders.

Results. The females in the family and the brothers and sisters were the main family members imprinting the way in which the children were deciphering symptoms like headache and neck or shoulder pain later in life. These illnesses were changed to a very little extent by the impact from the spouse.

Keywords. Headache, neck or shoulder pain, musculoskeletal disorders, illness behaviour.

Introduction

There are considerable differences in reporting illnesses between different cultures.¹ Within the cultures, women seem to report most illnesses more frequently than men.^{2–4} Nathanson explains the gender differences by gender-cultural differences.⁵ If such cultural gender differences exist, they are most likely adopted from parents during childhood and adolescence. The spouses may over the years change or develop to become more like each other, and the health workers and mass media may model the sick role behaviour. Giddens describes the process of socialization in childhood, stating that the most important agencies are the family, peer relationships (friendship groups, age grades), school, mass media and work.⁶ Lithman has claimed that North Americans report the source of health attitude to be 41.7% from the family, 15% from the spouse, 15% from the health personnel and 8.3% from the mass media.¹ There is no reason to believe

that unspecified complaints like headache and neck or shoulder pain are genetically inherited illnesses.⁷ We know, however, that the sick role behaviour may be socialized or 'transmitted' from one family member to another.⁸ In a previous study of reported non-migrainous headache and neck or shoulder pain, we found that women report these complaints about twice as often as men.⁹

In this paper we have explored how headache and neck or shoulder pain were reported within the family structure in a rural, ethnic and culturally relatively homogenous population. Furthermore, we have analysed the association between reported own complaints and reported first grade relatives' complaints to find clues about how illness behaviour is transmitted within family structures.

Method

The Bardu Musculoskeletal Study, 1989–1990, was a self-administered postal questionnaire study of musculoskeletal complaints in the total population aged 20–70

Received 22 November 1995; Accepted 28 January 1996.
Institute of Community Medicine, University of Tromsø, 9037
Tromsø, Norway.

years in Bardu, a total of 2409 people. Bardu is a municipality in the north of Norway. The gender distribution in the population was similar to the general population of Norway, but slightly younger. After one postal reminder 1939 questionnaires were returned, a response rate of 80.5%. The return rate was slightly higher among the eldest. The sex distribution was the same among the responders and non-responders.

The present paper is based on the following questions: "How often do you suffer from headache?" and "How often do you suffer from neck or shoulder pain?" These questions were given four exclusive response alternatives: "seldom or never" (1), "monthly" (2), "weekly" (3), "daily" (4). In the analysis, these variables were dichotomized by giving "seldom or never symptoms, and monthly symptoms" a value of 0 and "weekly and daily symptoms" the value of 1. The independent variables in this analysis are based on the following questions: "Have any of the following family members been suffering from headache?" and "Have any of the following family members been suffering from neck or shoulder pain?" To answer these questions the following alternatives were given: "none", "mother", "father", "sister", "brother", "children" and "spouse".

The calculations of frequencies were done by the statistics computer program EPI Info 6.0.¹⁰ The associations between reporting own headache and neck or shoulder pain and reporting family members with the same complaints were expressed as 'OR', and contrasted those who did not report relatives with complaints. The calculations were carried out by logistic regression analysis by the computer program Logreg.¹¹ All the analysed associations were age-standardized by forcing age in all the analysed models.

Results

Table 1 shows the age- and sex-specific prevalences of reported headache and shoulder pain. Both complaints are reported more frequently among females, and neck or shoulder pain is reported twice as frequently as headache in both sexes. But the sex differences are age dependent. The differences are largest in the youngest, and disappear in the eldest age group. There is a negligible age trend in the headache-reporting group ($P = 0.02$), while the age trend is significant ($P > 0.001$) in the neck or shoulder pain group. (Around the age of 40-50 years is the peak of the prevalences in both complaint groups.)

Tables 2 and 3 show the sex-specific frequencies of reporting first grade relatives to be suffering from headache and neck or shoulder pain, regardless of reporting own complaints. The main patterns are: both men and women more frequently report mothers, sisters and spouses to suffer from headache and neck or shoulder

pain than other family members; and women, compared to men, more frequently report their sisters and children to suffer from the questioned complaints. Females tend to report more frequently than their male counterparts their first grade relatives to be suffering both from headache and neck or shoulder pain.

The associations between reporting own headache and neck or shoulder pain and reporting first grade relatives with these conditions are shown in Tables 3 and 4.

Among the neck or shoulder pain reporters, there are patterns of association indicating that male sufferers report male relatives, while female sufferers report female relatives. However, the main finding regarding neck or shoulder pain is the strong association between reporting own complaints and reporting relatives with the same complaint, especially among men.

In neither of the sexes was reporting own illness associated with reporting spouses to be suffering from any of the target illnesses.

Discussion

The design of this population-based study has given us the opportunity to compare reporting own complaints with reporting identical complaints among first grade relatives and spouses. Our main findings are a strong and consistent association between reporting own complaints and reporting complaints among parents and siblings. This association could be interpreted in several ways. In a cross-sectional study, the direction of the association is not obvious. Of course, some of the women's over-reporting compared to men could be interpreted as recall bias. Women are more prone to illnesses such as headache, and they are therefore more aware of similar complaints among others.¹² Against such inference stands the fact that the reporting pattern is the same as among men, indicating that they share common experience of symptom complaints within their families.

Besides recall bias, the association could be explained by inheritance, common shared environmental factors, or learnt behaviour within the family structure. In contrast to migraine, there are no reported studies revealing any clues to genetic disposition to headache and neck or shoulder pain. The main pattern of association between reporters and reporting parents and children with the same complaints does not support theories of genetic factors involvement. Common shared environmental factors, like infections, would most likely hit family members in the same pattern, regardless of gender. Such a pattern is not recognized in this study.

Lastly, the pattern of reported headache and neck or shoulder pain could be explained by culturally learnt illness behaviour. If so, illness behaviour must either be learnt from the family members during childhood, or from the spouses, health workers and mass media.²

TABLE 1 Sex- and age- (20-70 years old, 981 men and 958 women) specific prevalence of reported weekly headache and weekly neck or shoulder pain; Bardu, 1989-1990 (95% confidence intervals (CI) in parentheses)

Age group (years)	Headache		Neck or shoulder pain	
	Male (%) (CI)	Female (%) (CI)	Male (%) (CI)	Female (%) (CI)
20-29	3.5 (1.7-6.3)	7.8 (4.7-12.1)	5.3 (2.9-8.5)	13.9 (9.4-18.4)
30-39	5.3 (2.7-9.3)	13.5 (8.8-18.2)	12.6 (8.0-17.2)	19.3 (13.9-24.7)
40-49	9.7 (6.0-14.6)	12.8 (8.2-17.3)	19.4 (14.0-24.8)	22.3 (16.7-27.9)
50-59	9.7 (5.2-16.0)	12.1 (7.0-18.9)	25.4 (18.3-33.6)	34.1 (26.1-42.8)
60-70	10.0 (5.7-16.0)	11.9 (7.5-17.6)	27.3 (20.4-35.2)	28.8 (22.3-36.1)
Total	7.0 (5.5-8.8)	11.5 (9.4-13.5)	15.9 (13.6-18.2)	22.4 (19.8-25.1)

TABLE 2 The age-standardized frequencies (%) of reported first grade relatives to be suffering from headache, among 981 men and 958 women in Bardu, 1989-1990 (95% confidence intervals (CI) in parentheses)

Relatives with headache	Male			Female		
	n	%	(CI)	n	%	(CI)
Mother	270	27.5	(24.7-30.3)	283	29.5	(26.7-32.4)
Father	80	8.2	(6.5-10.0)	101	10.5	(8.6-12.5)
Sister	108	11.0	(9.0-13.0)	198	20.7	(18.1-23.2)
Brother	54	5.5	(4.1-7.1)	81	8.5	(6.7-10.4)
Children	68	6.9	(5.4-8.7)	157	16.4	(14.0-18.7)
Spouse	215	21.9	(19.3-24.5)	161	16.8	(14.4-19.2)
Parents	327	33.3	(30.4-36.3)	358	37.4	(34.3-40.4)
Sisters and brothers	144	14.7	(12.5-16.9)	252	26.3	(23.5-29.1)
Male relatives	125	12.7	(10.7-14.8)	168	17.5	(15.1-19.9)
Female relatives	329	33.5	(30.6-36.5)	386	40.3	(37.2-43.4)

TABLE 3 The age-standardized frequencies (%) of reported first grade relatives to be suffering from neck or shoulder pain, among 981 men and 958 women in Bardu, 1989-1990 (95% confidence intervals (CI) in parentheses)

Relatives with neck or shoulder pain	Male			Female		
	n	%	(CI)	n	%	(CI)
Mother	234	23.4	(21.2-26.5)	284	29.6	(26.8-32.5)
Father	140	14.3	(12.1-16.5)	124	12.9	(10.8-15.1)
Sister	96	9.8	(8.0-11.8)	200	20.9	(18.3-23.5)
Brother	56	5.7	(4.3-7.3)	79	8.2	(6.5-10.2)
Children	48	4.9	(3.6-6.4)	106	11.1	(9.0-13.1)
Spouse	251	25.6	(22.6-28.3)	192	20.0	(17.5-22.6)
Parents	326	33.2	(30.3-36.2)	358	37.4	(34.3-40.4)
Sisters and brothers	138	14.1	(11.9-16.2)	248	25.9	(23.1-28.7)
Male relatives	180	18.3	(15.9-20.8)	183	19.1	(16.6-21.6)
Female relatives	297	30.3	(27.4-33.2)	404	42.2	(39.0-45.3)

TABLE 4 *The association between self-reported headache and reporting first grade family members to be suffering from headache expressed by OR, adjusted for age; Bardu, 1989-1990 (95% confidence intervals (CI) in parentheses)*

First grade family members reported to be suffering from headache	Self-reported headache			
	OR	Male (CI)	OR	Female (CI)
Mother	2.14	(1.24-3.69)	1.76	(1.13-2.73)
Father	1.49	(0.63-3.55)	1.52	(0.82-2.82)
Sister	1.03	(0.47-2.23)	1.59	(1.00-2.54)
Brother	1.67	(0.60-4.60)	2.16	(1.18-3.54)
Children	0.90	(0.36-2.23)	1.50	(0.89-2.54)
Spouse	1.05	(0.57-1.94)	0.89	(0.51-1.55)
Parents	2.39	(1.43-3.98)	1.71	(1.13-2.58)
Sisters and brothers	1.08	(0.55-2.13)	2.46	(1.63-3.70)
Male relatives	1.35	(0.66-2.74)	2.22	(1.41-3.50)
Female relatives	1.96	(1.19-3.23)	2.00	(1.33-3.00)

TABLE 5 *The association between self-reported neck or shoulder pain and reporting first grade family members to be suffering from neck or shoulder pain expressed by OR, adjusted for age; Bardu, 1989-1990 (95% confidence intervals (CI) in parentheses)*

First grade family members reported to be suffering from neck or shoulder pain	Self-reported neck or shoulder pain			
	OR	Male (CI)	OR	Female (CI)
Mother	1.10	(0.71-1.73)	1.80	(1.24-2.61)
Father	1.32	(0.79-2.21)	2.05	(1.29-3.25)
Sister	2.08	(1.22-3.53)	2.05	(1.42-2.98)
Brother	4.35	(2.32-8.16)	1.44	(0.83-2.48)
Children	1.52	(0.73-3.13)	1.55	(0.96-2.53)
Spouse	0.91	(0.60-1.38)	0.77	(0.51-1.17)
Parents	1.45	(0.99-2.13)	2.05	(1.47-2.86)
Sisters and brothers	3.31	(2.17-5.03)	2.45	(1.77-3.40)
Male relatives	2.25	(1.49-3.41)	1.95	(1.36-2.80)
Female relatives	1.50	(1.04-2.21)	2.67	(1.93-3.70)

The lack of association between reporting own complaints and reporting spouses with complaints make spouses implausible as the source of learning. The female preponderance found in questionnaires in reporting most illnesses may represent a sex difference in 'yea-saying'.¹³ In this study both men and women reported their female relatives to be suffering from both headache and neck or shoulder pain more frequently than their male relatives. This consistency in the reporting pattern supports the view that these complaints represent illnesses experienced and expressed within the family context. These findings support Gijsbers van Wijk who suggested that the sex differences found in health surveys may be partly explained by a higher

female symptom sensitivity, defined as a readiness to perceive physical sensations as symptoms of illness.¹⁴ Verbrygge states that women seem to be more involved than men with health and health care throughout life.¹² They are usually responsible for family members' health, used to noticing symptoms of diseases, attending to sick family members, and arranging appointments with medical practitioners, and therefore report a greater number of symptoms for both themselves and others. The tendency of women, in contrast to men, to report their children to have complaints, could be understood in this context.

A somewhat surprising finding was that the sex differences in reporting own complaints is dependent on

age, and that the sex differences disappeared with greater age. One explanation could be that as men get older they are increasingly exposed to both diseases and the health care system, adapting a sick role behaviour and health attitude more like the females. Macintyre gives support to this view, stating that, given an objective diagnosis or condition, men tended to "over-rate" their symptoms, becoming more like women in their reporting of symptoms.¹⁵

The association between reporting own headache and reporting mothers to suffer from headache was stronger among men than among women. The corresponding association regarding neck or shoulder pain, was strongest among females. Johnsen claims that among women, diseases in female first grade relatives are most important for reporting own dyspepsia, while male reporters put more emphasis on the disease rather than the sex of the relatives.¹⁶ Our findings support these observations. The strong association between reporting own complaints and reporting corresponding complaints among parents does not reveal any specific sex pattern. This finding is in contrast to Grimsmo's statement that the mothers are the sick role behaviour model or "transmitter" of the sick role behaviour.¹⁷ Our study showed that brothers and sisters were just as important as sick role "transmitters". One explanation may be that in the modern north Norwegian society, both parents are working outside the house and the brothers and sisters have partly taken over their role of being the model of sick role behaviour for their young siblings.

In summary, the conclusions are that the parents together with the brothers and the sisters seem to be the main family members imprinting the way in which the children are deciphering symptoms later in life. The modern society seems to have increased the importance of the siblings as models of sick role behaviour. The pattern of reporting own complaints and reporting complaints within the family structure, with no associations to spouses, indicates that the sick role behaviour is learnt early in life. The age-dependent sex differences in reporting own complaint support a theory of early life learning of illness behaviour.

References

- Zola IK. Culture and symptoms—an analysis of patients presenting complaints. *Am Sociol Rev* 1966; **31**: 615–630.
- Lithman TJ. The family as basic unit in health and medical care: a social-behavioural overview. *Soc Sci Med* 1979; **8**: 495–519.
- Popay J, Bartley M, Owen C. Gender inequalities in health: social position, affective disorders and minor physical morbidity. *Soc Sci Med* 1993; **36**: 21–32.
- Celentano DD, Linet MS, Stewart WF. Gender differences in the experience of headache. *Soc Sci Med* 1990; **30**: 1289–1295.
- Nathanson CA. Sex, illness, and medical care: a review of data, theory, and method. *Soc Sci Med* 1977; **11**: 13–25.
- Giddens A. *Sociology*. TJ Press (Padstow) Ltd, 1993.
- Ziegeler DK, Hassani RS, Harris D, Stewart R. Headache in a non-clinic twin population. *Headache* 1975; **213**–218.
- Turk DC, Rudy TE. Pain and families. I. Aetiology, maintenance, and psycho-social impact. *Pain* 1987; **30**: 3–27.
- Hasvold T, Johnsen R. Headache and neck or shoulder pain—frequent and disabling complaints in the general population. *Scand J Prim Health Care* 1993; **11**: 219–224.
- Dean AG, Dean JA, Burton AH, Dicker RC. *Epi Info, Version 5: a word processing, database, and statistics program for epidemiology on microcomputers*. Stone Mountain, GA: USD Incorporated, 1990.
- Campos-Filho N, Franco EL. A microcomputer program for multiple logistic regression by unconditional and conditional maximum likelihood methods. *Am J Epidemiol* 1989; **129**: 439–444.
- Verbrygge LM. Sex differentials in health. *Public Health Reports* 1982; **97**: 417–437.
- Moum T. Yea-saying and mood-of-the-day effects in self-reported quality of life. *Soc Indicators Res* 1988; **20**: 117–140.
- Gijsbers van Wijk CMT, van Vliet KP, Everaerd WTAM. Symptom sensitivity and sex differences in physical morbidity: a review of health surveys in the United States and the Netherlands. *Women and Health* 1991; **17**: 91–124.
- Macintyre S. Gender differences in the perceptions of common cold symptoms. *Soc Sci Med* 1993; **36**: 15–20.
- Johnsen R. Påvirker kronisk sykdom hos foreldre og søsken rapportering av mageplager? (Does chronic disease among parents, brothers and sisters influence the reporting of stomach complaints?) Tromsø: Til Anders Forsdahls 60-års dag, ISM's skriftserie nr. 15; 1990: 102–112.
- Grimsmo A. Fra å bli syk—til å bli pasient. (From illness—to patients) (Rapport nr. 1–1984.) Oslo: SIFF's gruppe for helsestjenesteforskning, 1984.

PAPER IV

Non-migrainous headache, neck or shoulder pain, and migraine – differences in association with background factors in a city population

Toralf Hasvold, Roar Johnsen and Olav Helge Førde

Institute of Community Medicine, University of Tromsø, Norway.

Hasvold T, Johnsen R, Førde OH. Non-migrainous headache, neck or shoulder pain, and migraine – differences in association with background factors in a city population. *Scand J Prim Health Care* 1996;14:92–99.

Objective – To study the pattern of association of background factors with reported migraine, non-migrainous headache, and neck or shoulder pain.

Design – In a cross-sectional survey the population of the municipality of Tromsø between 20 and 56 years of age was screened for risk factors of different diseases. Everybody attending the screening was given a questionnaire on psychosocial, lifestyle, and health factors. The odds ratios of reporting migraine, non-migrainous headache, and neck or shoulder pain were estimated by logistic regression for several background factors.

Setting – A population-based study conducted in the municipality of Tromsø, northern Norway.

Participants – In a survey of risk factors for diseases in 1987/86, all the subjects between 20 and 56 years of age in the municipality of Tromsø were invited. The attendees were given a questionnaire about lifestyle, health, and psychosocial factors. Of the 18105 people who were given a questionnaire, 8537 men and 9162 women (97.7%) answered the questions about “non-migrainous headache”, 8533 men and 9117 women (97.5%) answered the questions about neck or shoulder pain, and 8024 men and 7690 women (86.8%) the questions about migraine.

Main results – “Self estimated health” had the strongest association with all three target conditions although the strength of the association between headache and neck or shoulder pain was far higher than that of migraine. The reporting of headache and neck or shoulder pain was associated with psychosocial factors, in contrast to migraine. The less educated women were prone to both headache and neck or shoulder pain, while there was no association between migraine and length of education. The explored lifestyle factors were not associated with any of the target conditions.

Conclusions – Our findings underscore that migraine is reported by people with psychosocial backgrounds other than those of people who report chronic headache and neck or shoulder pain.

Key words: migraine, headache, neck or shoulder pain, lifestyle, health, psychosocial factors.

Toralf Hasvold, MD, Institute of Community Medicine, University of Tromsø, N-9000 Tromsø, Norway.

The majority of the general population experience during their lifetime periods of aches and pains from the head and the neck or shoulders (1-4). The manifestations in pain locations and pain character may differ between attacks and between individuals.

It is therefore important to distinguish between the acute and the chronic or subchronic headache and neck or shoulder pain. The acute and chronic pains are not only different in time scale but are fundamentally different in kind. The infrequent pain attacks and acute illness behaviour are generally proportional to the physical findings and the nociceptive stimulus, while chronic pain and disability become increasingly associated with emotional distress, depression, and adoption of a sick role (1, 5, 6). Most of the research on risk factors for chronic muscle aches and pains has been done on patients (2). In such a design it is difficult to distinguish between factors that brought on the complaints and those that brought the patients to the doctor (6). The clinical impres-

sion is that, in patients with frequently recurring disabling headache, emotional factors are important either as triggers or contributors to the underlying "proneness" to headache (5). Migraine is also a recurring periodic headache which is believed to have a neuro-vascular pathogenesis, while the pathogenesis of non-migrainous headache and neck or shoulder pain is more or less unknown. Therefore migraine has a "status" of being a disease rather than a disorder such as non-migrainous headache and neck or shoulder pain. In spite of the different pathogenesis in migraine and non-migrainous headache, migraine has been regarded by some authors as a point on a pain scale of headache (7). Both non-migrainous headache and migraine are conditions associated with different, but certain personalities (8). We therefore wanted to explore the association between non-migrainous headache, neck or shoulder pain, and migraine with a set of variables describing demographic, health, psychosocial and lifestyle factors in a cross-sectional design.

Table 1. The independent factors tested in the final model and their categories.

Variables	Descriptions (number of categories)
Demographic factors	
Age	Between 20-56 years in 5-years groups (1-7)
Education	Years of schooling <8,8-9,10-12,13-15,>15 (1-5)
Psychosocial factors	
Insomnia	Do you occasionally suffer from insomnia? (yes=1, no=0) (0-1)
Coping	Have you had coping problems in personal matters in the last 14 days? (never/seldom=1, occasionally=2, often/all the time=3) (1-3)
Depression	Have you been unhappy and depressed in the last 14 days? (never/seldom=1, occasionally=2, often=3, all the time=4) (1-4)
Health factors	
Health	How do you estimate your health? (Excellent=1, Good=2, Neither poor nor good=3, Poor=4, Very poor=5) (1-5)
Infections	How many times have you had infections like common cold, flu, in the last 6 months? (low-4=1, 5-10=2, 11-high=3) (1-3)
Stiff joints	Have you experienced stiff joints (knee, elbow, fingers, other) in the morning lasting more than 30 minutes? (yes=1, no=0) (0-1)
Back pain	Have you had back pain lasting more than 4 weeks in the last year? (yes=1, no=0) (0-1)
Lifestyle factors	
Liquor	How often do you drink liquor? (Never=1, 1-2 times per month=2, once a week=3, 2-3 times per week=4, every day=5) (1-4)
Breakfast	Do you eat breakfast every day? (yes=0, no=1) (0-1)

Table II. Prevalences of reported migraine, using migraine medicine during the last two weeks, and weekly headache and neck or shoulder pain among 8 771 men and 9 334 women. Tromsø 1986/87.

	N	Male n	%	N	Female n	%
Migraine	8024	362	4.5	7690	1024	13.3
Using migraine medicine	8024	84	1.0	7690	297	3.9
Headache	8537	513	6.0	9162	1202	13.1
Neck or shoulder pain	8533	1313	15.4	9117	2270	24.9

Material and method

In a survey of risk factors for diseases in 1987/86, all the subjects between 20 and 56 years of age in the municipality of Tromsø (21 826 persons) were invited to participate. The 18 105 attenders were given a (hand out) questionnaire about lifestyle, health, and psychosocial factors. Of these 18 105, 8 537 men and 9 162 women answered the questions about "non-migrainous headache", 8 533 men and 9 117 women answered the questions about neck or shoulder pain, and 8 024 men and 7 690 women the questions about migraine.

The dependent variables are based on the following questions: "How often do you have headache?" and "How often do you have neck or shoulder pain?" These questions were given four exclusive alternatives: "Seldom or never (1), Monthly (2), Weekly (3), Daily (4)". The variables in the present analysis were dichotomized by giving "seldom or never symptoms, and monthly symptoms" the value of 0 and "weekly and daily symptoms" the value of 1. "Do you suffer or have you ever suffered from migraine?" Answering "Yes" or "No". Factors contributing significantly to the explained variance of the target conditions were kept in the final model. The same model was used to explore all three target conditions. This final model estimated the odds ratio of association between these factors and reported migraine, headache, and neck or shoulder pain, respectively, by logistic regression with forward selection and backward elimination (9).

Results

The model was best fitted to the reported neck or shoulder pain, a little less to the reported head-

ache, and least to the reported migraine, judged by the explained variances in the multiple regression. Migraine reporters had a different pattern of association with the independent factors in the model from reporters of both headache and neck or shoulder pain. The pattern of association with both headache and neck or shoulder pain had a slight gender difference. Fig. 1 shows the reported prevalences of migraine between 20 and 56 years of age in both sexes. The prevalence in women increased up to the age of 50-54, after which it decreased slightly. The prevalence in men was independent of age.

In the non-migrainous headache reporting group there was a sex difference in association with education, age, and liquor drinking. Of the single factors, "self estimated health" had the strongest association with all three target conditions in both sexes (Tables III-IV).

The less educated women were more prone to both headache and neck or shoulder pain, while there was no significant association between migraine and education length. The reporting of neck or shoulder pain was associated with short education among men.

There was a trend towards increased reporting of neck or shoulder pain with increasing age in both sexes, while there was an opposite trend in the female headache reporters. The psychosocial factor in the model "ability to cope with personal problems (coping)" was associated significantly with both headache and neck or shoulder pain in both sexes. Migraine and headache were associated with "Suffering from insomnia (insomnia)" in both sexes, while the association with neck or shoulder pain was not significant in men.

Many lifestyle factors were initially tested, but they did not associate with any of the outcome variables.

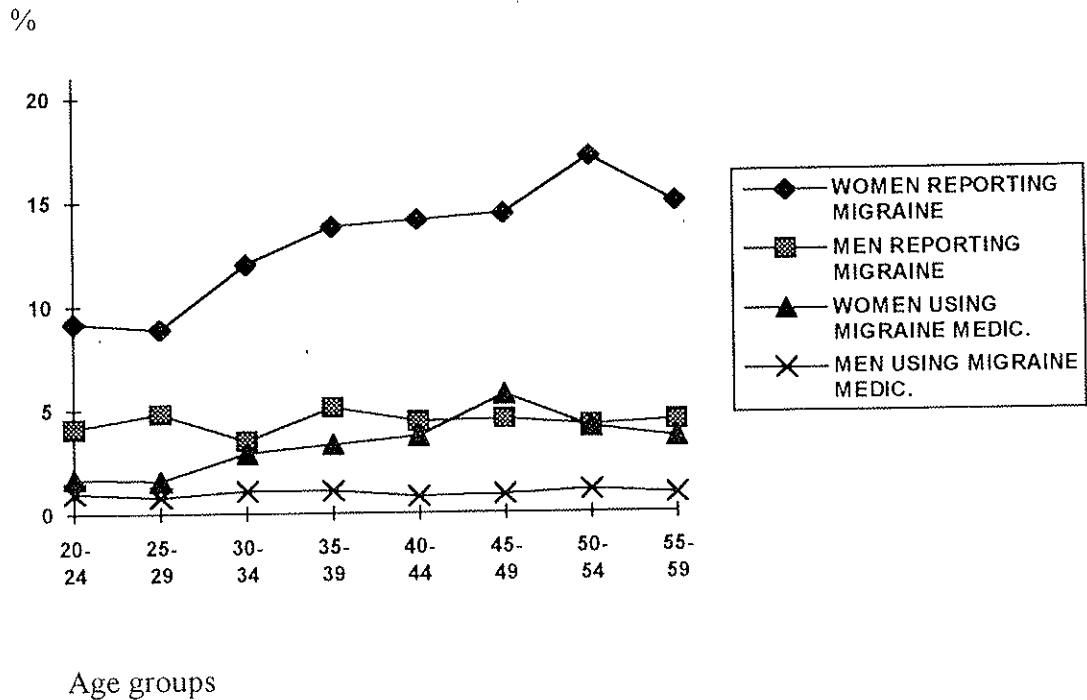


Fig. 1. Prevalences of reported migraine and use of migraine medication, by age and sex. Tromsø 86/87.

Discussion

Analysing reported migraine, non-migrainous headache, and neck or shoulder pain by the same model of background factors, is one way of describing both the similarities and the differences between these conditions. Two of the analysed outcome variables, headache and neck or shoulder pain, are not diseases to be classified by inclusion and exclusion criteria, and hence there is no point in validating the reporting of these conditions. They represent nothing but self-reports of subjective complaints. Migraine, however, is a diagnosis with criteria to be met. The migraine group in this analysis was not clinically confirmed, and therefore we cannot be sure that all those reporting migraine really fulfilled the diagnostic criteria (10). In an attempt to validate the migraine group, all those who reported both unspecified headache weekly together with migraine were first excluded from the migraine group. Second, we also explored the group that reported taking migraine medication during the previous 14 days, assuming that they must have been diagnosed by a physi-

cian in order to obtain their prescription. These groups were not different from the migraine group with respect to the pattern of association with the explored independent variables. Therefore, in this population, there were no indications of significant differences between self-reported and physician-diagnosed migraine. In any case, the potential contamination of the migraine group would tend to diminish the contrasts observed in the present analysis.

We found a point prevalence of reported migraine of 4.5% and 13.2% in males and females, respectively. Winnem (11) found the reported migraine prevalence to be 5.4% in men and 11.7% in women. Other authors have reported different prevalences depending on the selection of the population (12), and Stewart et al. reported prevalences of migraine attacks during the previous year of 6% in males and 17% in females (13). Both Crisp et al. (3) and Waters and O'Connor (14) found that for every diagnosed migraine patient there was one undiagnosed in the general population. Low health care utilization has been reported among migraine sufferers (1), which re-

Table III. Multiple logistic regression analysis of reported migraine, headache and neck or shoulder pain presented as Odds Ratio (OR) across all categories between the extremes with 99% confidence intervals in brackets in 8 771 men aged 20–56. Tromsø 1986–87.

	Migraine		Headache		Neck ache	
	OR	(c. i.)	OR	(c. i.)	OR	(c. i.)
Demographic factors						
Age (20–56 years)	1.17	(0.69–2.00)	0.75	(0.48–1.19)	2.11	(1.53–2.90)
Education (<8–>15 years of schooling)	1.57	(0.98–2.52)	0.68	(0.44–1.04)	0.42	(0.31–0.56)
Psychosocial factors						
Insomnia (0–1 categories)	1.15	(0.84–1.57)	1.54	(1.18–1.99)	1.17	(0.97–1.41)
Coping (1–3 categories)	0.81	(0.38–1.71)	1.92	(1.12–3.29)	1.89	(1.23–2.89)
Depression (1–4 categories)	2.23	(1.14–4.34)	1.27	(0.74–2.19)	1.08	(0.72–1.60)
Health factors						
Health (1–5 categories)	2.48	(1.16–5.30)	9.59	(5.01–18.35)	7.83	(4.93–2.44)
Infections (1–3 categories)	2.39	(0.86–6.63)	3.31	(1.52–7.21)	2.01	(1.04–3.88)
Stiff joints (0–1 categories)	1.29	(0.82–2.01)	1.36	(0.97–1.92)	3.12	(2.49–3.93)
Back pain (0–1 categories)	1.01	(0.71–1.44)	1.76	(1.35–2.30)	2.36	(1.97–2.83)
Lifestyle factors						
Liquor (1–4 categories)	0.59	(0.36–0.98)	0.45	(0.28–0.70)	0.83	(0.62–1.11)
Breakfast (0–1 categories)	1.00	(0.71–1.40)	1.35	(1.04–1.77)	1.16	(0.95–1.41)

inforces the problem of basing studies of migraine on selected groups of patients. Clinically, non-specific headache is believed to result from tension in the head and neck muscles (15), while migraine is regarded as a separate disease entity caused by neuro-vascular attacks. However, some authors suggest that the different types of headaches have the same pathogenesis, that they are found on a continuous scale of pain related to the head from mild to severe, and that migraine is part of that continuum somewhere at the severe end (7).

Our results indicate that migraine reporters differ from headache and neck or shoulder pain reporters in the pattern of association of background factors, supporting a hypothesis that migraine is a separate disease, different from headache and

neck or shoulder pain. In general, headache and neck or shoulder pain are associated with the same background factors in a very similar pattern.

Migraine is said by some authors to be associated with intelligent, perfectionist personalities (16). If education is a selector in this sense, our results do not support that, because the length of education was not associated with migraine. People with less education reported more headache and neck or shoulder pain than those with more education. Education may function as an indicator of social groups. Of course education is also associated with type of work, and the less educated may have jobs with more stress and strain both physically, psychosocially, and economically than the highly educated.

Table IV. Multiple logistic regression analysis of reported migraine, headache and neck or shoulder pain presented as Odds Ratio (OR) across all categories between the extremes with 99% confidence intervals in brackets in 9 334 women aged 20–49. Tromsø 1986–87.

	Migraine		Headache		Neckache	
	OR	(c.i.)	OR	(c. i.)	OR	(c. i.)
Demographic factors						
Age (20–56 years)	2.14	(1.51–3.01)	0.39	(0.27–0.54)	1.44	(1.09–1.89)
Education (<8–>15 years of schooling)	1.13	(0.84–1.54)	0.56	(0.41–0.77)	0.51	(0.42–0.70)
Psycho-social factors						
Insomnia (0–1 categories)	1.08	(0.90–1.30)	1.32	(1.11–1.58)	1.27	(1.10–1.46)
Coping (1–3 categories)	0.82	(0.52–1.29)	1.54	(1.06–2.25)	1.61	(1.15–2.25)
Depression (1–4 categories)	1.32	(0.86–2.04)	1.49	(0.99–2.23)	1.41	(1.00–1.98)
Health factors						
Health (1–5 categories)	2.07	(1.28–3.36)	10.18	(6.35–16.32)	9.22	(6.24–13.61)
Infections (1–3 categories)	1.56	(0.75–3.24)	2.32	(1.27–4.24)	2.32	(1.33–4.04)
Stiff joints (0–1 categories)	0.97	(0.73–1.28)	1.77	(1.41–2.22)	2.11	(1.74–2.57)
Back pain (0–1 categories)	1.11	(0.89–1.38)	1.46	(1.21–1.78)	2.32	(1.99–2.72)
Lifestyle factors						
Liquor (1–4 categories)	0.55	(0.36–0.85)	0.70	(0.47–1.05)	1.46	(1.07–1.99)
Breakfast (0–1 category)	0.84	(0.65–1.00)	1.26	(1.02–1.55)	1.08	(0.90–1.30)

There was a positive age trend in both sexes in the neck or shoulder pain group. In the migraine group the highest prevalences were found in the middle age groups in both sexes, as has also been reported in other studies (13), while there was a negative age trend among the female headache reporters. Only 50% of migraine sufferers are diagnosed by a physician (1, 17). In our study, 1.0% men and 3.8% women, i.e. 23% and 29% of those reporting migraine, reported taking migraine medicine during the previous two weeks. Middle-aged women in general seek medical care more often than any other group. This may result in a higher proportion of diagnosed migraine patients in the middle-aged groups of women and hence

explain the higher prevalence of migraine in these groups (4).

Self-estimated poor health was strongly associated with all three target conditions. This indicates that, even though migraine in the present survey seems to be a disease more independent of personality and psychosocial factors than headache and neck or shoulder pain, general health pessimism is strongly associated also with migraine. The odds of self-estimated poor health were, however, much higher for headache and neck or shoulder pain than for migraine, indicating that migraine is a different condition from both headache and neck or shoulder pain. The strength of the association between self-estimated

health and headache and neck or shoulder pain indicates that these complaints are quite determinant on people's experienced health. The associations between all three reported ailments and the psychosocial factors such as "coping" (ability to cope with personal problems) and "insomnia", are weak. But again, there was a difference in pattern of association between migraine and the other two ailments, indicating that headache and neck or shoulder pain are more psychosomatic conditions than migraine.

Headache and neck or shoulder pain were associated with other health factors and diseases related to the muscles and the skeleton, such as "back pain" and "stiff joints". This may be explained in the context of regarding these factors as unspecified muscle- and skeleton-related conditions, as well as headache and neck or shoulder pain. Hence, these complaints might be different expressions of more or less the same underlying aetiological or pathogenic mechanisms. Reporting frequent infections was significantly associated with headache and neck or shoulder pain in both sexes. There was a similar trend, but not significant, in the migraine reporters. The question with significant association with headache and neck or shoulder pain was: "How many times have you had infections such as flu, a common cold, and similar illnesses during the last half year?" The question "Have you had any such infections during the last 2 weeks?" was not associated with any of the target conditions. We believe that asking persons how many times they have had unspecified infectious illnesses during the last half year may invite them to overestimate the number of infections. In asking persons to record the infections during the last 2 weeks, we believe they report the real infections more correctly, and the associations vanish. The weakest associations should be interpreted with caution, regarding the many factors tested in the models.

In summary, the main pattern of associating background factors with the target conditions was that migraine had a weaker association with psychosocial and lifestyle factors than with reporting of headache and neck or shoulder pain. Headache and neck or shoulder pain were associated with psychosocial factors and other health-related factors, while lifestyle factors had a surprisingly weak association with these conditions. The single factor with the strongest association with

all three target conditions was self-estimated health. This factor seems to be a key to the understanding of both health care utilization and some reported illnesses (18, 19).

Our findings support the hypothesis that migraine sufferers have different psychosocial backgrounds from sufferers of chronic headache and neck or shoulder pain.

References

1. Lipton RB, Walter FS, Celentano DD, Reed ML. Undiagnosed migraine headache; a comparison of symptom-based and reported physician diagnoses. *Arch Intern Med* 1992;152:1273-8.
2. Linet MS, Stewart W, Celentano DD, Ziegler D, Sprecher M. An epidemiological study of headache among adolescents and young adults. *JAMA* 1989;261:2211-6.
3. Crisp AH, Kalucy RS, McGuinness A, Ralph PC, Harris G. Some clinical, social and psychological characteristics of migraine subjects in the general population. *Postgrad Med J* 1977;53:691-7.
4. Hasvold T, Johnsen R. Headache and neck or shoulder pain - frequent and disabling complaints in the general population. *Scand J Prim Health Care* 1993;11:219-24.
5. De Bendittis G, Lorenzetti A, Pieri A. The role of stressful life events in the onset of chronic primary headache. *Pain* 1990;40:65-75.
6. Waddell G. A new clinical model for the treatment of low-back pain. *Spine* 1987;12:632-44.
7. Bass JM, McWhinney IR, Dempsey JB, Annen AA, Bocking BD, Bryan WH, et al. Predictors of outcome in headache patients presenting to family physicians - a one year prospective Study. *Headache* 1986;26:285-95.
8. Nelson Craig F. The tension headache, migraine headache continuum: a hypothesis. *J Manipulative Physiol Ther* 1994;17:156-67.
9. Nie HH, Hull CH, Jenkins JG, Steinbrenner K, Bent DH. Statistical package for the social sciences. 2nd ed. New York: McGraw Hill, 1975.
10. Headache Classification Committee of the International Headache Society. Classification and diagnostic criteria for headache disorders, cranial neuralgia, and facial pain. *Cephalalgia* 1988; 8 (suppl 7): 19-28.
11. Winnem J. Prevalence of adult migraine in general practice. *Cephalalgia* 1992;12:300-3.
12. Deubner D. An epidemiological study of migraine and headache in 10-20 year old. *Headache* 1977;17:173-80.
13. Stewart FW, Lipton RB, Celentano DD, Reed ML.

- Prevalence of migraine headache in the United States. Relation to age, income, race, and other sociodemographic factors. *JAMA* 1992;267:64-9.
14. Waters WE, O'Connor PJ. Epidemiology of headache and migraine in women. *J Neurol Neurosurg Psychiatry* 1971;34:148-53.
 15. Lebbink J, Egilius LH, Messinger HB. A questionnaire survey of muscular symptoms in chronic headache. *Clin J Pain* 1991;7:95-101.
 16. Anderson CD, Franks RD. Migraine and tension headache: is there a physiological difference? *Headache* 1981;21:63-71.
 17. Koehler T, Buck-Emden E, Dutz K. Frequency of migraine among an unselected group of employees and variation of prevalence according to different diagnostic criteria. *Headache* 1992;32:79-83.
 18. Fylkesnes K, Førde OH. The Tromsø study: predictors of self-evaluated health - has society adopted the expanded health concept? *Soc Sci Med* 1991;32:141-6.
 19. Hibbard JH, Pope CR. Gender roles, illness orientation and use of medical service. *Soc Sci Med* 1983;17:129-37.

Received September 1994

Accepted October 1995

PAPER V

**Musculoskeletal problems - result of “mental pain”
rather than physical strain?**

Hasvold Toralf, MD, Johnsen Roar, MD, Førde Olav Helge MD.
Institute of Community Medicine, University of Tromsø, Norway
Tel: ... 47 + 77 64 48 05
Fax: ... 47 + 77 64 48 31

Study objective - We have explored the association between headache, neck or shoulder pain and demographic and personal psychosocial factors, work experience and work schedule, work related psychosocial factors, and physical strain factors related to current work, to be bothered by these strain factors, experienced physical strain factors in previous work..

Design - A cross sectional questionnaire based survey. The target population were all 40-42 years old men and women.

Setting - A population based study conducted in the county of Nordland, Northern Norway 1988/89.

Subjects - The total population of men and women aged 40-42, altogether 10497 people were invited to a health screening. Of the invited, 78 % of men (4301) and 86 % of women (4310) attended the screening. The attendees were given a self administered postal questionnaire which covered a broad spectrum of topics like demography, health and illnesses, social network, the use of health care system, lifestyle, psychological problems, coping abilities and work environment factors. Of all attendees 87 % in men and women responded to the questionnaire.

Results - The psychosocial work-related factors together with the more global and individual factors like “self-estimated health” and “depression”, and to be bothered by physical strain factors, were the main factors associated with both headache and neck or shoulder pain.

Conclusions - Neither previous nor present work related physical strain factors were associated with headache and neck or shoulder pain. A change in model of understanding musculoskeletal illnesses is overdue.

INTRODUCTION

The prevalence of unspecific muscle related pain seems to be increasing, and has escalated to a public health problem as well as an economic problem in the western societies (1-5). The traditional understanding of these conditions, as caused by work related physical strain, has led to heavy spending on sick leaves, physiotherapeutic treatment and rehabilitation as well as improvement of ergonomic conditions at work. Despite the fact that the documentation of the effects of these remedies has been questioned, and likewise that the problems are increasing rather than declining, the prevailing “physical strain” approach seems persistently vital (1, 6-7). In times where heavy physical work has become increasingly rare, the more recent hypothesis of long lasting and static low graded muscle strain being the culprit, has revitalised the “physical strain” strategy (8-10).

The characteristics of these conditions are subjectively experienced pain without any objective nociceptive substrate (2). Relatively young people, especially women, report disabling pain related to muscles (8). In most cases the pain is to be related to head, neck or low back regions (8, 11). The majority of the sufferers report periodic complaints, but even the prevalences of chronic complaints are high. These complaints are very common even compared to the mounting number of patients presenting themselves to the primary health care (12).

There are experiences that indicate that several other factors than work or occupational strain may play a role in this kind of epidemics (6,13-19). In our previous studies we have shown that personal psychosocial factors and “self-estimated health” are associated with unspecific headache and neck or shoulder pain (18). It is therefore necessary to extend the models of understanding the working place related complaints.

In the present population based study we had the opportunity to explore, simultaneously, the association between reported headache and neck or shoulder pain and demographic and personal psychosocial factors, work environmental factors, work related psychosocial factors, and physical strain factors related to their work. By focusing on, to what degree the work related factors were perceived as a nuisance and by taking into consideration both current and previous work, we could explore how work factors were recognised individually and the “healthy worker effect”.

METHOD

In 1988/89, the total population of men and women aged 40-42, altogether 10.497 people were invited to a health survey in the county of Nordland in Northern Norway. (The screening was performed by the National Health Screening Service in Norway). Of the invited, 78 % of men (4.301) and 86 % of women (4.310) attended. The attendees were given a self administered postal questionnaire which covered a broad spectrum of topics like demography, ethnicity, health and illnesses, social network, the use of health care system, lifestyle, psychological problems, coping abilities and work environment. Of all attendees 87 % men and women responded to the questionnaire (20).

The target conditions of the present analysis are based on the following questions: "How often do You suffer from headache ?" and "How often do You suffer from neck or shoulder pain ?" Four exclusive response alternatives were given: "Seldom or never (1), Monthly (2), Weekly (3), and Daily (4)". These dependent variables were dichotomised by giving "seldom or never" and "monthly" complaints a value of 0, and "weekly" and "daily" complaints a value of 1.

The independent variables were grouped and analysed both as blocks and as single variables in a logistic regression as follows:

- **block 1 - demographic and personal psychosocial factors:** levels of education (1-5 primary school to 6 years or more of university education), self rated health (1-4, excellent to poor), depressed last two weeks (1-4, all the time to never), satisfied with life (1-4, very pleased to very dissatisfied), annoyed by spending time waiting (1-3, very annoyed to never annoyed), physical training (1-4, less than 30 min to more than 2 hours a week), cigarette smoking (number of cigarettes/day), drinking wine, beer or/and liqueur (all three 1-5, from never to daily);

- **block 2 - work experience and work schedule:** years at present work-place, full-time work, shift work, more than one hour travel distance to work , stay over night at work (all yes-no), working overtime (1-3, never, every week, every month), support if trouble at work, busy at work, too demanding work, control of tempo at work,

harassed at work, afraid of change of work by reorganisation or new tasks (1-4, often to never);

- **block 3 - work related psychosocial factors:** work satisfaction (1-4, excellent to not at all), variation in work (1-4, often to never), are you told you are doing a good job? (1-4, often to never), co-operation with supervisors (1-4, good to never), co-operation with co-workers (1-4, often to never);

- **block 4 - physical strain factors related to current work, to be bothered by these strain factors, experienced physical strain factors in previous work:** are you exposed, in your current work/do you feel bothered by the exposure/have you been exposed in previous work for: noise, radiation, poor light, eye sight demanding work, heavy work, monotonous work, smoky and polluted air, pollution from engines, gas and solvents, unhealthy climate, vibration and chemicals (all yes-no to all three levels),

The selection of the variables in block 1 for the final model were based on the analysis in a previous study (18) being the variables contributing most to the explanation of the target conditions. The selection of work experience and work schedule (block 2) and work related psychosocial factors (block 3) and work related physical strain factors (block 4) were based on exploring several models of work-related variables. Each of the three dimensions of the work related physical strain (- being exposed to current strain factors, - to be bothered by the strain factors, - having been exposed previously to these strain factor) were explored as separate independent variables by crosstabulation (Table 2-3) and in logistic regression models. Variables contributing to the explained variance of one of the target conditions when put in preliminary model with all the variables in each block and adjusted for age and education were accepted to go into the final models.

Once the model was selected, the final analysis were done by logistic regression introducing each block stepwise (Table 4-5). The associations were expressed by OR, and the models fit to the data were tested by "Goodness of fit" . The contribution of each block to the model were tested by the Improvement chi-square test, corresponding to F-change statistics in multiple regression. All the analysis were performed with SPSS-X (21).

RESULTS

Sixty percent of both men and women who returned the questionnaire, answered the question about present occupation in such a way, that they could be classified in one of the ten different occupational groups (Table 1). There was a female preponderance of the target complaints of roughly 2/1 in all analysed occupations. Among males, the prevalences of headache were evenly distributed among the different occupations except for the fishermen who which reported a very low prevalence. In contrast, fishers and transport workers reported the highest prevalence of neck or shoulder pain. The teachers and the health workers reported neck or shoulder pain less than in any other occupations. Somewhat surprisingly there were reported high prevalences of both target conditions among the non-employed women, in contrast to non-employed men who reported prevalences not very different from what were reported among any of the other occupations.

Tables 2 and 3 show the frequencies of reporting weekly headache and neck or shoulder pain in those experiencing physical strain in present work, among those who reported to be bothered by the strain factors, and among those having been exposed to the strain factors in previous work compared to those without such experiences. Consistently higher frequencies of both conditions were observed for the exposed groups, currently or previously. The group who are exposed now, but not bothered by it reports frequencies on the same level or lower than the non-exposed group. Comparing the reported prevalence of the target condition among those exposed today and those exposed previously, there is a small, but consistent difference in reporting headache, not found in the neck or shoulder pain reporters. The reporting pattern are similar in both sexes.

In the regression models the “Goodness of fit” test were non-significant for all the headache models. For both genders and for both complaints variables from block 1, 3 and 4, contributed significantly to the explained variance. Variables from block 2, the work schedule variables, neither in the models nor as a separate block had any significant contribution according to the improved chi-square tests. Block 2 was therefor, not included in the final model.

Tables 4-5 show that the associations between the target conditions and “self-estimated health” and “depression” were strong and consistent through all three steps. Also the work related psychosocial factors (block 3) contributed significantly as a block, but the association with single variables were modest. The association between headache and neck or shoulder pain and the occupational strain factors found in univariate analysis disappeared when the more global individual factors like “self-estimated health” and “depression” were introduced in the equation, except for the variable “currently monotonous job”, which came out significantly associated with both the target conditions among women.

All analyses were also performed introducing the blocks in a retrograde pattern. The chi-square improvement changed somewhat depending on which of the other blocks were in the model. But the final model, regarding the significance of the contribution of the different blocks and the OR's for the single variables, did not differ from those presented. Due to the number of variables tested and the fact that some of the associations between the single variables and the complaints are weak, the associations should be interpreted with some caution.

DISCUSSION

Being a cross sectional analysis we cannot draw any positive causal inferences. But factors of no association to the target conditions hardly have any causal role. The most striking result of this survey was the lack of association between the physical strain factors related to the working place and the target conditions, which indicates that there are minimal causal association between headache and neck or shoulder pain and work related physical strenuous factors.

The current model of understanding these musculoskeletal conditions among clinicians is that they are results of long standing strain factors (1, 17, 22). This is in conflict with some of the results of the research in this field, which show that several other factors than biomechanical workload are important for the development of chronic muscle related pain syndromes making people unable to work (14-16, 19, 23, 24), and that the outcome of ergonomic changes done at the working places have been meagre (1,11, 24).

In cross sectional studies, considering the association between job and musculoskeletal complaints, we do not usually know whether people who have developed complaints have changed to a less strenuous job, and so lessened the association between physical strenuous work and the complaints, "the healthy workers effect". We therefore, analysed the association between headache and neck or shoulder pain with the three dimensions of each physical strain factor; - whether they had been exposed to the factor previously, - whether they were currently exposed, and whether they felt bothered by the strenuous factors they were currently exposed to. We found a modest "healthy workers effect" among the headache reporters, while there were no such effect among the neck or shoulder pain reporters.

Those who felt bothered by the strenuous factors, however, reported more frequently to be suffering from headache and neck or shoulder pain, indicating that it was not the exposure itself, but how they emotionally handled it that mattered. Some authors claim that those with musculoskeletal complaints tend to overstate their physical activity and strain on the job relative to those without any musculoskeletal complaints (23). There is no indication of such bias in this study.

There were only small differences in the prevalences of reported headache and neck or shoulder pain among the different occupations. Among the unemployed women the prevalences of both complaints were relatively high, while the prevalences of unemployed men were more or less the same as among employed men. This survey cannot explain this gender difference, but there may be a connection between an increasing tendency of redefining musculoskeletal symptoms as diseases when the unemployment in the society is increasing (14-16, 25), and women are more vulnerable in periods of unemployment. Both our present research and other papers, may indicate that women staying at home either because they choose it or because they have to, tend to develop more musculoskeletal problems than their employed and often double working "sisters" (26).

The psychosocial work-related factors together with the more global and individual factors like "self-estimated health" and "depression", and to be bothered by physical strain factors, were the main factors associated with both headache and neck or shoulder pain.

We claim that a change in understanding of musculoskeletal illnesses is overdue. The strain approach is however, deeply ingrained in clinical practice, occupational hygiene bodies and commercial interests. In addition it places the responsibility for the illness on external work-related factors and thereby enhances the status of the patients (14-16,25). The important legitimization-function that many of those patients enjoy, can hardly be tampered with without protests from the public.

On the other hand, the medical profession hardly improve objective and subjective health in the population by perpetuating the physical strain model. On the contrary, it probably contributes to medicalisation and ill health, in an area where our professional knowledge is insufficient and the effectiveness of our possible interventions are meagre.

Table 1

Frequencies of reported weekly headache and neck or shoulder pain among different occupational groups in 40 to 42 years old, Nordland 1988/89.

	Males		Females	
	N=3741 Headache	Neckache	N=3764 Headache	Neckache
	%	%	%	%
Housewife/home.	-	-	13.7	25.2
Students	16.7	16.7	7.7	22.2
Industrial	6.7	18.9	13.3	39.3
Agriculture	5.9	12.0	23.1	39.5
Fishing	2.7	20.3	22.2*	55.6*
Clerking	5.9	14.1	12.3	26.9
Health	7.0	10.1	8.8	23.0
Teachers	4.9	9.4	9.8	17.1
Transport	10.7	20.5	33.3*	55.6*
Not employed	7.2	16.2	20.8	42.2
Sum	6.3	16.1	12.5	26.6

*) N < 10

Table 2

Frequencies (%) of reported weekly headache and neck or shoulder pain among men reporting to have different type of physical strain in their current work (yes and no), whether they were bothered by that strain (yes and no) , and whether they had experienced these physical strains in previous work (yes and no). (95% confidence intervals in brackets). Nordland 1988/89.

Exposure	Headache N=2683		Neck or shoulder pain N=2672	
	Yes %	No %	Yes %	No %
Noise				
in current work	6.4 (5.1-7.7)	5.4 (4.2-6.6)	18.6 (16.6-20.6)	12.6 (11.8-13.5)
-bothered by	8.6 (6.6-10.8)	5.0 (3.5-6.8)	21.8 (18.8-24.8)	11.5 (10.7-12.6)
in previous work	7.3 (6.0-8.7)	5.3 (4.2-6.5)	18.7 (16.7-20.6)	11.5 (9.8-13.1)
Climate				
in current work	6.5 (5.2-8.0)	5.6 (4.1-6.7)	19.2 (17.0-21.4)	12.4 (10.6-14.3)
- bothered by	7.3 (5.5-9.5)	5.8 (4.2-7.8)	21.7 (18.7-24.8)	11.6 (8.6-13.1)
in previous work	7.8 (6.4-9.3)	4.3 (3.3-5.5)	18.4 (16.4-20.4)	11.8 (10.2-13.5)
Heavy work				
in current work	6.5 (5.2-8.0)	5.6 (4.4-7.0)	20.3 (18.3-22.3)	12.0 (10.4-13.6)
- bothered by	7.8 (5.4-10.8)	4.9 (3.1-7.5)	27.7 (23.4-31.9)	11.0 (8.1-14.1)
in previous work	7.5 (6.2-8.9)	4.6 (3.6-5.8)	19.2 (17.2-21.2)	10.2 (8.6-11.8)
Monotonous				
in current work	8.2 (7.0-9.4)	5.2 (4.2-6.2)	22.1 (20.3-23.9)	13.4 (11.9-14.9)
- bothered by	11.8 (7.4-16.1)	5.0 (2.6-9.0)	25.0 (19.2-30.8)	11.9 (7.4-16.1)
in previous work	9.1 (7.0-11.5)	4.9 (3.4-6.8)	17.6 (14.8-20.5)	14.4 (11.8-17.0)

Table 3

Frequencies (%) of reported weekly headache and neck or shoulder pain among women reporting to have different type of physical strain in their current work (yes and no), whether they were bothered by that strain (yes and no), and whether they had experienced these physical strains in previous work (yes and no). (95% confidence intervals in brackets). Nordland 1988/89.

Exposure	Headache N=2401		Neck or shoulder pain N=2388	
	Yes %	No %	Yes %	No %
Noise				
in current work	13.1 (10.1-16.0)	11.2 (8.5-14.0)	29.1 (25.2-33.1)	24.2 (20.6-28.0)
- bothered by	16.1 (12.1-20.1)	10.5 (7.3-14.0)	32.4 (25.7-35.6)	23.6 (19.2-28.3)
in previous work	15.5 (12.1-19.0)	11.2 (8.1-14.1)	31.1 (26.7-35.5)	24.4 (20.4-28.6)
Climate				
in current work	15.0 (12.4-17.7)	9.7 (7.6-12.1)	31.9 (28.5-35.4)	22.1 (19.1-25.2)
- bothered by	17.9 (14.5-21.3)	7.8 (5.5-10.4)	34.4 (30.2-38.6)	20.5 (16.9-24.0)
in previous work	17.8 (14.6-21.1)	9.5 (7.2-12.4)	34.2 (30.2-38.3)	21.5 (18.0-25.0)
Heavy work				
in current work	12.8 (10.8-14.8)	10.6 (8.7-12.4)	30.2 (27.4-33.0)	22.6 (20.1-25.2)
- bothered by	16.8 (12.3-17.0)	7.8 (5.3-11.3)	37.5 (32.4-42.6)	21.8 (17.6-26.2)
in previous work	14.6 (12.3-17.0)	10.2 (8.1-12.2)	30.6 (27.5-33.7)	21.9 (19.1-24.7)
Monotonous				
in current work	18.8 (15.6-21.9)	9.5 (7.2-12.1)	37.5 (33.5-41.4)	21.0 (17.7-24.3)
- bothered by	22.3 (16.4-29.2)	10.6 (6.6-16.4)	48.6 (41.0-56.2)	23.9 (17.7-30.7)
in previous work	18.5 (15.2-21.8)	10.0 (7.4-12.6)	34.0 (29.9-38.1)	23.3 (19.6-27.0)

Table 4

The association (odds ratio=OR) between reported weekly headache and independent variables when introduced in a logistic regression blockwise in tree steps. (The 95% confidence interval in brackets). Nordland 1988/89.

	Headache					
	Step 1		Step 2		Step 3	
	OR		OR		OR	
	M	F	M	F	M	F
Block 1						
Age	0.97	0.99	0.97	0.98	0.98	0.97
	(0.80-1.18)	(0.85-1.16)	(0.80-1.18)	(0.84-1.15)	(0.80-1.19)	(0.83-1.14)
Education	0.87	0.92	0.86	0.91	0.86	0.96
	(0.76-1.01)	(0.81-1.05)	(0.75-1.00)	(0.80-1.04)	(0.74-1.00)	(0.84-1.10)
Health	3.50	3.64	3.48	3.46	3.44	3.42
	(2.42-5.06)	(2.69-4.92)	(2.40-5.04)	(2.55-4.70)	(2.36-5.01)	(2.51-4.66)
Depressed	1.66	1.67	1.59	1.59	1.55	1.52
	(1.32-2.09)	(1.40-2.00)	(1.26-2.02)	(1.11-2.29)	(1.22-1.97)	(1.27-1.83)
Goodness of fit:	Male: 2659.441	p : 0.597	Female: 2385.467	p: 0.557		
Improvement:	Male: 73.935	p : 0.0000	Female: 127.184	p: 0.0000		
Block 3						
Busy			1.86	1.31	1.92	1.31
			(1.08-3.18)	(0.91-1.89)	(1.12-3.30)	(0.91-1.90)
Change of work			1.11	1.36	1.09	1.38
			(0.78-1.58)	(1.03-1.80)	(0.76-1.56)	(1.04-1.83)
Tempo			1.20	1.07	1.17	1.05
			(1.00-1.42)	(0.92-1.23)	(0.99-1.40)	(0.91-1.21)
Support			1.00	0.70	1.04	0.76
			(0.68-1.55)	(0.45-1.10)	(0.67-1.63)	(0.48-1.21)
Goodness of fit:	Male: 2702.994	p : 0.343	Female: 2378.113	p: 0.576		
Improvement:	Male: 11.998	p : 0.0174	Female: 11.911	p: 0.0180		
Block 4						
Bothered by monotonous work					1.72	0.81
					(0.94-3.17)	(0.47-1.37)
Currently monotonous work					1.03	1.83
					(0.66-1.62)	(1.32-2.55)
Bothered by heavy work					0.89	1.22
					(0.55-1.45)	(0.84-1.77)
Bothered by climate					0.93	1.60
					(0.62-1.40)	(1.17-2.20)
Goodness of fit:	Male: 2703.130	p : 0.323	Female: 2364.406	p: 0.630		
Improvement:	Male: 4.441	p : 0.3496	Female: 25.864	p: 0.000		

Table 5

The association (odds ratio=OR) between reported weekly neck or shoulder pain and independent variables when introduced in a logistic regression blockwise in tree steps. (The 95% confidence interval in brackets). Nordland 1988/89.

	Neck or shoulder pain					
	Step 1		Step 2		Step 3	
	OR	F	OR	F	OR	F
	M	F	M	F	M	F
Block 1						
Age	1.06	1.05	1.06	1.05	1.06	1.05
	(0.93-1.22)	(0.94-1.18)	(0.93-1.22)	(0.93-1.18)	(0.93-1.22)	(0.93-1.18)
Education	0.77	0.76	0.76	0.75	0.80	0.78
	(0.70-0.85)	(0.69-0.84)	(0.69-0.84)	(0.68-0.82)	(0.73-0.89)	(0.70-0.86)
Health	4.07	3.53	4.02	3.34	3.83	3.30
	(3.10-5.35)	(2.72-4.57)	(3.06-5.29)	(2.57-4.33)	(2.91-5.05)	(2.53-4.30)
Depressed	1.50	1.44	1.41	1.37	1.38	1.32
	(1.26-1.78)	(1.25-1.66)	(1.19-1.68)	(1.19-1.59)	(1.16-1.65)	(1.14-1.53)
Goodness of fit:	Male: 2614.242	p : 0.764	Female: 2382.016	p: 0.502		
Improvement:	Male: 166.157	p : 0.0000	Female: 183.909	p: 0.0000		
Block 3						
Busy			1.30	1.08	1.29	1.07
			(0.95-1.78)	(0.84-1.38)	(0.94-1.77)	(0.83-1.38)
Change of work			1.13	1.10	1.08	1.10
			(0.80-1.44)	(0.88-1.36)	(0.84-1.38)	(0.88-1.37)
Tempo			1.10	1.19	1.08	1.16
			(0.98-1.25)	(1.07-1.32)	(0.96-1.22)	(1.14-1.90)
Problems			0.73	0.63	0.78	0.67
			(0.55-0.99)	(0.43-0.92)	(0.58-1.05)	(0.46-0.99)
Goodness of fit:	Male: 2613.078	p : 0.744	Female: 2384.978	p: 0.462		
Improvement:	Male: 13.526	p : 0.0090	Female: 19.857	p: 0.0005		
Block 4						
Distressed by monotonous work					0.95	1.41
					(0.61-1.48)	(0.93-2.13)
Currently monotonous work					1.30	1.47
					(0.97-1.74)	(1.14-1.90)
Bothered by heavy work					1.57	1.28
					(1.16-2.14)	(0.96-1.71)
Bothered by climate					1.20	1.26
					(0.92-1.57)	(0.98-1.62)
Goodness of fit:	Male: 2610.920	p : 0.744	Female: 2382.053	p: 0.455		
Improvement:	Male: 19.448	p : 0.0006	Female: 33.207	p: 0.0000		

References

1. Ekenback K, Hagberg M. {Dålig prognos vid svåra nack-skulderbesvär.} A 10-year follow-up of women working in industry. Unfavourable prognosis of severe neck-shoulder disorders. *Läkartidningen* 1991; 88: 1120-21.
2. Simons DG. Muscle pain syndromes - part I. *Am J Physic Med* 1975; 54: 286-91.
3. Carlsson AM. Ryggbesvär - ett svårbehandlat smärttillstånd. *Läkartidningen* 1988;50: 399-400.
4. Kramer JS, Yelin EH, Epstein WV. Social and economic impacts of four musculoskeletal diseases. *Arthritis and Rheumatism* 1983; 26 ; 901-7.
5. Johansson B. Backache - current orthopaedic viewpoints. *Nord Med* 1994; 109: 155-6.
6. Kamwendo K, Linton ST, Moritz U. Neck and shoulder disorders in medical secretaries. Part II. Ergonomical work environment and symptom profile. *Scand J Rehab Med* 1991; 23: 135-42.
7. Bergnudd H, Nilsson B. Back pain in middle age; occupational workload and psychological factors: an epidemiologic survey. *Spine* 1988; 13: 58-60.
8. Brattberg G, Thorslund M, Wikman A. The prevalence of pain in a general population. The results of a postal survey in a county in Sweden. *Pain* 1989; 37: 215-22.
9. Hagberg M, Wegman DH. Prevalence rates and odds ratios of shoulder-neck diseases in different occupational groups. *Br J Int Med* 1987; 44: 602-10.
10. Damkot DK, Pope MH, Lord J, Frymoyer JW. The relationship between work history, work environment and low- back pain in men. *Spine* 1984; 9: 395-99.
11. Maeda K. Occupational cervicobrachial disorder and its causative factors. *J Human Ergol* 1977; 6: 193-202.
12. Hasvold T, Johnsen R. Headache and neck or shoulder pain - frequent and disabling complaints in the general population. *Scand J Prim Health Care* 1993; 11: 219-24.
13. Axelsson J-A, Blume J. {Psykosociala arbetsmiljöfaktorer ofta bakomliggande orsaker till ländryggssmertor} Work related psychosocial factors as causes of low back pain. *Läkartidningen* 1988; 85: 3331-4.

14. Bell SD. "Repetition strain injury": an iatrogenic epidemic of simulated injury. *Med J Australia* 1989; 151: 280-4.
15. Ferguson DA. "RSI": putting the epidemic to rest. *Med J Australia* 1987; 147: 213-4.
16. Cleland LG. "RSI": a model of social iatrogenesis. *Med J Australia* 1987; 147: 236-9.
17. Westgaard RH, Jensen C, Hansen K. Individual and work-related risk factors associated with symptoms of musculoskeletal complaints. *Int Arch Occup Environ Health* 1993; 64: 405-13.
18. Hasvold T, Johnsen R, Førde OH. Non-migraineous headache, neck or shoulder pain and migraine - differences in associations with background factors in a city population. *Scand J Prim Health Care* (Accepted for publication 1995).
19. Bigos SJ et al. A longitudinal, prospective study of industrial back injury reporting. *Clin Ortop* 1992; 279: 21-34.
20. Jacobsen BK, Stensvold I, Fylkesnes K, Kristiansen IS, Thelle DS. The Nordland health study. Design of the study, description of the population, attendance and questionnaire response. *Scand J Soc Med* 1992; 3: 184-7.
21. Nie HH, Hull CH, Jenkins JG, Steinbrenner K, Bent DH. Statistical package for the social sciences. 2nd ed. New York: McGraw Hill; 1975.
22. Magora A. Investigation of the relation between low back pain and occupation. *Scand J Rehab Med* 1973; 5: 191-6.
23. Kelsey JL, Golden AL. Occupational and workplace factors associated with low back pain. *Occupat Med* 1988; 3: 7-16.
24. Nachemson AL. Newest Knowledge of low back pain. *Clin Orthop* 1992; 279: 8-20.
25. Littlejohn GO. Fibrositis/Fibromyalgia Syndrome in the Workplace. *Rheumatic Disease Clinics of North America* 1989; 15: 45-60.
26. Viikari-Juntura E, Vouri J, Silverstein BA, Kalmo R, Kuosma E, and Videman T. A life-long prospective study on the role of psycho social factors in neck-shoulder and low-back pain. *Spine* 1991; 16: 1056-61.

QUESTIONNAIRE

Bardu-undersøkelsen 1989

Du har nå mottatt et spørreskjema fra kommunelege og forskningsstipendiat Toralf Hasvold. Dette spørreskjemaet er et viktig grunnlag for den forskning som jeg holder på med ved Universitetet i Tromsø angående muskel og skjelettplager. Undersøkelsen går ut på å finne årsaker og forklaringer på hodepine og nakke/skulderplager, slik at man bedre kan forebygge og behandle disse plagene i framtida. Noen av spørsmålene kan for enkelte virke merkelige, men alle spørsmålene er viktige når de blir analysert i sin rette sammenheng.

Jeg håper derfor at dere vil fylle ut dette skjemaet så samvittighetsfullt og nøyaktig som mulig.

Skjemaet inneholder ikke navn på den som fyller det ut. Skjemaene er derimot nummerert, og det er fordi jeg skal kunne purre på svaret. Jeg vil innkalle noen av de som svarer på skjemaet til en grundig helseundersøkelse og samtale, og skjema nummeret vil bli brukt til å finne fram til navn og adresse til de som skal etterinnkalles til denne undersøkelsen. All annen skjema behandling vil skjje anonymt.

FYLL UT SKJEMAENE NÅ, SÅ ER DET GJORT!

Har du problemer med å forstå spørsmålene, ta kontakt med Toralf Hasvold på telefon 81 333 (kommunelegen i Bardu).

Faglige veiledere ved denne forskningen er professor Anders Forsdahl og professor Olav Helge Førde ved Universitetet i Tromsø.

Med vennlig hilsen

Toralf Hasvold

Kommunelege og forskningsstipendiat

PERSONOPPLYSNINGER

1. Kjønn: 1 MANN 2 KVINNE
2. Alder: år
3. Siviltatus: Gift/samboer 1
 Skilt/separert 2
 Enslig 3
 Enke/enkemann 4
4. Hvor mange års skolegang har du medregnet grunnskolen? år.
5. Hvor lenge har du bodd i Bardu? år mnd
6. Har du familie/slektninger i Bardu? JA 1 NEI 2
7. Har du siste året vurdert å flytte? 1 2
 Hvis ja, var det på grunn av misnøye med:
- | | | |
|---|--------------------------|--------------------------|
| (kryss av for hver grunn) | JA | NEI |
| — eget arbeid | <input type="checkbox"/> | <input type="checkbox"/> |
| — utdanningstilbud | <input type="checkbox"/> | <input type="checkbox"/> |
| — barns oppvekstvilkår | <input type="checkbox"/> | <input type="checkbox"/> |
| — fritidstilbud | <input type="checkbox"/> | <input type="checkbox"/> |
| — servicetilbud, forretninger, offentlige kontorer osv. | <input type="checkbox"/> | <input type="checkbox"/> |
| — klimaet | <input type="checkbox"/> | <input type="checkbox"/> |
| — avstand til familie | <input type="checkbox"/> | <input type="checkbox"/> |

PLAGER I HODE, NAKKE OG SKULDRE

8. Hvor ofte er du plaget av hodepine?
 Sett kryss i ruten der JA passer best. JA
- | | | |
|---------------------------------|--------------------------|---|
| Sjelden eller aldri | <input type="checkbox"/> | 1 |
| En eller flere ganger i måneden | <input type="checkbox"/> | 2 |
| En eller flere ganger i uken | <input type="checkbox"/> | 3 |
| Daglig | <input type="checkbox"/> | 4 |
9. Hvor ofte er du plaget med smerter i nakke eller skuldre?
 Sett kryss i ruten der JA passer best. JA
- | | | |
|---------------------------------|--------------------------|---|
| Sjelden eller aldri | <input type="checkbox"/> | 1 |
| En eller flere ganger i måneden | <input type="checkbox"/> | 2 |
| En eller flere ganger i uken | <input type="checkbox"/> | 3 |
| Daglig | <input type="checkbox"/> | 4 |
10. Har noen av disse i din familie vært plaget med HODEPINE?
 Sett kryss i den eller de rutene som passer.
- | | | |
|-------------------|--------------------------|---|
| Ingen | <input type="checkbox"/> | 1 |
| Mor | <input type="checkbox"/> | 2 |
| Far | <input type="checkbox"/> | 3 |
| Søster | <input type="checkbox"/> | 4 |
| Bror | <input type="checkbox"/> | 5 |
| Barn | <input type="checkbox"/> | 6 |
| Ektefelle/samboer | <input type="checkbox"/> | 7 |
11. Har noen av disse i din familie vært plaget med NAKKE ELLER SKULDERPLAGER?
 Sett kryss i den eller de rutene som passer.
- | | | |
|-------------------|--------------------------|---|
| Ingen | <input type="checkbox"/> | 1 |
| Mor | <input type="checkbox"/> | 2 |
| Far | <input type="checkbox"/> | 3 |
| Søster | <input type="checkbox"/> | 4 |
| Bror | <input type="checkbox"/> | 5 |
| Barn | <input type="checkbox"/> | 6 |
| Ektefelle/samboer | <input type="checkbox"/> | 7 |

ANSVORLIGHETSGRAD

12. Reduserer plagene i hodet, nakke eller skuldre din arbeidsevne?
 Sett kryss i ruten der JA passer best.
- | | | |
|--------------------------------|--------------------------|---|
| Aldri, eller i ubetydelig grad | <input type="checkbox"/> | 1 |
| I noen grad | <input type="checkbox"/> | 2 |
| I betydelig grad | <input type="checkbox"/> | 3 |
| Klarer ikke vanlig arbeide | <input type="checkbox"/> | 4 |
13. Hvor sterke smerter fra hode, nakke eller skuldre har du hatt de siste 14 dager?
 Sett kryss i ruten der JA passer best.
- | | | |
|----------------|--------------------------|---|
| Ingen | <input type="checkbox"/> | 1 |
| Lite smerte | <input type="checkbox"/> | 2 |
| Noe smerte | <input type="checkbox"/> | 3 |
| Sterke smerter | <input type="checkbox"/> | 4 |
14. Har du de siste 14 dager brukt smertestillende midler?
 JA 1 NEI 2
15. Hvis du har brukt smertestillende midler, er det
 Sett kryss i ruten der JA passer best.
- | | | |
|---|--------------------------|---|
| På grunn av hodepine | <input type="checkbox"/> | 1 |
| På grunn av nakke eller skulderdersmerter | <input type="checkbox"/> | 2 |
| På grunn av andre plager | <input type="checkbox"/> | 3 |
16. Hvis du bruker smertestillende midler, hvor ofte bruker du slike midler?
 Sett kryss i ruten der JA passer best.
- | | | |
|---------------------------------|--------------------------|---|
| Sjelden | <input type="checkbox"/> | 1 |
| En eller flere ganger i måneden | <input type="checkbox"/> | 2 |
| En eller flere ganger i uken | <input type="checkbox"/> | 3 |
| Daglig | <input type="checkbox"/> | 4 |
17. Hvis du har plager fra hode, nakke eller skuldre, hvor gammel var du da plagene begynte? (Oppgi alderen i år) år
18. Hvis du har hatt plager fra hode, nakke eller skuldre bare en periode av ditt liv, hvor gammel var du da du ble kvitt plagene? (Oppgi alderen i år) år

ANDRE PLAGER

19. Har du ofte en eller flere av følgende plager? Sett kryss i ruten der JA passer best.
- | | | |
|---------------------|--------------------------|---|
| Mageplager | <input type="checkbox"/> | 1 |
| Svimmelhet | <input type="checkbox"/> | 2 |
| Hjertebank | <input type="checkbox"/> | 3 |
| Søvnvansker | <input type="checkbox"/> | 4 |
| Menstruasjonsplager | <input type="checkbox"/> | 5 |
| Ingen | <input type="checkbox"/> | 6 |
20. Hvordan syns du i hovedsak din helsetilstand er for tiden?
 Sett kryss i ruten der JA passer best.
- | | | |
|--------------------------|--------------------------|---|
| Dårlig | <input type="checkbox"/> | 1 |
| Hverken god eller dårlig | <input type="checkbox"/> | 2 |
| Bra | <input type="checkbox"/> | 3 |
| Utmerket | <input type="checkbox"/> | 4 |
21. Hvis du får store personlige problemer, regner du med å få hjelp og støtte fra noen av de følgende:
 (Sett kryss for enten ja eller nei på hver linje)
- | | | | | |
|--------------------------|--------------------------|----|--------------------------|-----|
| Ektefelle/samboer | <input type="checkbox"/> | JA | <input type="checkbox"/> | NEI |
| Venner | <input type="checkbox"/> | | <input type="checkbox"/> | |
| Arbeidskamerater | <input type="checkbox"/> | | <input type="checkbox"/> | |
| Familie utenom ektefelle | <input type="checkbox"/> | | <input type="checkbox"/> | |
22. Har du i lengre tid følt behov for å snakke med noen om personlige problemer, uten at du har gjort det?
 JA NEI

KONTAKT MED HELSEHELPEVESTEN

23. Har du søkt hjelp på grunn av plagene fra hode, nakke eller skuldre det siste året?
 JA NEI
24. Hvor mange besøk har du hatt det siste året på grunn av hodepine, nakke eller skuldersmerter?
- | | |
|---------------------------------|-------|
| Hos vanlig lege? | |
| Hos spesialist | |
| Hos fysioterapeut | |
| Hos kiropraktor | |
| Hos soneterapeut/naturmedisiner | |
25. Har du vært innlagt på sykehus på grunn av hodepine, nakke eller skuldersmerter i løpet av siste året?
 JA NEI

SOSIALE FORHOLD

26. Hvordan var de økonomiske forhold i familien under oppveksten din?

Sett kryss i den ruten som passer best.

- Meget god 1
- God 2
- Vanskelig 3
- Meget vanskelig 4

27. Hvordan vil du beskrive din økonomiske situasjon nå?

Sett kryss i den ruten som passer best.

- Meget god 1
- God 2
- Vanskelig 3
- Meget vanskelig 4

28. Hvor fornøyd er du med følgende sider/ områder av livet ditt?

Sett kryss i den ruten som passer best.

	Særdeles tilfreds	Meget tilfreds	Nokså tilfreds	Både/og	Nokså utilfreds	Meget utilfreds	Særdeles utilfreds
Leiligheten/boligen din?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nabolaget?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arbeidet ditt/ din daglige virksomhet?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Måten du tilbringer fritiden på?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samværet med familie og venner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forholdet til partner/ samboer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utdanningen din?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. Syns du kravene som blir stilt til deg på jobben er

Sett kryss i den ruten som passer best.

- Alt for stor 1
- Noe for stor 2
- Passe 3
- For små 4
- Det stilles ingen krav 5

30. Syns du kravene som stilles til deg i hjemmet er

Sett kryss i den ruten som passer best.

- Alt for stor 1
- Noe for stor 2
- Passe 3
- For små 4
- Det stilles ingen krav 5

31. Hvordan har du hatt det de to siste ukene?
(Sett ring rundt ett svar på hver linje.)

* Vært i stand til å konsentrere deg fullt ut om alt du har gjort? . . .	Mye mindre enn vanlig	Mindre enn vanlig	Samme som vanlig	Bedre enn vanlig
* Ligget våken på grunn av bekymringer?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig
* Vært i stand til å holde deg selv engasjert og i virksomhet?	Mye mindre enn vanlig	Mindre enn vanlig	Samme som vanlig	Mer enn vanlig
* Vært ute blant andre så mye som du pleier?	Mye mindre enn vanlig	Mindre enn vanlig	Samme som vanlig	Mer enn vanlig
* Følt at du i det store og det hele greier deg bra?	Mye mindre enn vanlig	Mindre bra enn vanlig	Omtrent som vanlig	Bedre enn vanlig
* Vært fornøyd med den måten du fungerer på?	Mye mindre enn vanlig	Mindre enn vanlig	Omtrent som vanlig	Bedre enn vanlig
* Følt at du tar del i ting på en nyttig måte?	Mye mindre enn vanlig	Mindre enn vanlig	Som vanlig	Mer enn vanlig
* Følt at du er i stand til å ta bestemmelser?	Mye mindre enn vanlig	Mindre enn vanlig	Som vanlig	Mer enn vanlig
* Følt deg stadig utsatt for press?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig
* Følt deg ute av stand til å mestre dine vanskeligheter?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig
* Vært i stand til å glede deg over dine daglige gjøremål?	Mye mindre enn vanlig	Mindre enn vanlig	Samme som vanlig	Mer enn vanlig
* Tatt tingene tungt?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig
* Vært i stand til å møte dine problemer?	Mye mindre enn vanlig	Mindre enn vanlig	Samme som vanlig	Mer enn vanlig
* Synes at alt vokser over hodet på deg?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig
* Følt deg ulykkelig og nedtrykt (Deprimert)?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig
* Mistet selvtilliten?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig
* Tenkt på deg selv som en verdiløs person?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig
* Stort sett følt deg tilfreds når alt tas i betraktning?	Mye mindre enn vanlig	Mindre enn vanlig	Som vanlig	Mer enn vanlig
* Stadig følt deg nervøs og anspent?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig
* Følt at du til tider ikke var i stand til å gjøre det minste fordi nervene dine var i ulage?	Ikke i det hele tatt	Ikke mer enn vanlig	Heller mer enn vanlig	Mye mer enn vanlig

Dato for utfylling

Dag:

Måned:

År:

ISM SKRIFTSERIE - FØR UTGITT:

1. Bidrag til belysning av medisinske og sosiale forhold i Finnmark fylke, med særlig vekt på forholdene blant finskattede i Sør-Varanger kommune.
Av Anders Forsdahl, 1976. (nytt opplag 1990)
2. Sunnhetstilstanden, hygieniske og sosiale forhold i Sør-Varanger kommune 1869-1975 belyst ved medisinalberetningene.
Av Anders Forsdahl, 1977.
3. Hjerte-karundersøkelsen i Finnmark - et eksempel på en populasjonsundersøkelse rettet mot cardiovasculære sykdommer. Beskrivelse og analyse av etterundersøkelsesgruppen.
Av Jan-Ivar Kvamme og Trond Haider, 1979.
4. The Tromsø Heart Study: Population studies of coronary risk factors with special emphasis on high density lipoprotein and the family occurrence of myocardial infarction.
Av Olav Helge Førde og Dag Steinar Thelle, 1979.
5. Reformer i distriktshelsetjenesten III: Hypertensjon i distriktshelsetjenesten.
Av Jan-Ivar Kvamme, 1980.
6. Til professor Knut Westlund på hans 60-års dag, 1983.
- 7.* Blodtrykksovervåkning og blodtrykksmåling.
Av Jan-Ivar Kvamme, Bernt Nesje og Anders Forsdahl, 1983.
- 8.* Merkesteiner i norsk medisin reist av allmennpraktikere - og enkelte utdrag av medisinalberetninger av kulturhistorisk verdi.
Av Anders Forsdahl, 1984.
- 9.* "Balsfjordsystemet." EDB-basert journal, arkiv og statistikkssystem for primærhelsetjenesten.
Av Toralf Hasvold, 1984.
10. Tvunget psykisk helsevern i Norge. Rettsikkerheten ved slikt helsevern med særlig vurdering av kontrollkommisjonsordningen.
Av Georg Høyer, 1986.

11. The use of self-administered questionnaires about food habits. Relationships with risk factors for coronary heart disease and associations between coffee drinking and mortality and cancer incidence.
Av Bjarne Koster Jacobsen, 1988.
- 12.* Helse og ulikhet. Vi trenger et handlingsprogram for Finnmark.
Av Anders Forsdahl, Atle Svendal, Aslak Syse og Dag Thelle, 1989.
13. Health education and self-care in dentistry - surveys and interventions.
Av Anne Johanne Søgaaard, 1989.
14. Helsekontroller i praksis. Erfaringer fra prosjektet helsekontroller i Troms 1983-1985.
Av Harald Siem og Arild Johansen, 1989.
15. Til Anders Forsdahls 60-års dag, 1990.
16. Diagnosis of cancer in general practice. A study of delay problems and warning signals of cancer, with implications for public cancer information and for cancer diagnostic strategies in general practice.
Av Knut Høltedahl, 1991.
17. The Tromsø Survey. The family intervention study. Feasibility of using a family approach to intervention on coronary heart disease. The effect of lifestyle intervention of coronary risk factors.
Av Synnøve Fønnebo Knutsen, 1991.
18. Helhetsforståelse og kommunikasjon. Filosofi for klinikere.
Av Åge Wifstad, 1991.
19. Factors affecting self-evaluated general health status - and the use of professional health care services.
Av Knut Fylkesnes, 1991.
20. Serum gamma-glutamyltransferase: Population determinants and diagnostic characteristics in relation to intervention on risk drinkers.
Av Odd Nilssen, 1992.

21. The Healthy Faith. Pregnancy outcome, risk of disease, cancer morbidity and mortality in Norwegian Seventh-Day-Adventists.
Av Vinjar Fønnebo, 1992.
22. Aspects of breast and cervical cancer screening.
Av Inger Torhild Gram, 1992.
23. Population studies on dyspepsia and peptic ulcer disease: Occurrence, aetiology, and diagnosis. From The Tromsø Heart Study and The Sørreisa Gastrointestinal Disorder Studie.
Av Roar Johnsen, 1992.
24. Diagnosis of pneumonia in adults in general practice.
Av Hasse Melbye, 1992.
25. Relationship between hemodynamics and blood lipids in population surveys, and effects of n-3 fatty acids.
Av Kaare Bønaa, 1992.
26. Risk factors for, and 13-year mortality from cardiovascular disease by socioeconomic status. A study of 44690 men and 17540 women, ages 40-49.
Av Hanne Thürmer, 1993.
27. Utdrag av medisinalberetninger fra Sulitjelma 1891-1990.
Av Anders Forsdahl, 1993.
28. Helse, livsstil og levekår i Finnmark. Resultater fra Hjerte-karundersøkelsen i 1987-88. Finnmark III.
Av Knut Westlund og Anne Johanne Søgaard, 1993.
29. Patterns and predictors of drug use. A pharmacoepidemiologic study, linking the analgesic drug prescriptions to a population health survey in Tromsø, Norway.
Av Anne Elise Eggen, 1994.
30. ECG in health and disease. ECG findings in relation to CHD risk factors, constitutional variables and 16-year mortality in 2990 asymptomatic Oslo men aged 40-49 years in 1972.
Av Per G. Lund-Larsen, 1994.

31. Arrhythmia, electrocardiographic signs, and physical activity in relation to coronary heart risk factors and disease. The Tromsø Study.
Av Maja-Lisa Løchen, 1995.
32. The Military service: mental distress and changes in health behaviours among Norwegian army conscript.
Av Edvin Schei, 1995.
33. The Harstad injury prevention study: Hospital-based injury recording and community-based intervention.
Av Børge Ytterstad, 1995.
34. Vilkår for begrepsdannelse og praksis i psykiatri. En filosofisk undersøkelse.
Av Åge Wifstad, 1996.
35. Dialog og refleksjon. Festskrift til professor Tom Andersen på hans 60-års dag, 1996.
36. Factors affecting doctors' decision making.
Av Ivar Sønbo Kristiansen, 1996.
37. The Sørreisa gastrointestinal disorder study. Dyspepsia, peptic ulcer and endoscopic findings in a population.
Av Bjørn Bernersen, 1996.

De som er merket med * har vi dessverre ikke flere eksemplar av.