

# Health promotion in specialist and community care: how a broadly applicable health promotion intervention influences patient's sense of coherence

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## Health promotion in specialist and community care: how a broadly applicable health promotion intervention influences patient's sense of coherence

**Background:** Chronic illness health interventions aim to strengthen individuals' wellness resources, in addition to their ability to handle their condition. This presupposes a partnership between patients and professionals and flexibility in care organization.

**Aim:** This study aims to investigate possible changes in individuals' sense of coherence while living with long-term illness as they engage in a broadly applicable health promotion intervention developed in specialist care settings that was later implemented in the community care context.

**Method:** This study had a pre-post design. Sense of coherence was measured using the SOC-29 questionnaire at baseline and within 14 days of programme completion. The total baseline sample included 108 Norwegian adults (aged 21–89) with chronic illness. Data were analysed using paired samples *t*-tests.

**Results:** In both clinical sites, the total sample's mean SOC score changed positively from the baseline to the

follow-up 4 months later. This change was larger for the participants in the community care context. Manageability increased significantly for women. Significant positive changes in SOC score and the manageability dimension were also identified among participants who had children. Similar findings were found for those who were living with a partner, as well as for public transfer payment recipients.

**Conclusion:** The intervention contributed to a positive change in participants' SOC while living with illness. The findings revealed that the intervention is a flexible health promotion tool across age, diagnostic categories and clinical sites. The community participants' SOC changed the most, which indicates that the intervention is especially relevant in the follow-up of persons living with long-term illness within the community. The intervention contributes to a shift of perspectives in health care towards strength-based care and health within illness.

**Keywords:** chronic illness, user involvement, health promotion, intervention development, sense of coherence, specialist care, community care, organization of care.

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## Introduction

Political reforms can have an important impact on healthcare delivery, as well as on patient outcomes. The majority of individuals in the healthcare system today are diagnosed with noncommunicable diseases (1). In the Nordic countries, community health care is now primarily responsible for care delivery and follow-up for patients with long-term conditions. Health promotion, illness and relapse prevention, nearby patients' early treatment, specialist and community care coordination and a

stronger patient role are important goals for Norway's ongoing coordination reform (2). To attain these goals, a variety of health services, such as patient education and health promotion for people living with illness, have been moved from hospitals to the community care context. This is a major transition for both patients and professionals, and it is important to study the flexibility of such health services and the patient outcomes.

This study focuses on the health-related outcomes of an intervention developed in cooperation with specialist healthcare professionals and later implemented in the community care context (3). The outcomes for patients participating in specialist care have been explored, and the following themes have been captured regarding participants' experiences of health promoting ability changes: changing health and illness perspectives, new

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ways of thinking and acting towards the illness; understanding the situations, choices and actions that make the health condition better or worse; widening one's life space—being more active; and communicating differently about health-related matters (3). Qualitative data analysis among community care intervention patients elicited the following outcomes: changes in self-awareness and attitudes; awareness of one's body and accepting one's limited capacity; making priorities and setting boundaries; and letting go of shame and regaining control over one's own life (4). In the current study, we seek through quantitative methods to explore the intervention's possible effects, in line with the mixed methods approach (5). We chose the sense of coherence (SOC) questionnaire as the outcome variable and measurement instrument (6). The questionnaire is based on Antonovsky's theory of salutogenesis with the sense of coherence as the core concept. The concept consists of three closely connected dimensions: comprehensibility, manageability and meaningfulness. According to Antonovsky (6), these dimensions represent central health assets as they reflect the ability to understand one's existence as organised and the belief that one has the ability to handle one's life, in addition to the ability to establish and re-establish meaning while facing life's changing conditions. Within the salutogenic paradigm, health is understood as a dynamic continuum, and aspects of health can be identified even if the person is living with illness. The question is whether and how it is possible to strengthen health capacities such as SOC. The literature has described SOC as a relatively stable trait variable. However, several studies demonstrate that SOC is changeable as a result of both age (7, 8) and health interventions over time.

Langeland et al. (9) developed an intervention based on salutogenic treatment principles for people with mental health problems. The intervention was structured into 16 1.5-hour-long weekly sessions over a period of 19 weeks and was arranged in a Norwegian community healthcare setting. Mental health professionals who had undergone a 3-week training programme led the groups, and a sample of 116 patients were included in a randomised trial to study the intervention's effect. The SOC mean score change before and after the intervention was significantly higher in the experimental group ( $p = 0.03$ ), compared to the control group. The manageability dimension was also affected ( $p = 0.01$ ), and the comprehensibility and meaning dimension likewise improved. Forsberg et al. (10) developed a 12-month health intervention that focused on diet and physical activities for people with a psychiatric disability. Intervention group participants ( $n = 24$ ) significantly increased their total SOC score by the follow-up compared to the baseline and the controls ( $n = 17$ ), as both manageability and comprehensibility factors were increased. Lillefjell et al. (11) studied the association between SOC, anxiety, pain

and functional health status in employees who engaged in a 12-week multidisciplinary rehabilitation programme. Even if the strong SOC sample reported higher levels of pain intensity and experienced the pain as more troublesome at the baseline, the pain experience decreased more sharply by the follow-up as compared to the weak SOC sample. Nilsen et al. (12) reported similar findings in a study sample of diabetes stage 2 patients. According to Lillefjell et al. (11), it is important to increase SOC levels, as well as resources that encourage SOC, in those who are most vulnerable. This requires that professionals attain adequate knowledge and intervention methods for contributing to SOC strengthening.

This study's aim was to investigate possible changes in the sense of coherence (SOC) in individuals living with long-term illnesses who engaged in a new health promotion intervention in either specialist or community care, and to compare the results according to the clinical context.

Three research questions guided this study:

- 1 What are the participants' demographic characteristics?
- 2 Are there any differences in baseline SOC between participants recruited from specialist care compared to participants recruited from community care?
- 3 Does SOC change from baseline to follow-up after programme completion, and do the results differ with regard to the clinical context?

## Methods

### *Design of the study*

This study was part of a larger study that explored the structure, process and results of a new intervention that aimed to promote patients' health and wellness in long-term illness. A pre-poststudy design was chosen for this part of the research (13). Data on patient's demographics and SOC were collected both before and after programme completion.

### *Settings and participants*

This study involved specialist and community health care in Southern and Eastern Norway. Participants were recruited by interdisciplinary healthcare personnel working at different clinical sites. The total baseline sample included 108 Norwegian adults (aged 21–89) diagnosed with somatic and/or psychological problems. At the follow-up, there were 86 participants in the sample, of whom 77 could be included in the paired samples *t*-tests used to evaluate SOC changes. Nine participants could not be included in the paired *t*-test due to the fact that the personal identity of their follow-up questionnaires was unclear. Some participants moved during the follow-up period, some quit the programme due to being too

sick to attend, and some did not complete the SOC questionnaire for unknown reasons. There were a total of 22 dropouts.

### *The intervention*

The intervention's main focus was health within illness, in addition to patients' bodily knowledge as a resource with the potential to strengthen wellness. Bodyknowledging theory (14, 15) was used as the intervention frame. Bodyknowledging can be defined as 'a fundamental process for the development of personal knowledge about one's own body, coping skills, health and wellbeing' (16, page 65). The intervention was named the Bodyknowledging Programme (BKP) and consisted of seven sessions stretched over a period of 4 months and conducted in 3-hour group sessions involving eight to ten persons living with different kinds of long-term conditions, or in a 1.5-hour individual format with the same content. Interdisciplinary professionals with 80 hours of training led the programme and worked in partnership with the patients in researching their health capabilities. The pedagogical methods were varied and included introduction to the Bodyknowledging model, dialogue, physical exercises and diary writing. A full description of the BKP's development, structure and content has been published elsewhere (17).

### *Data collection and measurements*

Participants completed the SOC-29 questionnaire before beginning the programme and within 14 days of its completion. Socio-demographic variables like age, gender, living with a partner and having children were assessed. The SOC-29 is a self-reporting instrument that has been tested for reliability and validity in several studies (18). The scale is of Likert type with items ranging from 1 to 7. The total score ranges from 29 to 203, with higher scores reflecting a stronger sense of coherence. This study's internal consistency showed a Cronbach's alpha of 0.93 for the total SOC scale. The alpha coefficient varied for the three dimensions: manageability was 0.85, comprehensibility was 0.82, and meaningfulness was 0.80, suggesting that the internal consistency was high.

### *Preparing and analysing the data*

Data screening was done prior to the analyses. Data were input manually, and possible outliers were checked. One subject was excluded from the analyses due to missing values for many SOC items (more than 20% missing). Completed questionnaires contained <1% missing data. To avoid missing sum score numbers when evaluating possible SOC changes, missing data substitution was performed separately for each individual. The imputation

was based on regression analyses in which age, living with a partner and having children were independent variables.

### *Statistical analyses*

The SPSS-23 programme was used for data analysis. Descriptive statistics were assessed to investigate the participants' demographic characteristics. Bivariate correlation analysis (Pearson's  $r$ ) was used to examine associations between SOC and age. Independent samples  $t$ -test was conducted when exploring possible SOC differences in specialist care and in the community-based sample's baseline. Paired sample  $t$ -tests were used to investigate possible SOC changes from baseline to follow-up. A  $p$ -value of <0.05 was considered statistically significant.

### *Ethical considerations*

This study was approved by the South-Eastern Regional Committee for Medical and Health Research Ethics (REK), as well as the Norwegian Social Science Data Services (NSD). Patients who had been treated at different sites were handed a letter by the health professionals with information about the study's purpose, its research methods, that the participation was voluntary and that they had the right to withdraw from the study without any negative consequences. Group leaders did not know the participants beforehand and were neither involved in their treatment before nor after the programme ended. They knew the participant's gender, age and diagnosis, but did not have access to patient records. A reminder of the rule of group confidentiality was given at the start of each session.

## **Results**

### *Characteristics of the sample*

All of the BKP participants were living with long-term health problems. A variety of diagnostic categories were represented in the sample, such as neurological diseases (i.e. epilepsy, MS, parkinson); musculoskeletal pain; stroke; psychological problems like anxiety and depression; diabetes; heart failure; chronic obstructive pulmonary disease (COPD); and chronic inflammatory bowel disease (IBD) (Table 1).

Both community care (49%) and specialist care (51%) participants were equally represented in the sample. A fairly equal distribution of women (57%) and men (43%) attended the programme. The majority of the participants were living with a partner and had children. A majority of the participants were recipients of public transfer payments, such as old age pensions, disability and sick leave.

**Table 1** Characteristics of the participants at baseline (n = 108)

	n (%)	Mean (SD)	Range
Context			
Specialist care	55 (51)		
Community care	53 (49)		
Age	105	53.3 (3.14)	21–89
Gender			
Male	46 (43)		
Female	61 (57)		
Living with partner			
Yes	63 (68)		
No	29 (32)		
Having children			
Yes	72 (84)		
No	14 (16)		

The mean age was 53 (ranging from 21 to 89). The correlation coefficient between age and baseline SOC was 0.296 in the present study (significant at the 0.001 level).

#### *Differences between baseline specialist care and community care*

For investigation of possible baseline SOC differences between participants from the specialist and community care settings, an independent samples *t*-test was conducted between the two groups.

There was a significant difference in the specialist care sample's mean baseline SOC score (139.0) compared to the community-based sample (126.3). Specialist care participants reported higher baseline SOC than the community care participants ( $p = 0.012$ ). The average age was

also significantly higher among specialist care participants, 57.2, compared to the community care's 48.9 ( $p = 0.003$ ). At the follow-up, there was no significant difference in mean SOC score between the specialist and community programme delivery care contexts.

#### *Changes in SOC from baseline to follow-up*

The total sample's mean SOC score increased from a baseline of 135.3–137.6 at the follow-up 4 months later (Table 2). The manageability and comprehensibility dimensions also improved, whereas the meaningfulness subscale score remained relatively stable. Participants' SOC increased in both the community and specialist care settings, showing a larger mean change in community care (3.2) compared to specialist care (1.4). The paired samples *t*-test showed a significant change in women's manageability subscale from baseline to follow-up (mean change was 4.7). Significant changes in SOC and manageability subscale scores were also found for participants with children. Similar patterns of positive manageability dimension changes (although not significant at the 0.05 level) were identified for participants living with a partner and public transfer payment recipients (on pension).

Significant changes were also found from baseline to follow-up for single items, that is:

'When you face a difficult problem, the choice of a solution is: 1 = Always confusing and hard to find – 7 = Always completely clear' ( $p = 0.017$ ) (understanding);

'How often do you have the feeling that there's little meaning in the things you do in your life? 1 = Very

**Table 2** Paired sample *t*-tests on differences in SOC and subscales between baseline and follow-up

Participants	Component	Baseline Mean (SD)	Follow-up Mean (SD)	Mean change	<i>p</i> -Value
All groups (n = 76–77) <sup>a</sup>	SOC	135.3 (24.0)	137.6 (22.9)	2.3	0.207
	Manageability	39.8 (7.8)	41.0 (7.8)	1.2	0.093
	Comprehensibility	46.2 (10.5)	47.2 (9.2)	1.0	0.260
	Meaningfulness	49.8 (8.6)	49.7 (8.6)	–0.1	0.974
Specialist care (n = 36)	SOC	140.9 (23.6)	142.3 (22.2)	1.4	0.555
Community care (n = 40)	SOC	130.3 (23.5)	133.5 (23.1)	3.2	0.260
Female (n = 43)	SOC	131.2 (23.3)	135.9 (21.6)	4.7	0.058
	Manageability	39.3 (7.9)	41.1 (8.0)	1.8	0.045
Male (n = 33)	SOC	140.8 (24.1)	139.9 (24.8)	–0.9	0.732
	Manageability	40.4 (7.7)	40.8 (7.6)	0.4	0.734
Living with partner (n = 44)	SOC	134.8 (24.3)	137.4 (23.1)	2.6	0.244
	Manageability	39.2 (8.3)	40.8 (8.4)	1.6	0.060
Having children (n = 53)	SOC	137.7 (24.4)	141.6 (22.9)	3.9	0.043
	Manageability	40.0 (8.3)	41.7 (7.5)	1.7	0.022
Pension (n = 50)	SOC	135.9 (22.5)	138.7 (21.6)	2.8	0.224
	Manageability	38.9 (7.5)	40.5 (7.1)	1.6	0.072

<sup>a</sup>n is 76 for the SOC scale and for the meaningfulness subscale, whereas n is 77 for the manageability and comprehensibility subscales.

often – 7 = Very seldom or never' ( $p = 0.019$ ) (meaning);

and 'When you think of the difficulties you are likely to face in important aspects of your life, do you have the feeling that: 1 = You will always succeed in overcoming difficulties – 7 = You won't succeed in overcoming the difficulties' ( $p = 0.017$ ) (manageability).

The three items above reflect aspects of the three SOC components and exemplifies some of the post-BKP changes in the participants' ability to handle their life situation with long-term health problems.

## Discussion

The BKP focuses on health within illness by acknowledging and facilitating the person's resources and strengths to promote their health while taking the illness into account as a part of the health promoting process (3, 17). This is in line with recommendations for health promotion interventions' development and implementation in the context of chronic illness (19).

Participants were recruited from specialist and community care, which makes it possible to compare the patients' outcomes and BKP's flexibility in both sites. A variety of diagnostic categories were represented in the sample, and a fairly equal distribution of women and men attended the programme. The mean age was 53 (ranging from 21 to 89), representing the whole adulthood spectrum. Silverstein and Heap (7) studied SOC changes over the lifespan and found that SOC increased with age. This could be connected to the fact that the capacity to comprehend, manage and find meaning in life—the components of SOC—seems to be strengthened as people grow older. Individuals participating in the specialist healthcare BKP reported significantly higher baseline SOC compared to the community care context. This could be explained by the mean age of the specialist care participants, which was higher (57.2) than the community participants' mean age (48.9). However, health problems, lack of social contact and lack of perceived social support have been identified as having a negative impact on SOC (12). All of the participants in our sample were struggling with health problems that likely had a negative impact on their SOC. Many participants in the community reported that they had psychological problems like anxiety and depression, which is known to negatively impact SOC (20). This could be part of the explanation as to why the community dweller's baseline SOC was lower. Most of both samples' participants were living with a partner and had children, which is acknowledged as positive SOC sources. However, the majority of participants were recipients of public transfer payments (on pension or sick leave), implying a low socio-economic level, which could negatively impact SOC, especially the

younger ones who probably had higher expectations towards work and social life than the older participants, who had reached a natural pension age (7).

Antonovsky (6) argued that SOC was a relatively stable trait variable. However, the present study supports recent results showing that SOC is changeable via health interventions (10, 11, 21–23).

The total sample's mean SOC score changed positively from baseline to follow-up 4 months later when the participants had accomplished the programme. This indicates that the participant's active engagement in BKP had contributed to the majority moving from disease/unease towards better health on the health continuum (6). The SOC increased after BKP for participants in the community setting as well as those in the specialist care context, although the mean SOC change was larger for the community care context participants. The question is what the positive SOC changes imply. According to Eriksson and Lindström (20), the relation between SOC and perceived health is strong, and in their review of 25 years of research, they found that 'SOC seems to be a health promoting resource, which strengthens resilience and develops a positive subjective state of health' (op.cit. p. 376). This study's findings indicate that the BKP does function as a salutogenic intervention, that is: an intervention that facilitates the participants' understanding of their situation, their ability to handle their illness-related challenges and their capacity to add meaning to their life situation (6). Qualitative patient outcome studies strengthens this argument by eliciting the participants' experiences of health-related changes in themes, such as understanding the situations, choices and actions that make the health condition better or worse; new ways of thinking and acting towards the illness; and widening one's life space—being more active and regaining control over one's own life illuminates the changes in SOC's comprehensibility and manageability components. Meaningfulness changes can be traced in themes like changes in attitudes, accepting one's limited capacity, letting go of shame and changing perspectives on health and illness (3, 4). These new competencies enabled the participants to prevent deterioration, as well as to detect signs of relapses early on and act accordingly to avoid hospitalisation. The positive SOC changes from baseline to after programme completion is an important result, as it indicates that the participants found the programme to be relevant to supporting their ability to handle their chronic illness life situation. The significant manageability findings is especially important as it reflects that the BKP contributes to strengthening individuals' coping and health promotion abilities in the context of chronic illness. These findings demonstrate that the BKP is a useful tool for strengthening patients' general resistance resources (6), empowering patients to be in charge of their individual health promotion. This meets the coordination reform's important goals (2).

Our findings are comparable to Langeland et al. (9, 21), especially when it comes to the SOC's manageability component. We agree that a significant change in this component can indicate that the dynamic process of changing sense of coherence will start with changes in the manageability subscales and that it is reasonable to assume that this will lead to an improvement in other SOC components in the long run.

The fact that SOC increased more in the community sample than in the specialist care sample can partly be due to the age variable mentioned above, or it can be explained by the fact that because the community dwellers had lower baseline SOC scores, their potential for change was larger. Held together with the lower age in this sample, the potential for SOC change may have been bigger. It is also interesting to note that psychological problems were more frequent in the community sample; hence, the larger SOC changes at this site showing that BKP was a useful tool for health promotion with people who struggle with mental health problems. The qualitative studies support this and convey BKP as flexible programme for health promotion across diagnostic categories and clinical sites (4). This flexibility is important in relation to the possibility to move the health service from specialist to community care in line with the coordination reform's intentions (2).

The manageability dimension improved significantly for women from baseline to follow-up. This could have several explanations. There were 14 more women in the sample than men at time point 2. This may or may not have been important for the results. Other explanations seem to be more relevant. Evidence generally suggests that men have stronger SOC than women across different age groups (7). Therefore, the potential for SOC changes by intervention could be lower for men. However, the qualitative findings are somewhat contradictory to the numbers here, as the men expressed that the BKP was important in many ways, i.e. when it comes to training on how to communicate with family members and others on health-related matters (3). Women in general have a multitude of roles and responsibilities in the family and in society. Chronic illness often implies the inability to fulfil these roles to the fullest. This could create emotional tension and worries on the part of women, and questions could arise regarding whether they are able to take care of their family, able to work and to do the practical work that is expected of them. These thoughts and worries were evident in the analysis of the larger study's qualitative data material from both clinical sites (3, 4). The healthcare personnel who are BKP group leaders encourage and promote openness on such issues, and by this, they offer the possibility to receive support and ideas for a solution from peers and professionals, and hence, they could have become more able to negotiate and handle the tensions of competing roles and expectations.

Significant manageability changes were also found for participants with children. Social relations are explicitly thematised in the BKP. Questions are posed on these issues, and the participants are challenged to tell about their experiences and to write a diary, and questions concerning social dimensions were posed. All together, these activities promote the participants' ability to express themselves regarding how they were and what they needed to do for themselves, as well as what support they needed from others to stay healthy while living with long-term health problems. The ability to be open and communicate on these issues enhanced the social support possibilities. Langeland and Wahl (22) found that studying the provision of nurturance opportunity was an important determinant for a positive SOC change in people diagnosed with mental illness, and the experience of being the provider instead of the receiver of assistance was essential. This is in line with the findings of the larger study of the BKP programme, which illuminated the nurturance, giving, receiving and learning that goes on between peers and professionals (3, 4). BKP is a pedagogical health service for people with long-term health problems, whether somatic, mental or both. It is therefore an intervention with a wider range of applications than the interventions that are designed for specific diagnostic groups. This flexibility is important for the programme's usability. The manageability dimension also changed positively for participants that were recipients of public transfer payments, which in fact was the majority of the participants. They could have low economic capacity and not be able to buy assistance in the private arena. The possibility for BKP attendance encompassed an opportunity for professional and peer support in health promotion, which had not been available beforehand.

Langeland et al. (23) argued that, to improve their SOC, people must experience a positive interaction between their general resistance resources (GRR) and their SOC and that interventions with an explicit salutogenic focus are needed in this regard. The BKP is an example of such an intervention. However, it is the lay-based concept, theory and model of Bodyknowledging that provides the content's frame (16). While working on the Bodyknowledging phases like uncertainty—denying and escaping the sick body; losing life space—grieving and anger; listening and understanding the body's signs—strengthening hope; and integrating embodied knowledge—new possibilities for wellness and health, the person can move towards the healthy end of the disease/health continuum. The person's ability to comprehend, manage and create new meaning was facilitated, and their bodily knowledge of health and illness was acknowledged as an important GRR. This approaches advantage is that the patient's embodiment is understood as a personal resource for health. Having a main focus on

the person and their resources and possibilities of health instead of focusing mainly on the disease is in line with Antonovsky's salutogenic philosophy (6). Interventions that offer practical tools to promote the perspective of health within illness are scarce in the current healthcare system.

Participants were actively involved in defining their situation, identifying their inner and external resources and handling their health. Ideas on meaningful activities and plans for the future were shared with peers and professionals. Personal engagement, the healthcare professionals' attitudes and approaches and the group work have been identified as the interventions' active ingredients (17). These have also been identified as important ingredients in other health interventions (8, 10, 22, 23). This mode of partnership with patients constitutes a strength-based approach which currently gradually is impacting health care on the system level (24).

Lillefjell et al. (11) argued that it is important to increase SOC levels, as well as the resources that encourage SOC, in those who are most vulnerable. This study demonstrates the advantage of working systematically on the Bodyknowledging phases in groups of peers and health professionals to strengthen SOC. The quantitative results confirm the qualitative studies' results (3, 4). Compared to Langeland's (21), Langeland et al.'s (22), Forsberg's (10) and Lillefjell et al.'s (11) interventions, the BKP has significantly fewer sessions. Based on the positive SOC change, it is reasonable to assume that more significant changes would be attained with more sessions held in a longer time frame so that the follow-up would be intensified and longer. The BKP programme's outcome studies have proven it to be an important tool for health promotion, and one that is broadly applicable across diagnostic categories and clinical sites in the long-term illness context. Men and women, both young and old, reported that their BKP engagement strengthened their ability to prevent deterioration and enhanced their ability to promote their health. Patients' engagement in the programme, the group work and the professionals' attitudes and approaches has been identified as active ingredients for the change (17). This programme fits well with the coordination reform's intentions as it focuses on utilising patients' resources for health and well-being, is interdisciplinary and is suitable for both specialist and community health care.

#### *Study limitations*

This study must be interpreted in the light of its limitations. As we did not evaluate long-term outcomes, we cannot draw conclusions regarding sustainable change

after BKP. Furthermore, as a control group was not used, the increase in SOC may be explained by factors unrelated to the intervention. However, the comparison of specialist and community care results served to strengthen the study's validity and reliability. Qualitative research on the outcomes of BKP further strengthen the findings of the current study. Control groups and larger samples are recommended in future BKP studies, as well as the measurement of a variety of outcome variables such as quality of life, patient activation and health economy.

## **Conclusion**

The programme was implemented in mixed groups when it comes to gender, age and diagnostic categories both in specialist and in community care settings. The interventions' main focuses are the promotion of health as a process of change and the strengthening of health capacity. The findings strongly indicate that SOC was improved after patients' active participation in the Bodyknowledging programme. The SOC score for the total sample increased from baseline to follow-up. Significant changes in total SOC, as well as in the manageability dimension, were identified among participants who had children. The manageability dimension increased significantly for women. Similar patterns of positive manageability changes were identified for participants living with a partner, as well as for public transfer payment recipients (on pension). Bodyknowledging is a new and flexible tool to strengthen SOC in clinical practice. It is a tool to empower patients to be in charge of their health.

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## **Author contributions**

Kristin Heggdal was responsible for designing the study and collecting data in partnership with healthcare professionals. She engaged in the data's statistical interpretations and was responsible for writing the manuscript. Beate Jelstad Løvaas was responsible for the statistical work as well as for writing the paper's results section and contributed to the manuscript's intellectual content and critical review.

## Ethical approval

This study was approved by the South-Eastern Regional Committee for Medical and Health Research Ethics of Norway (REK) and the Norwegian Social Science Data Services (NSD).

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