

# Depressive episodes and depressive tendencies among a sample of adults in Kielce, south-eastern Poland

Leif Edvard Aarø<sup>1,2</sup>, Aleksadra Herbec<sup>3</sup>, Johan Håkon Bjørngaard<sup>4</sup>, Marta Mańczuk<sup>5</sup>, Witold A. Zatoński<sup>5,6</sup>

<sup>1</sup> Division of Mental Health, Institute of Public Health, Oslo, Norway

<sup>2</sup> Department of Health Promotion and Development, University of Bergen, Bergen, Norway

<sup>3</sup> Health Promotion Foundation, Warsaw, Poland

<sup>4</sup> Department of Public Health and General Practice, The Norwegian University of Science and Technology, Trondheim, Norway

<sup>5</sup> Department of Cancer Epidemiology and Prevention, the Maria Skłodowska-Curie Cancer Centre and Institute of Oncology, Warsaw, Poland

<sup>6</sup> European Health Inequalities Observatory, Institute of Rural Health, Lublin, Poland

## Abstract

**Introduction and Objectives:** Previous community research has shown differences in depression and depressive symptoms across different socioeconomic and demographic groups. However, very few population-based studies on depression have been conducted in Poland. The purpose of the present study is to assess depressive episodes and depressive tendencies, and associations of the latter with selected socio-economic and demographic predictors among a sample of adults from Poland.

**Materials and Methods:** Data stem from a community health survey carried out as part of a large prospective study among people aged 45-64 in the Kielce province of south-eastern Poland (n=3,862). Self-reported depressive episodes, depressive tendencies (7 items) and use of antidepressants were measured. Depressive tendencies were modelled as a latent variable and analyzed against selected demographic and socioeconomic predictors.

**Results:** The prevalence of depressive episodes was higher among females (25.0%) than among males (14.7%). When depressive tendencies were modelled as a latent variable, the following predictors were associated with high scores: age (females only), living in rural districts, being a pensioner (not including old age pension), and being unemployed (males only). Scores on depressive tendencies were negatively associated with high education, being self-employed (borderline significance only) and high personal income.

**Conclusions:** Depressive episodes were prevalent among the sample. If the associations between depressive tendencies and demographic variables shown in this study are confirmed by future studies, it suggests that action should be taken to offer improved preventive action and improved mental health services – such as early treatment – to females, people living in rural areas, and selected low status segments of the population in particular.

## Keywords

depressive symptoms, gender, socioeconomic status, community survey, urban population, rural population

## INTRODUCTION

It has been estimated that each year 38.2% of the EU population suffer from a mental disorder. Among the most frequent diagnoses are major depression (6.9%), and depression is found to be one of the 4 most disabling single disease conditions [1]. Importantly, depression can be prevented. Evidence from more than 30 trials confirms that preventive action can reduce the incidence by as much as 22% [2, 3, 4], and even by 50% when stepwise interventions are used [5]. Prevention of depression, action to strengthen early treatment of depression, and mental health promotion in general need to be based on solid epidemiological evidence. Such evidence should include not only findings from studies of clinically

diagnosed mental disorder, but also population studies of, for instance, depressive episodes and depressive tendencies.

Concepts like 'depressive disorder' and 'depressive episodes' are rather well-defined and operationalized in the scientific literature [6]. When symptoms of depression are measured by a series of items in questionnaires or standardized interviews, and data reduction techniques are used to create sumscores or latent variables, there seems to be less agreement on the use of labels. In the present publication, we have chosen to use the term 'depressive tendencies' for the underlying latent variable which is assumed to be reflected in the seven depression symptom items.

There are few population studies of depression, depressive episodes and depressive tendencies in the former Communist countries in Central and Eastern Europe. The studies that have been conducted indicate that the prevalence of depression in these countries is high [7]. In order to strengthen the evidence-base for preventive action, more research on depression and its determinants is urgently needed. This study adds to the

Address for correspondence: Leif Edvard Aarø, Norwegian Institute of Public Health, Division of Mental Health, PO Box 4404, Nydalen, N-0403 Oslo, Norway. Tel.: +47 – 21 07 83 57 (office); +47 – 45 88 98 99 (mobile) E-mail: leea@fhi.no

Received: 18 October 2011; accepted: 03 December 2011



existing body of knowledge by presenting selected findings on depressive episodes and depressive tendencies from a population study in the Kielce province in south-eastern Poland. Associations with gender and socioeconomic status are highlighted.

### Gender and depression

One of the most definitive findings in psychiatric epidemiology is that the prevalence of depression is higher among females than among males, and there is no consistent evidence pointing towards reduced gender differences in younger cohorts [8]. Bobak et al. [7] carried out a study among samples from urban populations in Novosibirsk (Russia), Krakow (Poland) and Karvina (Czech Republic). They defined a case as a participant having a score of at least 16 on the Centre for Epidemiological Studies Depression Scale (CESD [9]). The point prevalence in the Krakow sample (n=552) was found to be 21% among males and 40% among females. In another report from the same group of researchers [10], and with data from the same countries, it was concluded that the prevalence of depression was high in the Polish (Krakow) sample (n=5 379), and that the prevalence was higher among females (32.9%) than among males (20.4%).

Mikolajczyk et al. [11] carried out a study among students at 4 European Universities, measuring depression with the Modified Beck Depression Inventory (M-BDI). The Polish sample (n=562) was from the Catholic University in Lublin. Prevalence were higher in Poland and Bulgaria than in Denmark and Germany. The proportion with a score equal to or higher than 35 was 27.3% among male students and 45.5% among female students in Lublin. Other reports indicate that the psychological aspects also exert an effect on health behaviours [12].

**Socioeconomic status and depression.** Meta analyses have confirmed that depression is more widespread among groups with low levels of socioeconomic status [13]. Nicholson et al. examined associations between socioeconomic status and depressive symptoms among samples from Russia, Poland, and the Czech Republic [10]. The Polish study was carried out in Krakow (n=5,379). Depressive symptoms were assessed using the Centre for Epidemiological Studies Depression Scale (CESD). A score of 16 or higher qualified for being classified as depressed. Strong socioeconomic inequalities in depression were observed in both genders. Social differences in depression were more strongly associated with current economic circumstances than with education or early life conditions.

### Objectives

In the presented study, the following topics will be addressed: 1) prevalence of depressive episodes among males and females; 2) dimensionality and reliability of the 7 items depressive tendencies scale; 3) associations between depressive tendencies and selected demographic variables, including gender and indicators of socioeconomic status

## MATERIALS AND METHODS

### Sample and data collection

The study is based on data from the first wave of participants of the Polish-Norwegian Study of Chronic Diseases (PONS

Study) in the Kielce region of south-east Poland. The PONS study is a large open-ended prospective study with very broad research aims, the main purpose of which is the study of the impact of lifestyle factors and biological risk factors on different health outcomes, such as the incidence of chronic diseases and quality of life. The ultimate aim of the study is to advance our understanding of important causes of morbidity and mortality in Poland, and to establish a solid knowledge base for the prevention of these major causes of premature morbidity and mortality.

Participant recruitment and data collection took place in the Kielce region that is located in Świętokrzyskie Province in south-east Poland. In this first phase of the project, 2 distinct geographical areas were covered: the city of Kielce and the rural county of Kielecki. The total population in the 2 districts in the relevant age groups (45-64 years) is 110,000 (60,000 in the city and 50,000 in the rural district).

Seven recruitment units were established, 2 in urban and 5 in rural districts. Two additional recruitment units in the rural areas are in the process of being established as from the autumn of 2011. The recruitment of study participants began in September 2010. So far, participants have been recruited through mass media campaigns, leaflets and newspaper advertisements. The PONS study aims to recruit a final sample of about 100,000 participants. The figure of 15,000 will be reached by the end of 2011. The results presented in this study are based on data from the first 3,862 participants recruited between September 2010 and April 2011.

All participants in the study were interviewed by nurses trained to conduct these interviews. The interviews were based on a comprehensive questionnaire assessing lifestyle, health, as well as social and demographic factors. The responses of all participants were entered into electronic data files during the interview, after which the data were sent directly to a management centre in Warsaw for further processing and storage. Completing the questionnaire took on average around 40 minutes. All information provided was confidential.

Study participants underwent medical check-up, anthropometric measurements, and provided blood and urine samples for long-term storage. Fasting glucose and lipids profiles were checked in the laboratory. The questions and scales assessing depressive tendencies and episodes, as well as use of antidepressants, formed an integral part of a wider health and lifestyle questionnaire administered to all study participants. The whole visit at the assessment centre took about 90 minutes. For more details about the purpose and methods of the PONS project, see the article by Zatoński and Mańczuk in this issue of the journal.

**Measurement.** Measurements of depressive tendencies and depressive episodes were adapted from the PURE study [11]. Depressive episodes were measured with one questionnaire item: Has it happened in the past 12 months that you felt sad, worried, or depressed, for a period longer than 2 weeks? The response categories were 'Yes' and 'No'.

The depressive tendencies scale consisted of 7 items (Table 1), and participants could answer 'Yes' or 'No' to each of them. The 7 items included such as the following:

- During the last 12 months: Have you lost interest in things that used to bring you pleasure (such as hobby, work, or other activities)?
- During the last 12 months: Have you felt tired, without energy?



Demographic variables were measured with standard questionnaire items similar to other community surveys. These included age, gender, employment status, education level and income.

### Data analysis

Statistical analyses were carried out with IBM SPSS Statistics version 19 and Mplus version 6. Depressive tendencies were modelled as a latent variable, with all 7 items serving as ordinal level categorical indicators. The Weighted Least Squares, Mean adjusted and Variance adjusted (WLSMV) estimator was used in all model testing. This estimator is robust to deviations from multivariate normality and is able to handle dichotomous and ordinal level categorical indicators. The fit of models was assessed with Chi square tests, the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA). In order to examine gender differences in predicting depressive tendencies from demographic variables, a series of multi-group analyses were conducted. All loadings and coefficients were constrained across genders and released one by one in order to detect significant improvements of fit. Gender differences were also examined with 95% confidence intervals for males and females separately on unstandardized coefficients. Model modification indices were systematically used in order to obtain models with acceptable fit.

**Ethics.** The study was approved by the Ethics Committee of the Cancer Centre and the Institute of Oncology in Warsaw, Poland.

## RESULTS

### Gender differences

Table 1 shows percentage distributions for all depression variables. Antidepressants were reported used in the past 30 days by 2.1% of males and 3.3% of females ( $p=.51$ ). The proportion reporting to have had at least one depressive episode of 2 weeks duration in the last 12 months was 14.7% among males and 25.0% among females ( $\chi^2=53.536$ ;  $d.f.=1$ ;  $p<.001$ ). The percentages answering 'yes' on the items in the depressive tendencies scale varied between 11.7% - 36.2% in males, and between 20.2% - 48.9% in females. For every single item, the proportion was significantly higher among females than among males ( $p<.001$ ).

A simple additive sum score (sum across items divided by the number of items) was constructed. Mean score on the

depressive tendencies was 1.40 for males and 2.11 for females ( $t=11.332$ ;  $d.f.=3009.399$ ;  $p<.001$ ) (t-test for independent samples when equal variances are not assumed). This difference corresponds to an effect size of .20.

### Properties of the depressive tendencies scale

Table 2 shows polychoric intercorrelations among the 7 indicators of depressive tendencies. The correlations are all positive and significant ( $p<.001$ ) and vary in size from .41-.71. The items can be seen as indicators of a single underlying latent variable. This is based on the assumption that the scale is unidimensional. In order to check this assumption, a simple, unidimensional measurement model with no correlated error terms was tested (Table 3). The measurement model showed acceptable fit (CFI=.985; RMSEA=.054). Loadings ( $y_x$ -standardized) varied from .59-.86. The lowest loading was for the third item: 'Have you gained or lost weight?' This loading also had the lowest communality (.34) (proportion of variance explained by the latent depression variable). The remaining communalities varied between .47-.75. When regressing the latent depressive tendencies variable on gender, the coefficient (de-standardized on gender) turned out to be .35 ( $p<.001$ ). This result is consistent with the gender differences on single items and the gender difference shown when analyzing the depressive tendencies sumscore above.

Additional analyses of the depressive tendencies scale were carried out with more conventional statistical approaches. The Cronbach's alpha (alias Kuder-Richardson 20 coefficient) for the scale was .78. All items contributed to increasing the alpha value, but the 'gained or lost weight' item did so only marginally. A multiple logistic regression analysis was carried out with 'depressive episode' as the dependent variable and all the depressive tendencies items as predictors. All items except 'gained or lost weight' (adjusted odds ratio=1.15;  $p=.25$ ) contributed significantly to predicting depressive episodes with adjusted odds ratios varying from 1.48 - 3.69 ( $p<.001$ ).

**Table 2.** Depression scale: inter-item polychoric correlations. All correlations were significant -  $p<.001$

|  | 1    | 2    | 3    | 4    | 5    | 6    | 7    |
|--|------|------|------|------|------|------|------|
| 1. Lost interest in pleasurable things                         | 1.00 |      |      |      |      |      |      |
| 2. Felt tired, without energy                                  | .71  | 1.00 |      |      |      |      |      |
| 3. Gained or lost weight                                       | .41  | .51  | 1.00 |      |      |      |      |
| 4. Trouble falling asleep                                      | .47  | .58  | .43  | 1.00 |      |      |      |
| 5. Problems concentrating                                      | .60  | .71  | .42  | .62  | 1.00 |      |      |
| 6. Thinking about death of relative or person important to you | .51  | .57  | .52  | .43  | .46  | 1.00 |      |
| 7. Feeling helpless and worthless                              | .66  | .65  | .41  | .54  | .61  | .65  | 1.00 |

**Table 1.** Percentage distributions for depression items by gender.

|   | Males |      |         | Females |      |         | n     | $\chi^2$ test | p<   |
|---|-------|------|---------|---------|------|---------|-------|---------------|------|
|   | Yes % | No % | Total % | Yes %   | No % | Total % |       |               |      |
| Have you been taking any of the following medicines/drugs in the past 30 days: Antidepressants?                   | 2.1   | 97.9 | 100.0   | 1,290   | 3.3  | 96.7    | 100.0 | 2,572         | n.s. |
| Has it happened in the past 12 months that you felt sad, worried, or depressed, for a period longer than 2 weeks? | 14.7  | 85.3 | 100.0   | 1,286   | 25.0 | 75.0    | 100.0 | 2,568         | .001 |
| In the last 12 months:  |       |      |         |         |      |         |       |               |      |
| 1. Have you lost interest in things that used to give you pleasure (hobby, work, or other activities)?            | 13.6  | 86.4 | 100.0   | 1,284   | 20.5 | 79.5    | 100.0 | 2,555         | .001 |
| 2. Have you felt tired, without energy?   | 36.2  | 63.8 | 100.0   | 1,286   | 48.9 | 51.1    | 100.0 | 2,567         | .001 |
| 3. Have you gained or lost weight?  | 13.8  | 86.2 | 100.0   | 1,289   | 20.2 | 79.8    | 100.0 | 2,567         | .001 |
| 4. Have you had trouble with falling asleep?  | 25.4  | 74.6 | 100.0   | 1,288   | 39.4 | 60.6    | 100.0 | 2,561         | .001 |
| 5. Have you experienced usual problems with concentration and focus?  | 21.4  | 78.6 | 100.0   | 1,287   | 32.7 | 67.3    | 100.0 | 2,569         | .001 |
| 6. Have you been thinking about the death of a relative or other person important to you?                         | 17.6  | 82.4 | 100.0   | 1,288   | 26.9 | 73.1    | 100.0 | 2,557         | .001 |
| 7. Have you felt helpless and worthless?  | 11.7  | 88.3 | 100.0   | 1,287   | 22.5 | 77.5    | 100.0 | 2,560         | .001 |

**Table 3.** Measurement model - confirmatory factor analysis. All indicators defined as ordered categorical; estimator: WLSMV

|  | Coefficients*<br>(stdYX standardization) | Communalities<br>(R square) |
|--|--|-----------------------------|
| 1. Lost interest in pleasurable things                             | .78                                      | .60                         |
| 2. Felt tired, without energy                                      | .86                                      | .75                         |
| 3. Gained or lost weight   | .59                                      | .34                         |
| 4. Trouble falling asleep  | .69                                      | .47                         |
| 5. Problems concentrating  | .79                                      | .63                         |
| 6. Thinking about the death of relative or person important to you | .70                                      | .48                         |
| 7. Feeling helpless and worthless                                  | .80                                      | .65                         |

Chi square = 169.780; d.f. = 14; p &lt; .001

CFI = .985

RMSEA = .054

\* - Corresponds to factor loadings in factor analysis

In order to allow for comparisons of findings with other publications based on the depressive tendencies scale, it was decided, however, to include the 'gained or lost weight' item in the list of depressive tendencies indicators.

**Associations among depression variables.** Among those who reported no depressive episode in the last 12 months, mean score on the depressive tendencies sumscore was 1.31. Among those who reported a depressive episode, the mean score was 3.91 ( $t=3.989$ ;  $d.f.=1140.961$ ;  $p<.001$ ) (equal variances not assumed). This corresponds to an effect size of 1.45.

Among those who reported not to have taken antidepressants in the past 30 days, the mean score on the depressive tendencies sumscore was 1.81. Among those who reported to have used antidepressants, the mean score was 4.23 ( $t=10.701$ ;  $d.f.=3860$ ;  $p<.001$ ) (equal variances assumed). This corresponds to an effect size of 1.24.

### Prediction of depressive tendencies

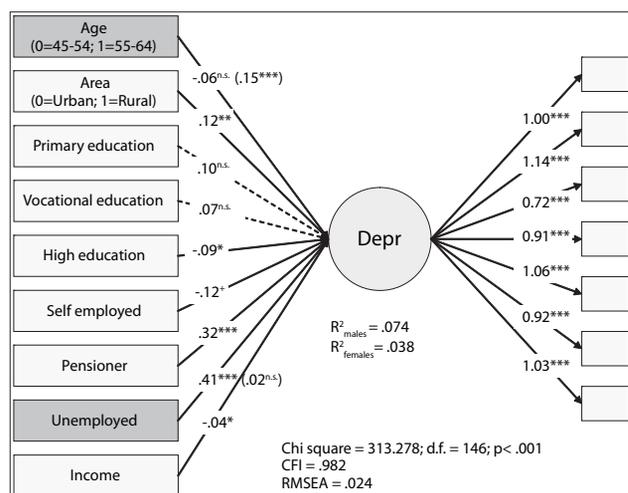
Through a series of steps and by inspection of modification indices, a structural equation (multiple regression-like) model with depressive tendencies as the latent dependent variable was analyzed against selected demographic predictors. Males and females were defined as separate groups, and differences in unstandardized regression coefficients across genders were systematically examined by testing differences in fit of models, and by checking that 95% confidence intervals of unstandardized regression coefficients were not overlapping. The final model with unstandardized regression coefficients (to allow comparisons across genders) is shown in Fig. 1. The fit of the model was excellent ( $CFI=.982$ ;  $RMSEA=.024$ ), and all depressive tendencies indicators loaded significantly on the latent variable (all  $p$ -values < .001), which was also the case when the measurement model was initially tested.

Results showed that the following were associated with higher levels of depressive tendencies:

- older age (females only);
- living in a rural area;
- living on a pension (old age pension not included);
- being unemployed (males only).

The following were associated with lower levels of depressive tendencies:

- high level of education;
- being self-employed;
- high income.



**Figure 1.** Depressive tendencies (latent variable) by selected demographic predictors – a multi-group (gender) analysis. Estimator: WLSMV (Weighted Least Squares Variance and Mean adjusted). All depression indicators are defined as categorical variables. Only unstandardized coefficients and loadings are presented. When coefficients are different for males and females, figure for females in parenthesis

The amounts of variance in the latent dependent variable explained by the models were rather low: 7.4% among males and 3.8% among females.

## DISCUSSION

### Summary of findings

Depressive episodes are more prevalent among females than among males, and females score higher on depressive tendencies. Scores on depressive tendencies are strongly elevated among those who have taken antidepressants during the last 30 days, and among those who report having had at least one depressive episode in the last 12 months. Depressive tendencies can be modelled as a unidimensional latent variable. A number of demographic variables, most of which can be interpreted as indicators of socioeconomic status, contribute to predicting depressive tendencies. All associations are consistent with the notion that depressive tendencies are higher among low-status segments of the population.

### Quality of measurements

The instruments used for measuring depressive episodes and depressive tendencies seem to have functioned relatively well. This is confirmed by a strong association between these 2 measures and the unidimensionality and high internal consistency of the depressive tendencies scale. Moreover, the associations between the depressive tendencies latent variable and indicators of socioeconomic status reveal a highly consistent pattern. Confidence in the data is further supported by the pronounced differences between males and females, which is in line with previous community studies [7,8,10,13].

However, only a small amount of variance in depressive tendencies (7.4% for males and 3.8% for females) is explained by the available demographic predictors. Other indicators of socioeconomic inequality could have been added to the study, for instance, quality and size of housing, subjective evaluation of own material situation, and perceived family affluence.

## Depression and gender

As mentioned previously, high scores on depressive symptoms and high prevalence of depression is one of the most definitive findings in mental health epidemiology. This is also confirmed in the present study. The difference in the prevalence of depressive episodes, 25.0% vs. 14.7% for females and males, respectively, corresponds to an odds ratio of 1.94. This is close to that which has been found elsewhere in other community studies, and strengthens the general confidence in the findings of the presented study [7, 15-17].

## Depression and socioeconomic status

Associations between indicators of socioeconomic status (income, education, occupation) and depressive tendencies were shown not to be particularly strong, but the picture is definitely consistent. All significant associations were in the assumed direction. The lower income, educational level and job status, the higher are the scores on the latent depressive tendencies variable. There was one significant gender difference in such associations. Unemployment was the strongest of all predictors of depressive tendencies among males, but among females no such association was found. Therefore, unemployment seemed to be less of a burden for females, but a rather heavy burden for males. Similar gender difference in depression and depressive tendencies in response to unemployment has been reported in other studies [18]. This difference may be related to the traditional status of the male being responsible for having a paid job and the importance of providing money for the family, associated with the role of the male in a family. Not being able to fulfill these obligations may represent an extra heavy burden for males.

In former Communist countries in Central and Eastern Europe (transition countries), rural populations are generally found to be more disadvantaged than urban populations [19]. The present study confirms that this disadvantage is also visible in the field of mental health. Living in rural areas is associated with higher scores on depressive tendencies, and this difference is still present after control for a number of other predictors related to income, occupations and level of education. There must be aspects of rural life beyond those captured by our socioeconomic indicators that explain this difference.

## Future Directions

There are a number of additional research questions that deserve to be examined in the light of the available data from Kielce on mental health. First of all, an analysis similar to the one conducted for depressive tendencies should be undertaken for depressive episodes. Since the dependent variable would be a dichotomy, such analyses must be based on multiple logistic regression, and might require a larger number of observations. Secondly, other groups of variables assessed in the PONS study deserve to be analyzed against depressive tendencies and episodes. These include Stressful Life Events, use of health services, health related behaviours, and somatic health indicators.

## Limitation of study

An important limitation of the present study is related to the methods of recruitment of participants. Since participants were recruited primarily through the mass media, there may be a selection bias. Those who would score high on

depressive tendencies and those who have experienced depressive episodes might have been less likely to take the effort of participating in such a study. Also, those who would have reported good or excellent mental health may be under-represented among the study participants. Having good or excellent health may make participation in a study that has a strong focus on chronic diseases look less relevant and beneficial. This kind of self-selection may have led to some bias in incidence and prevalence, although it is difficult to know in which direction. Due to reduced variance in the variables measured, it may also have reduced the strength of associations between variables, such as depressive tendencies and demographic variables. This could explain the rather low amount of variance in depressive tendencies accounted for in this study by the demographic predictors. Since new approaches to recruitment will be introduced in the PONS study, there may be less bias in the future selection of participants. Future analyses will reveal the extent to which these different recruitment methods will change associations among variables, and the amount of variance accounted for by the predictors of depressive tendencies.

## CONCLUSIONS

Scores on depressive tendencies were higher and depressive episodes were shown to be more prevalent among females than among males. These differences have been well established by a large number of studies from several countries. The importance of targeting females by early treatment and preventive action on depression is therefore not unique to the Kielce region of Poland. If the patterns of associations between depressive tendencies and indicators of socioeconomic status shown in this study turn out to be valid, action should be taken to offer improved mental health services (including early treatment) to disadvantaged groups, and preventive efforts should target in particular the low status segments of the population.

## ACKNOWLEDGEMENTS

The authors want to thank professors Arne Holte (Deputy Director) and Arnstein Mykletun (Director of the Department of Community Mental Health) of the Norwegian Institute of Public Health for valuable advices regarding relevant literature and methodological aspects of this publication.

The study was supported by a grant from the Polish-Norwegian Research Fund (PNRF-228-AI-1/07). Thanks are expressed to the members of the PONS project team, and to the participants for their contributions to the study.

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