

# Modern Health Worries, Subjective Health Complaints, Health Care Utilization, and Sick Leave in the Norwegian Working Population

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## Abstract

**Background** Modern health worries (concerns about aspects of modern life affecting health) have been associated with subjective health complaints and health care utilization.

**Purpose** The aim of this study was to investigate the association between modern health worries (MHW) and subjective health complaints (SHC), health care utilization, and sick leave related to such complaints in the Norwegian working population.

**Methods** A sample of the Norwegian working population ( $N=569$ ) answered a questionnaire which included the Subjective Health Complaints Inventory and a Norwegian version of the Modern Health Worries Scale.

**Results** Ninety-one percent of the participants reported at least one complaint in the past 30 days, and 96 % of the participants reported concerns for at least one of the items in the MHW scale. Women reported significantly more and more severe complaints compared to men and significantly more concern about aspects of modern life affecting health. Participants who reported a high level of MHW showed nearly twice the risk of reporting a high level of SHC (odds ratio (OR)=1.83; 95 % confidence interval (CI)=1.30–2.71;  $p=0.001$ ), and they showed twice the risk for self-certified sick leave related to SHC (OR=2.04; 95 % CI=1.01–3.92;  $p=0.048$ ). High levels

of MHW showed no significant association with health care utilization or doctor-certified sick leave.

**Conclusions** Subjective health complaints and concerns about aspects of modern life affecting health are very common, even among healthy workers. Women have more complaints and more concerns compared to men. Within the health care system, it may be advantageous to pay close attention to the association between high levels of MHW and high levels of SHC.

**Keywords** Modern health worries · Subjective health complaints · Health care utilization · Sick leave

## Introduction

Musculoskeletal pain, gastrointestinal discomfort, fatigue, and mood disorders are highly prevalent in the Norwegian population [1]. Such health complaints are distributed in a continuum, and there are no sharp or obvious cutoffs separating “normal” and endurable pain and complaints, and complaints that require professional help and might eventually be labeled or diagnosed as a specific syndrome [1]. Eriksen and Ihlebæk [2] have referred to such pain and complaints, in general, as “subjective health complaints” (SHC). SHC is a frequent cause for medical consultation [3, 4], as well as short- and long-term sick leave in Norway [5, 6]. Women report more frequent and substantial complaints than men, and the intensity of most of the complaints increases with age [1].

There is a growing interest in how the environment and other aspects of modern life can affect public health, with a special focus on potential environmental hazards, such as air pollution, genetically modified food, radiation from high-tension power lines, and cell phones [7–9]. Named modern health worries (MHW), this phenomenon was measured for the first time among New Zealand medical students in 2001

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[8]. This study, as well as later studies, have found modern health worries to be associated with subjective health complaints and health care utilization [8, 10, 11], particularly, the use of alternative medicine [8, 12]. Worries about how aspects of modern life affect health have also been shown to influence how individuals perceive incidents in the environment [13]. Individuals suffering from perceived environmentally related complaints report higher levels of modern health worries, compared to healthy controls [14].

An increased focus on environmental threats in the population may influence how individuals think about their health [8]. It may even contribute to the development of chronic and severe SHC, through psychobiological [15] and cognitive sensitization [16, 17] and sustained activation [15]. In this context, we anticipate that individuals with high levels of MHW may experience more SHC. We also want to investigate if individuals with high levels of MHW have a lower threshold for SHC-related health care utilization and sick leave. The aim of this study has, therefore, been to examine the association between MHW and SHC, health care utilization, and sick leave related to such complaints in the Norwegian working population.

## Methods

### Participants

The study population consisted of 1,000 individuals from the general population in Norway. For the present study, only employed individuals eligible for sick leave ( $N=569$ ) were included (private sector 46.5 %, public sector 47.5 %, and self-employed 6 %). Students, job seekers, disability beneficiaries, and retirees were excluded.

### Procedure

In spring 2008, the market research company, TNS Gallup AS, collected data on behalf of Uni Health as part of a monthly national omnibus registration. Computer-assisted telephone interviews were performed following a standard procedure. In order to ensure a representative sample of the adult population ( $\geq 15$  years), a sample was randomly drawn using telephone numbers in proportion to the population in each municipality. The samples were convenience samples, and the market research company determined the sample size.

### Instruments

#### *Subjective Health Complaints Inventory*

The subjective health complaints inventory [18] was used to measure subjective health complaints as experienced in the

past 30 days. The questionnaire consists of 29 items in which the intensity of each complaint is scored on a four point scale (0=not at all; 1=a little; 2=some; 3=severe). Cronbach's alpha for the total scale was 0.82. Five factors are usually reported [18]: *Musculoskeletal pain* ( $\alpha=0.74$ ) consisting of headache, neck pain, low back pain, upper back pain, arm pain, shoulder pain, migraine, and leg pain; *pseudoneurology* ( $\alpha=0.68$ ) consisting of palpitation, heat flushes, sleep problems, tiredness, dizziness, anxiety, and depression; *gastrointestinal problems* ( $\alpha=0.67$ ) consisting of heartburn, stomach discomfort, ulcer and nonulcer dyspepsia, stomach pain, bloating, diarrhea, and constipation; *allergy* ( $\alpha=0.47$ ) consisting of asthma, breathing difficulties, eczema, allergies, and chest pain; and *flu* ( $\alpha=0.65$ ) consisting of cough and flu. A total SHC score was computed as the sum of all 29 items in the questionnaire. A high level of subjective health complaints was indicated by a SHC total score higher than the median score (median=5).

#### *Health Care Utilization and Sick Leave*

The participants, who reported one or more complaints, were asked whether they had visited a doctor or another health care provider because of these complaints in the past 30 days. The following question was asked: "Have you visited a doctor or other healthcare provider in the past 30 days because of these complaints?" They were also asked if they had been on sick leave in relation to SHC within the past 30 days, as well as in the past year. Three questions were asked: (1) "Have you taken self-certified sick leave in the past 30 days because of these complaints?", (2) "Have you been granted doctor-certified sick leave in the past 30 days because of these complaints?", and (3) "Have you been granted doctor-certified sick leave in the past year because of these complaints?" They were also asked about the specific complaints for their sick leave.

#### *Modern Health Worries Scale*

A Norwegian version of the modern health worries scale [8] was used to assess participants' concern about the effect of different aspects of modern life on their personal health. The original version of the MHW scale was developed after a pilot study conducted on students in New Zealand, in 2001, and consists of 29 items. Later on, the MHW scale has been reduced to 25 items [8]. In this study, a modified version with 20 items was adapted to reflect Norwegian life conditions in 2008. While concerns about radio or cell phone towers, antibiotics in food, hormones in food, fluoridation of water, overuse of antibiotics, leakage from microwave ovens, bacteria in air condition systems, medical and dental X-rays, and pesticide spray were considered less relevant

for Norwegian life conditions and, therefore, excluded; concerns about earth radiation is well known in Norway and were, therefore, added to the Norwegian version. Concerns about acts of terror, avian flu, and climate changes were also added to the Norwegian version because of their relevance at the time of the survey. The participants were asked to rate each item on a five-point scale, ranging from 1 (no concern) to 5 (extreme concern). The scale showed high levels of internal reliability producing a Cronbach's alpha of 0.941 in this sample. The scale consist of four subscales [8]: *Toxic interventions* ( $\alpha=0.88$ ) consisting of amalgam dental fillings, vaccination programs, toxic chemicals in household products, poor building ventilation, contaminated water supply, drug resistant bacteria, and avian flu; *environmental pollutions* ( $\alpha=0.88$ ) consisting of air pollution, depletion of the ozone layer, noise pollution, traffic fumes, and climate change; *tainted food* ( $\alpha=0.89$ ) consisting of genetically modified food, additives in food, and spraying of fruit and vegetables; and *radiation* ( $\alpha=0.80$ ) consisting of cell phones, high tension power lines, earth radiation, and radiation from computer screens. Concern about acts of terror was included in the total MHW score, which was computed based on the sum of all the items. High levels of modern health worries was indicated by a total MHW score higher than the median score (median=37).

### Health Interest

The participants reported their level of health interest on a four-point scale from 1 (no interest) to 4 (high interest).

Gender, age, and educational level were registered on all participants.

### Analytic Strategy

All analyses were conducted with PASW statistic version 18.00. Univariate and bivariate analyses were first performed. Independent sample *t*-tests were used to calculate and compare mean values between men and women. Chi-square tests were applied in case of categorical variables. Logistic regression analyses were used to investigate the association between MHW and different health outcomes: high levels of SHC, health care utilization caused by SHC, self-certified sick leave caused by SHC, and doctor-certified sick leave caused by SHC. Individuals, who reported no complaints, were excluded from the logistic regression analyses on health care utilization and sick leave. Age, gender, education, and health interest were included in the logistic regression model as potential confounders.

## Results

### Demographics

There were 301 women (53 %) and 268 men (47 %), with a mean (*M*) age of 43.6 (SD=12.74). In all, 59 % had educational qualifications from universities/university colleges; 37 %, from upper secondary school; and 4 %, from primary and lower secondary schools.

### Health Interest

Of the participants, 12 % reported “no interest” in health-related topics; 44 % reported “a little interest;” 26 % reported “moderate interest;” and 18 % reported “high interest.”

### Subjective Health Complaints

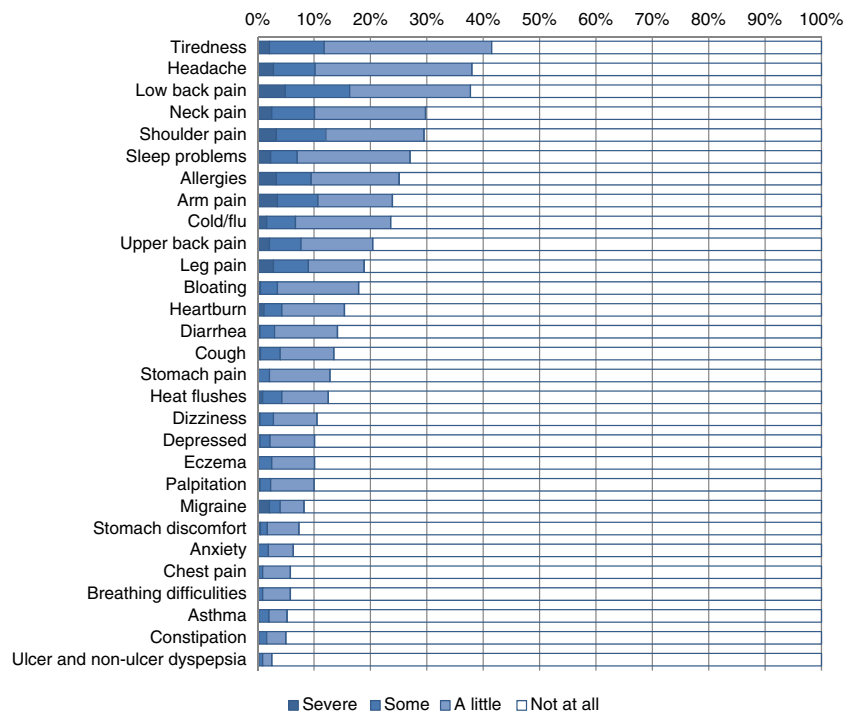
Of the participants, 91 % reported at least one complaint in the past 30 days; 75 % reported musculoskeletal complaints; 59 %, pseudoneurological complaints; 40 %, gastrointestinal complaints; 36 %, allergic complaints; and 28 %, flu-like complaints. The most frequent complaints were tiredness, headache, and low back pain (Fig. 1). The complaint, which is most often reported as severe, was low back pain, followed by arm pain and shoulder pain (Fig. 1). Women (*M*=5.5, standard deviation (STD)=4.49) reported significantly more SHC than men (*M*=4.2, STD=3.60),  $t(567)=-3.933$ ,  $p<0.001$ , and women (*M*=8.0, STD=7.74) had a significantly higher score on SHC total than men (*M*=5.5, STD=5.06),  $t(567)=-4.485$ ,  $p<0.001$ .

### Health Care Utilization and Sick Leave

Regarding health care utilization, 23 % ( $n=130$ ) of the participants reported that they had visited a doctor or other health care provider because of SHC in the past 30 days. Health care utilization was significantly higher among women (27 %) than men (18 %) ( $p<0.001$ ).

Self-certified sick leave in the past 30 days was reported by 8 % ( $n=45$ ) of the participants. Doctor-certified sick leave was reported by 11 % in the past 30 days ( $n=62$ ), and in the past year, by 24 % ( $n=135$ ). The most common reasons for self-certified sick leave were flu (41 %), headache (7 %), neck pain (7 %), arm pain (7 %), and diarrhea (7 %). The most common reasons for doctor-certified sick leave in the past 30 days were low back pain (16 %), neck pain (15 %), and arm pain (11 %), and in the past year, low back pain (15 %), neck pain (10 %), and allergy (9 %). There was no significant association between gender and self-certified sick leave in the past 30 days ( $p=0.496$ ) or sick leave in the past year ( $p=0.242$ ). In contrast, doctor-certified sick leave in the past 30 days was reported

**Fig. 1** Subjective health complaints, in the Norwegian working population, distributed by single items, in percentage and divided into the categories “not at all,” “a little,” “some,” and “severe”



significantly more often among women (13 %) than men (8 %) ( $p=0.049$ ).

15.57) reported significantly more MHW than men ( $M=36.88$ ,  $STD=13.21$ ),  $t(566)=-5.384$ ,  $p<0.001$ .

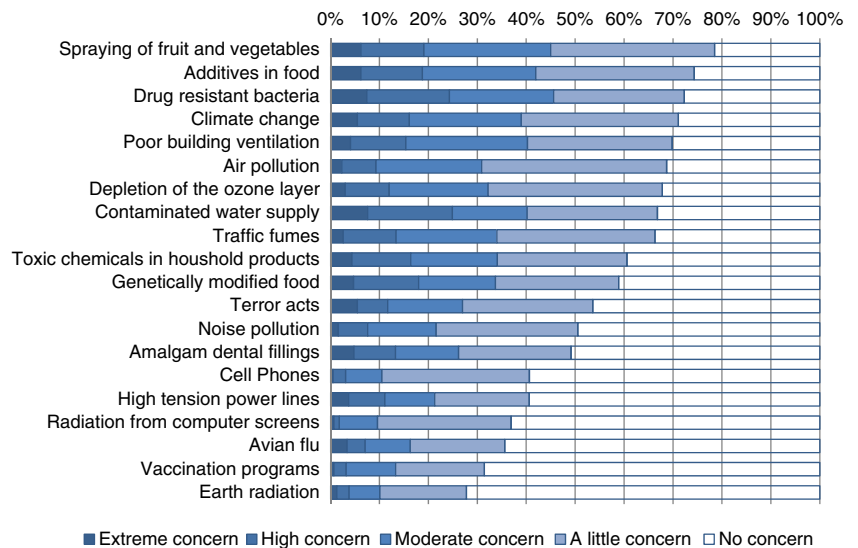
Modern Health Worries

A total of 95 % of the participants reported concern for at least one of the items in the MHW scale. Spraying of fruit and vegetables, additives in food, and drug-resistant bacteria were most frequently reported (Fig. 2). Contaminated water supply and drug-resistant bacteria caused most severe concern, and cell phones and radiation from computer screens caused least concern (Fig. 2). Women ( $M=43.26$ ,  $STD=$

Modern Health Worries and Subjective Health Complaints

Participants who reported a high level of MHW showed nearly twice the risk of reporting a high level of SHC compared with those participants with a low level of MHW (Table 1). Concern for toxic interventions, environmental pollution, and tainted food was also significantly associated with high levels of SHC (Table 1). In addition, all single MHW items were significantly associated with

**Fig. 2** Modern health worries, in the Norwegian working population, distributed by single items, in percentage and divided into the categories “no concern,” “a little concern,” “moderate concern,” “high concern,” and “extreme concern”



**Table 1** Odds ratios, confidence intervals, and *p* value for MHW on high levels of SHC.<sup>a</sup>

| Independent variables   | MHW  | Number | OR   | 95 % CI     | <i>p</i> Value |
|-------------------------|------|--------|------|-------------|----------------|
| MHW total               | Low  | 260    | 1.0  |             |                |
|                         | High | 258    | 1.83 | (1.30–2.71) | 0.001          |
| Toxic interventions     | Low  | 269    | 1.0  |             |                |
|                         | High | 249    | 1.63 | (1.14–2.37) | 0.008          |
| Environmental pollution | Low  | 287    | 1.0  |             |                |
|                         | High | 232    | 1.86 | (1.25–2.60) | 0.002          |
| Tainted food            | Low  | 276    | 1.0  |             |                |
|                         | High | 243    | 1.85 | (1.25–2.60) | 0.002          |
| Radiation               | Low  | 273    | 1.0  |             |                |
|                         | High | 246    | 1.43 | (0.96–2.00) | 0.078          |

OR odds ratios, CI confidence intervals

<sup>a</sup>Analyzed by logistic regression analysis and adjusted for age, gender, education, and health interest; each explanatory variable was analyzed separately

SHC, except for high-tension power lines, spraying of fruit and vegetables, and climate change.

#### Modern Health Worries and Health Care Utilization

A high level of MHW was not significantly associated with health care utilization (Table 2). However, those reporting concerns about contaminated water supply (odds ratio (OR)=1.19; 95 % confidence interval (CI)=1.03–1.40; *p*=0.022) and amalgam dental fillings (OR=1.22; 95 % CI=1.05–1.47; *p*=0.013) had a higher risk of health care use.

#### Modern Health Worries and Sick Leave

The risk for self-certified sick leave was two times greater among the participants who had a high MHW total score (Table 2). A high level of MHW was not significantly associated with doctor-certified sick leave in the past 30 days or doctor-certified sick leave in the past year. However, tainted food was significantly associated with doctor-certified sick leave in the past year (Table 2), as was concern about spraying of fruit and vegetables (OR=1.19; 95 % CI=1.02–1.47; *p*=0.030) and amalgam dental fillings (OR=1.19; 95 % CI=1.01–1.43; *p*=0.037).

### Discussion

In this study, we found a high prevalence of subjective health complaints and modern health worries in the working population in Norway. As many as 91 % of the participants had experienced at least one complaint in the past month, and 95 % of the participants reported concern for at least one aspect of modern life. This is in accordance with other studies, showing that healthy people also worry about their health [11].

Women reported more complaints than men, and they also reported more concerns about aspects of modern life

affecting health. Similar gender differences have been found in other studies on subjective health complaints [1, 10, 19] and in studies on modern health worries [10, 12]. The results from this study are consistent with other studies, showing that concerns about aspects of modern life are associated with increased levels of subjective health complaints [8, 10, 13]. The finding that MHW are highly prevalent in the general population might be related to an increased attention paid to health issues in the media, especially when it comes to environmental threats [8, 9, 20]. Media's one-sided focus may influence individual perceptions of vulnerability to environmental features [8]. This, in turn, might lead to an attentional bias towards thoughts and information related to fears and somatic complaints [17].

We expected to find an association between concerns about aspects of modern life and health care utilization as shown in prior studies [8, 10, 12]. However, when asking specifically for health care visits due to subjective health complaints, we did not find support for this. In previous studies, a marginal significant association between MHW and health care utilization among young and healthy students has been reported [11], and subjective health complaints may mediate the association between MHW and health care utilization [10, 21].

To our knowledge, there are no previous studies investigating the associations between MHW and sick leave. We found individuals with high levels of MHW to have a higher risk for self-certified sick leave, but no increased risk for doctor-certified sick leave. Prior studies have found individuals with high levels of MHW to be more inclined to use alternative medicine [11] and to be more skeptical toward modern medicine [12]. In addition, these individuals have been shown to have a lower consumption of medication [11]. Our findings might be interpreted as an indication of skepticism towards modern medicine among those with high levels of MHW. The risk for self-certified sick leave increased with each level of education, while the risk for doctor-certified sick leave and health care utilization decreased with each level of education.



**Table 2** Odds ratios, confidence intervals, and *p* value for MHW on health care utilization, doctor-certified sick leave during the past 30 days, self-certified sick leave during the past 30 days, and doctor-certified sick leave the past year.<sup>a</sup>

| Independent variables                                  | Number | OR   | 95 % CI     | <i>p</i> Value |
|--|--------|------|-------------|----------------|
| <b>Health care utilization</b>                         |        |      |             |                |
| MHW total  |        |      |             |                |
| Low  | 260    | 1.0  |             |                |
| High   | 258    | 1.47 | (0.96–2.24) | 0.073          |
| Toxic interventions                                    |        |      |             |                |
| Low  | 269    | 1.0  |             |                |
| High   | 249    | 1.48 | (0.97–2.25) | 0.066          |
| Environmental pollution                                |        |      |             |                |
| Low  | 287    | 1.0  |             |                |
| High   | 232    | 1.15 | (0.76–1.74) | 0.508          |
| Tainted food   |        |      |             |                |
| Low  | 276    | 1.0  |             |                |
| High   | 243    | 1.15 | (0.76–1.74) | 0.521          |
| Radiation  |        |      |             |                |
| Low  | 273    | 1.0  |             |                |
| High   | 246    | 1.21 | (0.80–1.83) | 0.377          |
| <b>Doctor-certified sick leave during past 30 days</b> |        |      |             |                |
| MHW total  |        |      |             |                |
| Low  | 260    | 1.0  |             |                |
| High   | 258    | .81  | (0.46–1.42) | 0.453          |
| Toxic interventions                                    |        |      |             |                |
| Low  | 269    | 1.0  |             |                |
| High   | 249    | 1.21 | (0.65–2.00) | 0.635          |
| Environmental pollution                                |        |      |             |                |
| Low  | 287    | 1.0  |             |                |
| High   | 232    | .94  | (0.54–1.64) | 0.831          |
| Tainted food   |        |      |             |                |
| Low  | 276    | 1.0  |             |                |
| High   | 243    | 1.02 | (0.59–1.79) | 0.918          |
| Radiation  |        |      |             |                |
| Low  | 273    | 1.0  |             |                |
| High   | 246    | .89  | (0.51–1.55) | 0.667          |
| <b>Self-certified sick leave during past 30 days</b>   |        |      |             |                |
| MHW total  |        |      |             |                |
| Low  | 260    | 1.0  |             |                |
| High   | 258    | 2.04 | (1.01–3.92) | 0.048          |
| Toxic interventions                                    |        |      |             |                |
| Low  | 269    | 1.0  |             |                |
| High   | 249    | 1.76 | (0.90–3.39) | 0.102          |
| Environmental pollution                                |        |      |             |                |
| Low  | 287    | 1.0  |             |                |
| High   | 232    | 1.72 | (0.90–3.34) | 0.098          |
| Tainted food   |        |      |             |                |
| Low  | 276    | 1.0  |             |                |
| High   | 243    | .98  | (0.51–1.87) | 0.761          |
| Radiation  |        |      |             |                |

**Table 2** (continued)

| Independent variables                            | Number | OR   | 95% CI      | <i>p</i> Value |
|--|--------|------|-------------|----------------|
| Low  | 273    | 1.0  |             |                |
| High   | 246    | .90  | (0.47–1.74) | 0.940          |
| <b>Doctor-certified sick leave the past year</b> |        |      |             |                |
| MHW total  |        |      |             |                |
| Low  | 260    | 1.0  |             |                |
| High   | 258    | 1.16 | (0.76–1.76) | 0.497          |
| Toxic interventions                              |        |      |             |                |
| Low  | 269    | 1.0  |             |                |
| High   | 249    | 1.03 | (0.68–1.56) | 0.898          |
| Environmental pollution                          |        |      |             |                |
| Low  | 287    | 1.0  |             |                |
| High   | 232    | 1.05 | (0.69–1.58) | 0.827          |
| Tainted food                                     |        |      |             |                |
| Low  | 276    | 1.0  |             |                |
| High   | 243    | 1.54 | (1.01–2.33) | 0.047          |
| Radiation  |        |      |             |                |
| Low  | 273    | 1.0  |             |                |
| High   | 246    | 1.22 | (0.79–1.83) | 0.381          |

OR odds ratios, CI confidence intervals

<sup>a</sup> Analyzed by logistic regression analysis and adjusted for age, gender, education, and health interest; each explanatory variable was analyzed separately

### Limitations of the Study

Classic response rates for quota sample surveys are not quantifiable; however, in other studies, it is indicated that 30 to 55 % of eligible subjects responded to such surveys [22]. The main reasons for not participating are usually lack of time, objections to telephone interviews, or no particular reason [23]. A shortened version on the original MHW scale was used to reflect current concerns about possible health threats in Norway, in 2008. This limits the possibility of comparison with other studies of the actual values of the subscales. However, it is not likely to affect the associations of MHW with the other variables. In addition, the intention of the MHW scale is to be flexible in order to reflect current conditions, and the reliability of the subscales, in this study, was found to be high. This is a cross-sectional study, and no conclusions on the causal relationships between MHW and any of the other variables can be drawn. Even so, several psychosocial and cognitive models could imply that worrying causes SHC [16, 17], and so SHC might also cause worrying. Individuals with complaints may search for explanations in exposure to environmental health risks. This may give an increased level of MHW among individuals with high levels of SHC. In addition, we have to be aware of the possibility that environmental factors, corresponding to

the worries, can, in fact, be responsible for the complaints reported by the participants.

## Conclusion

The prevalence of complaints and worries was found to be high in a Norwegian working population. There was an association between high levels of MHW, high levels of SHC, and self-certified sick leave for such complaints. A small group of individuals have strong complaints and serious worries. It may be important to be aware of the association between MHW and SHC when this patient group is met by the health care system, as it could have implications for what advice and reassurance are given.

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