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## PUBLIC HEALTH | RESEARCH ARTICLE

# Long term sick leave, subjective health complaints and sense of coherence, a cross-sectional study

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**Abstract:** *Background:* Long-term work absence is increasing in Western countries. More people suffer from subjective health complaints, such as musculoskeletal pain and depression-like symptoms. Social rights and benefits are based on medical diagnoses; hence large resources are used to identify the biological causes. An alternative approach towards medicalization and diagnosis, like Salutogenesis, with the key factor “Sense of coherence” (SOC) should be approved. *Purpose:* To explore the level of SOC, anxiety and depression, as well as the associations between SOC and general resistance resources (GRRs) and deficits, in people with subjective health complaints on long term sick leave. *Material and methods:* Cross-sectional study, including data from 892 participants from the Friskgården (Norwegian health promotion center) database. The questionnaire included the SOC-13, the Hospital Anxiety and Depression Scale and questions about demographics and sick leave. Multivariable linear regression models were used. *Results:* Participants’ mean (SD) age was 49 (10) years, 70% were women. Mean SOC was 59.4 (13.3). The mean anxiety and depression for all participants were 8.7 (4.4) and 6.2 (3.8) respectively. No difference was found in SOC in participants on sick leave less than, compared with more than one year ( $p = 0.07$ ). *Conclusions:* People on long-term sick leave have lower SOC and higher level of anxiety and depression than previously shown



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### ABOUT THE AUTHORS

The authors share common interests in research on rehabilitation, musculoskeletal disorders and Salutogenesis. Dr Robinson is Associate Professor with several publications on female health, pregnancy and musculoskeletal disorders. Coward is Physiotherapist, MSC and the present paper is based on some of the work related to her Master thesis, where Robinson was her supervisor. Dr Bjorbækmo is qualitative researcher with publications on the phenomenon of touch, knowledge exchange and meaning-making in clinical practice. Dr Langeland is Associate Professor with several publications on Salutogenesis and Mental Health. Robinson and Langeland have previously been working together in a research group with focus on psoriasis, quality of life and Salutogenesis and have several publications with this group.

### PUBLIC INTEREST STATEMENT

This study explores the Sense of coherence (SOC) in persons with subjective health complaints and on long-time work absence in Norway. Associations between SOC and different general resistance resources and deficits are also examined. SOC is a theoretical concept involving comprehensibility, manageability and meaningfulness. It is about coping with stress.

*Main findings:* Persons on long term sick leave with subjective health complaints have lower SOC and higher level of anxiety and depression than what have previously been found in the general population. Large parts of the variation in SOC can be explained by the person’s resistance resources and deficits (such as influence/control, inherent worth, optimism and worries). The latter indicates potential for improvement in SOC by for instance participation in resource oriented therapy. Interestingly, no difference in SOC was found in participants on sick leave less than one year compared with participants on sick leave for one year or longer.

in general populations. Large parts of the SOC variation are explained by GRRs and deficits, indicating potentials for improvement by for instance participation in Salutogenic/resource oriented therapy.

**Subjects:** Rehabilitation Medicine; Health & Society; Disability; Health Conditions; Chronic Diseases

**Keywords:** Salutogenesis; resistance resources; anxiety; depression; HADS

## 1. Introduction

Long term absence from work due to sickness is a major concern for Western countries including Norway. Sick leave implies large social and economic costs where long term sick leave represents the largest cost. An increasing number of people suffer from, and are on sick leave due to, subjective health complaints. These are complaints without objective signs or symptoms, such as musculoskeletal pain, sleep deprivation and depression-like symptoms (Ihlebaek, Eriksen, & Ursin, 2002). Social rights and benefits, however, are regulated by medical diagnoses and large resources are used to try to identify the biological cause of the complaints. Hence, there is more emphasis on symptoms and disease than on the peoples' perception of their health and resources. Previously published studies report that around 20% of the consultations in general practice concern subjective health complaints (Burton, 2003; Rosendal, Carlsen, Rask, & Moth, 2015) and these complaints cause more than half of the long-term sick leave (Aakvik, Holmås, & Kamrul Islam, 2010; Wynne-Jones, Mallen, & Dunn, 2010). There is also a lack of knowledge concerning factors relevant for a return to work (Svensson, Mussener, & Alexanderson, 2010) and a more specific understanding of health and sickness in relation to long term sick leave (Allebeck & Mastekaasa, 2004). Research has, however, demonstrated that personal factors like coping and adaptability can be of importance for long time sick leave and also for return to work (Hansen, Edlund, & Branholm, 2005; Svensson, Mussener, & Alexanderson, 2006).

Several studies recommend health personnel to change their attitude when treating patients with subjective health complaints and that alternative approaches to disease and medicalization should be approved (Catford, 2014; Hay, 2010; Hoefsmit, Houkes, & Nijhuis, 2012; Hollnagel & Malterud, 2000; Waddell, 2006).

Salutogenesis (*salute*—of health, and *genesis*—the origins, or coming into existence), might be a more viable concept and theory to understand health and illness (Antonovsky, 1979). This interdisciplinary theory focuses on peoples' own perception of their health and suffering and what promotes health rather than disease. Furthermore, Salutogenesis identifies perceived individual and collective general resistance resources (GRRs). GRRs are physical and biochemical resources, such as knowledge, identity, social support, inner feelings, values, coping strategies and different material goods, resources that may promote an effective management of tension in demanding situations (Antonovsky, 1987).

A key factor in Salutogenesis is “a Sense of Coherence” (SOC), defined through three components. *Comprehensibility*: a belief that things happen in an orderly and predictable fashion, challenges and events are understood, and that one can reasonable predict what will happened in the future; *manageability*: a belief that things are manageable and within control and that one has the skills and the resources that are needed to take care of things, and capable to meet the demands; *meaningfulness*: a belief that things in life are interesting and the demands are challenges that motivate one towards investment and engagement (Antonovsky, 1979, 1987). The Salutogenic model focuses on peoples' active adaptation in the interplay between their SOC and use of GRR, and a stronger SOC is associated with higher levels of GRR. When a person has the presence of negative factors for health such as depression, pain and anxiety he/she has general resistance deficits (GRD) and is likely to have a lower SOC (Antonovsky, 1979, 1987).

Previous research has shown that persons on long-term sick leave have lower SOC than employed persons (Bergh, Baigi, Fridlund, & Marklund, 2006; Hansen, Edlund, & Henningsson, 2006; Lydell, Marklund, Baigi, Mattsson, & Månsson, 2011). There is also a strong relationship between SOC and factors measuring mental health, and SOC is negative related to anxiety, burnout, demoralization, depression, hostility, hopelessness, perceived stress and post-traumatic stress disorder (Eriksson & Lindstrom, 2007).

Few studies have investigated SOC among people on long-term sick leave and no studies have applied the Salutogenic model by exploring the associations between SOC and GRR/GRD among people on long-term sick leave. The main purpose of this study was therefore to explore the level of SOC as well as the associations between SOC and different GRDs and GRRs in people on long term sick leave due to subjective health complaints in Norway.

## 2. Materials and methods

The participants in the present cross-sectional study were selected among persons on sick leave included in the database from Norwegian health promotion centers (Friskgården) in the period 1994–2011. The centers are located in different parts of Norway and routinely collect data from their participants in a database (FG database), approved by the Norwegian Data Protection Authority. The database consisted of 3213 participants. A total of 907 participants had been on 100% sick leave for more than eight weeks and 892 of them had the sufficient amount of data to be included in the study.

All participants gave written consents for participation and completed the comprehensive questionnaires at home, after their first contact with their supervisor at Friskgården. The Regional Committee for Medical Research Ethics provided formal approval for the study (Reference number 2011/1698).

Friskgården provides courses and training with the objective that every individual adult should be given the opportunity to take part in work related activity. The activities at Friskgården are based on a Salutogenic approach.

### 2.2. Outcome measure; sense of coherence (SOC)

SOC was measured by The Sense of Coherence Questionnaire (SOC-13) (Antonovsky, 1987). SOC-13 has been tested for validity and reliability in several studies (Antonovsky, 1993; Eriksson & Lindstrom, 2005, 2007; Feldt et al., 2007; Hittner, 2007). A systematic review also concluded that the SOC scale seems to be a reliable, valid and cross-culturally applicable instrument measuring to what extent people managed stress and were able to stay healthy (Eriksson & Lindstrom, 2005). SOC-13 comprises 13 items related to comprehensibility (five items), manageability (four items), and meaningfulness (four items). Responses to all items are scored on a seven-point, Likert-type scale. The total score ranges from 13 to 91, with higher scores indicating a stronger SOC. The Cronbach Alpha ( $\alpha$ ) in the present study was 0.88.

### 2.3. Explanatory variables

#### 2.3.1. General resistance resources (GRR)

The following GRRs were measured: sleep quality, ability to relax, self-efficacy, control/influence, inherent worth and optimism all answered on numeric rating scales (NRS) from 0 to 10 (10 is worst).

#### 2.3.2. General resistance deficits (GRD)

The Hospital Anxiety and Depression Scale (HADS), is a self-administered questionnaire and is used as a measure of global emotional distress (Zigmond & Snaith, 1983). The HADS-14 has been validated in several studies and translated into 78 languages (Bjelland, Dahl, Haug, & Neckelmann, 2002). The two dimensions of the questionnaire measure depressive symptoms (seven items) and anxiety symptoms (seven items). Each item scores on a response category (0–3, 3 is worst), and the

total score for the scale ranges from 0 to 42 (Zigmond & Snaith, 1983). HADS has good internal consistency and a previous study reported Cronbach alpha score 0.94 (Whelan-Goodinson, Ponsford, & Schönberger, 2009). A literature review supports the validity of the scale (Bjelland et al., 2002). The Cronbach Alpha ( $\alpha$ ) in the present study was 0.85 for anxiety symptoms, 0.80 for depression symptoms and 0.89 for the HADS total score.

### 2.3.3. Other variables

Pain bothersomeness is measured by one single question: How much bothered are you from pain? Answered on a NRS (0–10, 10 is worst). In addition the extent of worries (Do you often worry?) was asked and answered on NRS from 0 (very seldom)–10 (very often).

Sociodemographic variables as age, gender, level of education, as well as length and volume of the sick leave were also asked for.

The length of sick leave was recoded into less than one year (=0) and one year or more (=1) for analysis purposes.

## 3. Statistical analyses

Descriptive data are presented as frequencies, percentages or means with standard deviations (SD). Independent sample *t*-tests were used to compare SOC scores in participants on sick leave less than one year and one year or longer.

The associations between outcome and explanatory variables, as well as between explanatory variables are explored through bivariate correlations (Pearson's *r*). Variables significantly correlated with SOC ( $p \leq 0.05$ ) were used in multiple linear regression models to explore the associations between SOC (dependent variable) and the explanatory variables. The best subset of explanatory

**Table 1. Descriptive characteristic of the participants**

<b><i>n</i> = 892</b>	<b>Mean (SD)</b>	<b><i>n</i> (%)</b>
Age	49 (10)	
Gender (women)		619 (70)
Sick listed one year or longer (yes)		602 (67)
Education		
$\leq 12$ year of school attendance		534 (60)
Vocational education		184 (21)
Higher education (University)		174 (19)
SOC total score (13–91) <sup>1</sup>	59.4 (13.3)	
HADS total score (0–42)	14.6 (7.3)	
Anxiety (0–13)	8.7 (4.4)	
Depression (0–13)	6.2 (3.8)	
Pain bothersomeness (0–10) <sup>2</sup>	6.5 (2.8)	
Sleep quality (0–10) <sup>1</sup>	4.2 (2.6)	
Ability to relax (0–10) <sup>1</sup>	4.2 (2.4)	
Self-efficacy (0–10) <sup>1</sup>	6.2 (2.4)	
Control/influence (0–10) <sup>1</sup>	5.8 (2.3)	
Inherent worth (0–10) <sup>1</sup>	6.2 (2.3)	
Optimism(0–10) <sup>1</sup>	6.1 (2.4)	
Extent of worries (0–10) <sup>2</sup>	6.2 (2.5)	

Notes: SD = Standard deviation; SOC = Sense of coherence; HADS = Hospital Anxiety and Depression Scale.

<sup>1</sup>High is good.

<sup>2</sup>High is worse.

variables was selected through exclusion of the variables with the smallest contribution (largest  $p$ -values). Based on results from previous studies (Atroshi et al., 2002; Engstrom & Janson, 2009), we decided to keep gender and age in the final models, independently of the  $p$ -values in the correlation analyses. Due to the high correlation between SOC and anxiety (0.70), two adjusted models are presented, one with anxiety (model 1) and one without (model 2). The residuals were examined to check model assumptions.

The statistical analyses were performed using the SPSS statistical program, version 22 (IBM Corp., New York, NY) and a 5% level of significance was used.

#### 4. Results

A total of 892 participants from the Friskgården database are included in the analyses. They were 49 (SD 10) years old and 619 (70%) were women, 174 (19%) had University education and 534 (60%) had 12 or less years of school attendance (Table 1) The mean (SD) SOC score for all the participants was 59.4 (13.3). Mean (SD) anxiety and depression was 8.7 (4.4) and 6.2 (3.8) respectively.

No differences in SOC scores were found in participants on sick leave less than one year ( $n = 295$ , 33%) compared with one year or longer ( $p = 0.07$ ). Mean pain bothersomeness measured with NRS was 6.5 (2.7). Mean (SD) value for sleep quality and ability to relax was 4.2 (2.6) and 4.2 (2.4) respectively (Table 1).

The correlation coefficients between SOC and the explanatory variables ranged between  $-0.70$  and  $0.02$ . The correlation coefficients between the explanatory variables ranged between  $-0.58$  and  $0.63$  and did not suggest collinearity (i.e. none were above 0.7) (Table 2).

Education and self-efficacy was not significantly associated with SOC in the bivariate analyses ( $p = 0.12$  and  $0.23$  respectively). These variables were not included in the multivariable models. Pain bothersomeness, Sleep quality and Ability to relax were associated with SOC in crude analyses ( $p \leq 0.003$ ) but were not associated with SOC in the multivariable models.

Age, gender, anxiety, depression, influence/control, inherent worth, optimism and worries were significantly associated with SOC in the multivariable model ( $p < 0.01$ , except for gender), and explained 64% of the variation in SOC (Table 3). No significant interactions between the explanatory variables were found ( $0.11 < p_{\text{interaction}} < 0.78$ ).  $R^2$  reduced from 0.64 to 0.58 when anxiety was removed from the final model (model 2).

#### 5. Discussion

To our best knowledge this is the first study exploring the association between SOC and GRR's and GRD's in people on long-term sick leave. In multivariable linear regression models age, gender, anxiety, depression, influence/control, inherent worth, optimism and worries were associated with SOC and explained 64% of the variation.

Mean SOC score of 59.4 is lower than what others have reported previously on healthy individuals (Hansen et al., 2005), and also lower than reported on persons on long time sick leave in a Swedish study (Atroshi et al., 2002; Engstrom & Janson, 2009). The latter might be explained by the length of the sick leave; in our study a larger fraction had been on sick leave longer and this might have influenced the result. However, among our participants we found no difference in SOC between those on sick leave less than one year compared with those on sick leave one year or longer. Since the Norwegian social system reimburses the total income for the employee the first year of sick leave, and after that reduces reimbursement to about 67%, we found it important to use sick leave as a dichotomous variable.

**Table 2. Correlation between the outcome variable, SOC, and the explanatory variables**

	SOC	Sex	Age	Education	Anxiety	Depression	Pain bothersomeness	Sleep quality	Ability to relax	Self-efficacy	Control/influence	Inherent worth	Optimism	Extent of worries
SOC	1													
Sex	0.02	1												
Age	0.22**	0.04	1											
Education	0.05	-0.06	-0.03	1										
Anxiety	-0.70**	-0.05	-0.10**	-0.07*	1									
Depression	-0.61**	0.02	0.03	0.02	0.63**	1								
Pain bothersomeness	0.11**	0.01	0.1**	-0.19**	-0.04	-0.07*	1							
Sleep quality	0.28**	-0.03	-0.04	0.11**	-0.35**	-0.34**	-0.20**	1						
Ability to relax	0.45**	0.05	0.05	0.10**	-0.58**	-0.45**	-0.11**	0.58**	1					
Self-efficacy	0.04	-0.16**	-0.26**	0.17**	-0.04	-0.08*	-0.19**	0.20**	0.12**	1				
Control/influence	0.55**	-0.06	0.02	0.03	-0.46**	-0.53**	0.04	0.31**	0.45**	0.23**	1			
Inherent worth	0.58**	-0.04	0.09	0.06	-0.47**	-0.49**	0.08*	0.26**	0.38**	0.24**	0.62**	1		
Optimism	0.52**	-0.03	0.07*	0.02	-0.44**	-0.42*	0.09**	0.23**	0.38**	0.19**	0.5**	0.54**	1	
Extent of worries	-0.49**	-0.01**	-0.14**	-0.04	0.57**	0.37**	0.02	-0.27**	-0.40**	0.09**	-0.31**	-0.30**	-0.38**	1

\* $p < 0.05$ .

\*\* $p < 0.01$ .

**Table 3. Crude and adjusted linear regression models with SOC as outcome variable**

n = 892	Crude estimates		Adjusted estimates <sup>a</sup>			
			Model 1; including anxiety		Model 2; without anxiety	
	$\beta$ (95% CI)	p-value	$\beta$ (95% CI)	p-value	$\beta$ (95% CI)	p-value
Gender	0.67 (-1.32, 2.65)	0.51	0.30 (-0.92, 1.52)	0.63	0.62 (-0.70, 1.93)	0.36
Age	0.30 (0.21, 0.58)	<0.001	0.21 (0.16, 0.27)	<0.001	0.23 (0.17, 0.29)	<0.001
Anxiety	-2.15 (-2.30, -2.00)	<0.001	-1.08 (-1.27, -0.89)	<0.001	-	-
Depression	-2.12 (-2.31, -1.93)	<0.001	-0.61 (-0.82, -0.41)	<0.001	-1.13 (-1.33, -0.93)	<0.001
Influence/control	3.29 (2.95, 3.63)	<0.001	0.70 (0.36, 1.04)	<0.001	0.78 (0.42, 1.15)	<0.001
Inherent worth	3.39 (3.06, 3.72)	<0.001	0.97 (0.63, 1.31)	<0.001	1.18 (0.81, 1.54)	<0.001
Optimism	3.18 (2.82, 3.55)	<0.001	0.56 (0.24, 0.89)	0.001	0.70 (0.35, 1.05)	<0.001
Worries	-2.65 (-2.97, -2.33)	<0.001	-0.42 (-0.70, -0.14)	0.004	-1.09 (-1.36, -0.81)	<0.001

Notes: SOC = Sense of coherence; CI = Confidence interval.

Pain bothersomeness, sleep quality and ability to relax were associated with SOC in crude analyses ( $0.001 < p \leq 0.003$ ) but were not associated with SOC in the two final models.

No significant interactions between the explanatory variables were found ( $0.11 < p_{\text{interaction}} < 0.78$ ).

<sup>a</sup>Adjusted for all the other variables included in the model.

Our results also suggest that SOC increases with age, which is consistent with other studies (Eriksson & Lindstrom, 2005; Lindmark, Stenstrom, Gerdin, & Hugoson, 2010; Nilsson, Leppert, Simonsson, & Starrin, 2010), including a systematic review (Eriksson & Lindstrom, 2005).

Interestingly, we found no significant difference in SOC based on gender and education levels. This is in contrast to Swedish studies where men have higher SOC than women (Lindmark et al., 2010; Nilsson et al., 2010) and that education influences SOC in a general population (Nilsson, Holmgren, & Westman, 2000). Possible explanations for these differences may be that the present study sample had a majority of people with lower education, 60% had 12 or less years of school attendance. Our study sample also consisted of more women than men, but with such a large number of participants ( $n = 892$ ), this cannot be seen as an explanation for the different finding. Furthermore, the gender distribution in the present study is in accordance with a previously published study on subjective health complaints in Norway (Ihlebaek et al., 2002).

The correlation between anxiety, depression and SOC is high (-0.70 and 0.61 respectively) in the present study. This is consistent with a previous systematic review (Eriksson & Lindstrom, 2007) and it has previously been questioned whether SOC is just another measure of mental health (Eriksson, 2007). On the other hand, one may also claim that SOC and mental health is independent, but yet correlated phenomena (Eriksson & Lindstrom, 2007) as our results also may confirm. Although the questionnaires are highly correlated, HADS measures symptoms while SOC includes resources, challenges and deficits. This difference is significant in a Salutogenic perspective.

The association between of Depression and SOC differs in the two final models (with and without Anxiety). This is probably due to the size of the bivariate correlation between depression and anxiety (0.63), and when both variables are included in the same model some of the shared variance will be statistically removed. Depression contributes more to the variation in SOC in the model without anxiety. However, the change in  $R^2$  was small between the two final models.

Previous studies have shown that SOC might be improved as a result of major life changes or different health care interventions (Bergman, Malm, Berterö, & Karlsson, 2011; Forsberg, Björkman,

Sandman, & Sandlund, 2010; Habroe, Schmidt, & Evald Holstein, 2007; Langeland & Wahl, 2009). Langeland, Wahl, Kristoffersen, and Hanestad (2007) and Langeland et al. (2006) also showed that talk therapy groups built on Salutogenesis improved SOC among people with long term mental health problems. Furthermore, in an intervention study based on Salutogenesis the participants emphasize relaxation exercises as a factor contributing to their recuperation (Höjdahl, Magnus, Mdala, Hagen, & Langeland, 2015).

Our results indicate that the participants might have a potential for improving their GRRs and reducing their GRDs. The results from the multivariable regression models show that influence/control, inherent worth, optimism and level of worries and depression were associated with SOC. It might be of importance to explore further the possibilities for improvement in these factors among people with subjective health complaints, to see if their SOC and subsequently their perception of health can be improved. A new Norwegian qualitative study suggested that improving the Salutogenic capacity by working with these factors might also contribute to return to work (Langeland, Gjengedal, & Vinje, 2016). The latter is also supported by a previously published systematic review, concluding that multidisciplinary interventions are effective for return to work (Hoefsmi et al., 2012) and also by a longitudinal study on employees and SOC as predictor for re-entry to work (Lillefjell & Jakobsen, 2007).

Our definitions of GRDs and GRRs can be a subject for discussion. There might be a floating transition between them; i.e. a low score on sleep quality might be a GRD even though sleep quality is defined as a GRR. Hence, another classification of resources and deficits based on, for instance, pathogenic and Salutogenic perspectives could be more appropriate. In the present study we have defined anxiety as a GRD. This might also be criticized because a low level of anxiety might be seen as a resistant resource in a Salutogenic perspective. This is because tension is seen as a necessary and normal feeling when coping with challenges. However, it seems important to distinguish between tension and anxiety. The ability to cope with demanding situations prevents tension to be transformed into stress. The mean anxiety is moderate in the present study and therefore we also find it reasonable to define anxiety as a GRD.

In the present study sleep quality, ability to relax, self-efficacy, control/influence, inherent worth, optimism, worries and pain bothersomeness are all measured by single questions answered on NRS. This can be seen as unprecise and as such a weakness. Further, we cannot be sure that these responses are not influenced by information bias. However, we think that these measures still give an impression of the participants' perception. Future studies should nevertheless aim at using more comprehensive and valid instruments if available. Information regarding job titles and specific sectors was not available to the authors of this paper. Hence, we do not know if/how this information could have influenced our results. This can be seen as a weakness of the study.

## 6. Conclusion

The present study contributes to increased knowledge about the persons on long term sick leave with subjective health complaints in Norway. Our results reveal that they have a lower SOC and a higher level of anxiety and depression than previously shown in the general population. A large part of the variation in SOC can be explained by GRRs and GRDs, and thus indicates potentials for improvement by for instance as participation in Salutogenic and resource oriented therapy.

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### Competing Interests

The authors declare no competing interest.

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