Personality and Social Psychology

Mental health among people with psoriasis undergoing patient education in climate therapy

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This study investigated the mental health of people with psoriasis undergoing patient education in climate therapy. A prospective design included a baseline assessment and two follow-ups after a 3-week patient education program. Participants were 254 adults. Positive mental health was measured by the mental health continuum short form (0–70), and negative mental health by the emotional distress subscale (1–4) of the health education impact questionnaire. Paired-samples *t*-tests were used to evaluate changes in mental health from baseline to follow-up. Multiple linear regression was used to analyse the ability of socio-demographic and clinical variables and emotional distress to predict changes in positive mental health. To predict change in negative mental health we repeated the same analysis but with a change in negative mental health as a dependent variable and positive mental health as an independent variable. The results show that positive mental health and health-related emotional distress improved significantly from before to after the intervention by 7.1 points, $p < 0.001$ and 0.21 points, $p < 0.001$) respectively. At the second follow-up, health-related emotional distress remained significantly improved compared with baseline levels by 0.11 points, $p = 0.004$. The longer participants had lived with psoriasis ($\beta = 146$, $p = 0.027$), and the presence of co-morbid health problems ($\beta = 111$, $p = 0.051$) the greater the improvement in the positive mental health immediately after the intervention. No predictors were identified for negative mental health. This study indicates that the promotion of positive mental health needs to be integrated into the climate therapy program, and sustained in their home context.

Key words: Climate therapy, patient education, positive and negative mental health, prospective design, psoriasis.

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INTRODUCTION

Psoriasis is a long-term dermatological multisystem condition affecting 2–3% of the population and the skin manifestations of this disease are particularly distressing (Hayes & Koo, 2010). Previous research confirms the significance of mental health issues in understanding the illness of psoriasis (Nelson, Chew-Graham, Griffiths & Cordingly, 2012). Psychological distress may contribute to the first manifestations and later exacerbations of psoriasis (Simonic, Kastelan, Peternel, Pernar, Brajac, Rončević-Gržeta & Kardum, 2010), and psychological distress (Kirby, Richards, Mason, Fortune, Main & Griffiths, 2008; Kossakowska, Cieścińska, Jaszewska & Placek, 2010), anxiety, depression, embarrassment and stigmatization (Hayes & Koo, 2010; Voorhees & Fried, 2009) are reported as common problems in people with the disease. Further, people with psoriasis experience worry, shame, anger, and problems in their daily activities and social life (Fortune, Richards & Griffiths, 2005; Sampogna, Tabolli, Abeni & IMPROVE investigators, 2012) and experience negative body images (Khory, Danielsen & Skiveren, 2013). These, in turn, can affect employment and social activities by contributing to social anxiety and social avoidance (Schneider, Heuft & Hockmann, 2011). In addition, emotional distress, changes in body image, difficulties in close relationships and impaired daily activities are associated with a higher risk of committing suicide among people with psoriasis (Picardi, Lega & Tarolla, 2013). Awareness of the relationship between psoriasis, psychiatric disorders and substance abuse is important, as these co-morbidities can lead to poor treatment compliance and outcomes (Hayes & Koo, 2010; Kirby *et al*., 2008). There is a call and need for more awareness of mental health issues and psoriasis among health-care professionals (Picardi *et al*., 2013).

Fortune *et al*. (2005) emphasize that although living with psoriasis can be a source of significant stress and distress, it is also important to recognize that psoriasis can leave the individual transformed in ways that may not be universally negative. Accordingly, an overreliance on research into deficits in functioning may mean that evidence of human thriving or adversarial growth related to the disease is overlooked. It is suggested that future research should examine the patterns and predictors of adversarial growth in patients with psoriasis and their families. In this context, it is important to include the assessment of positive mental health (Grzywacz & Keyes, 2004).

Positive mental health consists of emotional, psychological and social well-being. Emotional well-being (EWB) focuses on subjective well-being, defined in terms of overall life satisfaction and happiness (Diener, Suh, Lucas & Smith, 1999). Psychological well-being (PWB) draws heavily on formulations of human development and existential challenges of life (Ryan & Deci, 2001), whereas social well-being (SWB) consists of dimensions describing functioning optimally in society (Keyes, 2007).

Positive mental health is an important issue in the treatment of people with physical illnesses (Lamers, Bolier, Westerhof, Smit & Bohlmeijer, 2011a) because lack of positive mental health may have the same detrimental consequences on one's functioning as the presence of illness (Fredrickson, 2004; Keyes, 2005). Recent research shows the significance of the dual continua mental health model: one continuum indicating the presence and absence of positive mental health, the other indicating the presence and absence of mental illness symptoms (negative mental health) such as depression and anxiety (Keyes, 2007). Findings support the dual continua model of positive mental health and mental illness as separate but related factors (Keyes *et al*., 2008; Lamers, Westerhof, Bohlmeijer, ten Klooster & Keyes, 2011b; Westerhof & Keyes, 2010). Lamers *et al*., (2011a) suggest that negative mental health is related to the course and severity of several physical diseases. In their meta-analysis they conclude that positive emotional well-being predicts long term prognosis of different physical illnesses. However people with psoriasis was not included in this meta-analysis and Lamers *et al*., (2011a) call for investigating the effects of psychological interventions on the prognosis on physical illness. They recommend investigating the association between socio-demographic, clinical variables and positive mental health. One study (Westerhof & Keyes, 2010) reveals that while gender and being a migrant predicts positive mental health, age, being married, being employed and the number of physical conditions predict negative mental health, suggesting that the predictors for positive and negative mental health might be distinct. Psoriasis treatment guidelines and research emphasize the importance of broad multidimensional and holistic approaches to the treatment and assessment of psoriasis, including physical, psychological and social aspects (Gelfand, Feldman, Stern, Thomas, Rolstad & Margolis, 2004; Hayes & Koo, 2010; Menter & Griffiths, 2007; Reimus, Vingerhoets, Soons & Kostanje, 2007; Schneider *et al*., 2011; Voorhees & Fried, 2009; Wahl, Mørk, Cooper & Padilla, 2005; Zeljko-Penavic, Situm, Simic & Vurnek-Zivkovic, 2009). The purpose of treatment is not only to alleviate the symptoms but also to enable persons to live optimally with their psoriasis (Schneider *et al*., 2011). Few studies have investigated both positive and negative mental health in an intervention study. Consequently, research investigating the issue of a dual continua model of mental health in the context of psoriasis treatment and care should represent valuable knowledge development. Patient education in the context of climate therapy is a publically funded treatment of psoriasis. The main aims are to reduce disease severity, increase knowledge and improve coping. Previous studies on such programs have reported such as highly significant reductions in disease severity and symptoms (Ben-Amitai & David, 2009, Hodak, Gottlieb, Segal *et al*., 2003) and improvements in quality of life (Mørk & Wahl, 2002, Wahl *et al*., 2005). To the best of our knowledge, no studies have illuminated both positive and negative mental health in a psoriasis population and whether this program also can improve mental health. Based on the knowledge about the dual continua model of mental health (Keyes, 2007), it is reasonable to expect that the therapy with emphasis on that, such as management of psoriasis, social support, physical activity and knowledge will improve both positive and negative mental health. Hence, the overall aim of the present study was to investigate the phenomenon of the dual continua model of mental health, with special emphasis on positive mental health, in a sample of psoriasis patients undergoing patient education in climate therapy. The following research questions were asked:

- What is the association between socio-demographic and clinical variables, positive mental health and negative mental health at baseline?
- To what extent do baseline positive and negative mental health change immediately after and 3 months after climate therapy?
- Which factors (socio-demographic and clinical variables and negative mental health) may predict change in positive mental health?
- Which factors (socio-demographic and clinical variables and positive mental health) may predict change in negative mental health?

METHOD

Study design and population

The present study is a pretest–posttest design of Norwegian patients with psoriasis, aged 20 years or more, who completed a 3-week patient education and climate therapy program on Gran Canaria. The program is one of the publically funded therapeutic options for patients with moderate to severe psoriasis. The psoriasis area and severity index (PASI) is the most widely used tool for the measurement of psoriasis severity (Bhosle, Kulkarni, Feldman & Balkrishnan, 2006). A PASI score > 7 is compatible with moderate to high psoriasis severity. To be eligible for climate therapy, the patient and a dermatologist or general practitioner individually complete an application form, which includes the PASI score, goals/objectives for the therapy, co-morbidity, antipsoriatic medication and other medication. Applications are evaluated by the Department for Climate Therapy (Oslo University Hospital) which is responsible for all climate therapy, including patient education organized abroad.

The design included three measurements over a 4-month period. Patients were recruited into the study shortly after they arrived at the treatment site. They completed a questionnaire just before (baseline) and immediately after climate therapy (follow-up 1) and again 3 months after climate therapy (follow-up 2). The study period lasted from late April 2009 until January 2010. During this time, 343 psoriasis patients attended the program and were eligible for the study. Of these, 254 psoriasis patients were included (74%). A total of 26% declined to participate without giving any reasons. Positive mental health data were available for 254 (baseline), 242 (follow-up 1), and 209 (follow-up 2) patients.

Patient education and climate therapy

The program consisted of both sun treatment and education. Patients received, on average, 80 hours of sun therapy during the stay. Sun exposure was scheduled for each individual in accordance with skin type and UV index. Patients were encouraged to bathe frequently in salt water and to use moisturizing creams. A dermatologist, nurses and a physiotherapist monitored patients and provided individual and group-based education, guidance and daily training. The teaching program contained information/dialogue about psoriasis pathogenesis, manifestations, co-morbidity, quality of life and treatment options. The importance of lifestyle choices was emphasized, with particular focus on physical activity and healthy eating. Discussions in smaller groups focused on finding ways to manage psoriasis in daily life. An overview of the aim and content of the patient education and climate therapy program is shown in Box 1.

Box 1.

Aim and content of the three-week climate therapy program
Aims:

Reduce disease severity
Increase knowledge and insight about coping with the disease
Increase knowledge and insight about nutrition and physical activity

Content:

- A combination of tailored sun treatment and salt-water bathing
- Physical activity
  - Mandatory 30 minutes of morning gym
  - Voluntary participation in other physical activities such as water gym, mountain trips and strength athletics
- Lessons, including use of liniment, sun treatment, nutrition and physical activity
- A total of 2–3 group meetings, focusing on experiences such as living with psoriasis, coping with stress, nutrition in daily life, sleep and rest, and self-care
- Self-care, focusing on body and soul, and harmonious lifestyle, in a quiet atmosphere
- Interaction with others with similar health challenges in formal and informal settings

Measures

Socio-demographic and clinical variables. Socio-demographic variables of age, sex, social and marital status, employment status and education level were assessed. Clinical variables of duration of psoriasis, pretreatment PASI score, co-morbidity (whether they in addition to psoriasis had another long-term disease or not) and previous climate therapy were used.

Positive mental health. The mental health continuum short form (MHC-SF) is a relatively recently developed instrument designed to measure three dimensions of the positive mental health concept: emotional (EWB), psychological (PWB) and social well-being (SWB) (Keyes, 2002, 2005). The MHC-SF consists of 14 items as a total scale (possible score range 0–70), and is divided into three subscales: EWB (3 items), PWB (6 items) and SWB (5 items). Each item is scored by rating the frequency of different feelings during the past month on a six-point scale from never (0) to every day (5). Higher scores indicate higher levels of positive mental health. In addition, a categorical diagnosis may be made to estimate the prevalence of the mental health categories flourishing, languishing and moderately mentally healthy (Keyes, 2002, 2005). To be diagnosed as flourishing, individuals must report that they experience at least seven of the symptoms "everyday" or "almost every day," including one symptom from the EWB dimension. To be diagnosed as languishing, individuals must report that they "never" or "once or twice" experienced at least seven of the symptoms, including one of the symptoms from the EWB dimension. Those who do not fit the criteria for flourishing or languishing are categorized as moderately mentally healthy (Keyes *et al*., 2008).

Previous studies support the three-factor structure of the MHC-SF (Keyes *et al*., 2008; Lamers *et al*., 2011b; Robitschek & Keyes, 2009). Convergent validity has been found in the subscales, which correlate well with corresponding aspects of well-being and functioning (Lamers *et al*., 2011b), and in the scale as a whole (Keyes *et al*., 2008). A previous study revealed high internal reliability for the whole scale and the EWB and PWB subscales, adequate internal reliability for the SWB subscale, and moderate test–retest reliability (Lamers *et al*., 2011b). Keyes *et al*. (2008) found satisfactory internal consistency (cf. the cut-off point of 0.70 recommended by Nunnally and Berstein (1994)) for the whole scale and the EWB subscales, but lower consistency for the PWB and SWB subscales.

The MHC-SF was translated into Norwegian for use in the present study. The translation procedure of MHC-SF from English to Norwegian (N) was completed in accordance with the guidelines by Hawkins and Osborne (2007), including forward and back translations with independent checking, cognitive interviews and pretesting. No major translation problems were encountered. In the present study, Cronbach's alpha was 0.92 for the whole scale, and 0.88, 0.83 and 0.88, for the emotional, social and psychological subscales, respectively.

Negative mental health. To measure negative mental health we used a general measure of negative mental health, the emotional distress-specific domain from the health education impact questionnaire (heiQ). This subscale measures overall negative affective responses to health in general including depression, being upset, feeling anger, dissatisfaction, worry and hopelessness, and consists of six items. Response alternatives range from strongly disagree to strongly agree on a four-point Likert scale. Higher scores indicate stronger negative emotions about the respondent's health in general. The Cronbach's alpha for this subscale in this study was 0.89.

Statistical analysis

Statistical analyses were conducted using SPSS version 19.0 (SPSS Inc., Chicago, IL, USA). Bivariate correlation analyses (Pearson's *r*) were used to investigate associations between socio-demographic and clinical variables, negative mental health and positive mental health at baseline. To evaluate possible changes in positive and negative mental health from baseline to follow-ups, paired-samples *t*-tests were performed. To investigate the factors that may predict change in positive mental health, multiple linear regression analysis (enter) was performed, with change in positive mental health as the dependent variable. The independent variables were: age, living alone or not, education, gender, previous climate therapy, co-morbidity, baseline PASI score, duration of psoriasis, and health-related emotional distress and MHC at baseline. To investigate the factors that may predict change in health-related emotional distress, we repeated the same analysis but with change in health-related emotional distress as dependent variable and MHC and health-related emotional distress at baseline as independent variables. *P* values of 0.05 or less were interpreted as statistically significant.

Ethical approval

Approval of the study was obtained from the Norwegian Social Science Data Service and the Regional Committee for Medical Research Ethics for Southern Norway. Participants were coded and analysis performed anonymously.

RESULTS

Characteristics of the sample

The mean age of the respondents was 47 years (range = 20–80 years, *SD* = 12). One hundred and two (40%) were women and 153 (60%) reported less than 12 years of education. Seventy (28%) reported that they lived alone. The mean duration of psoriasis was 24 years (range = 1–60 years, *SD* = 13). The mean pretreatment PASI score was 7.5 (*SD* = 4.1), indicating moderate disease severity, and 111 (44%) respondents reported co-morbidity. Further details of the sample characteristics are shown in Table 1.

Baseline

The mean MHC-SF score at baseline was 45.1 (*SD* =14.1). The categorical diagnosis using the MHC-SF (Keyes, 2005) was

Table 1. *Demographic and clinical characteristics of the group at baseline (n = 254)*

		Mean (*SD*)	Range	*n* (%)
Sex	Male			152 (60)
	Female			102 (40)
Age (years)		47 (12)	20–80	
Living alone	Yes			70 (28)
	No			184 (72)
Employed	Yes			174 (69)
	No			80 (31)
Education	Primary school: ≤ 12 years			153 (60)
	University or college: ≤ 4 years			52 (21)
	University or college: > 4 years			49 (19)
Previous climate therapy	Yes			140 (55)
	No			114 (45)
PASI		7.5 (4.1)	0.4–26.1	
Years with psoriasis		24 (13)	1–60	
Comorbidity	Yes			111 (44)
	No			143 (56)

applied to the data to obtain estimates of the population prevalence of the mental health categories. According to these criteria, results show that at baseline, 44.3% of respondents were flourishing, 49.8% were moderately mentally healthy and 5.5% were languishing.

There was no significant correlation between MHC-SF and socio-demographic variables such as age and education. There was a significant correlation between co-morbidity and MHC-SF ($r = 0.15$, $p = 0.021$), and between MHC-SF and duration of psoriasis ($r = 0.18$, $p = 0.004$). The correlation between the HeiQ subscale of emotional distress and MHC-SF was $r = –0.38$ ($p < 0.01$).

Change in positive mental health

A paired-samples *t*-test showed that there was a significant change ($p < 0.001$) in MHC-SF score from baseline to follow-up 1, with a difference of 7.1 points (95% CI: 5.7–8.4), but no significant change in MHC-SF from baseline to follow-up 2 ($p = 0.26$). There were significant changes ($p < 0.001$) in the emotional, social and psychological subscales from baseline to follow-up 1 with differences of 1.4 (95% CI: 1.1–1.7), 3.2 (95% CI: 2.5–3.8) and 2.5 (95% CI: 1.9–3.2) points, respectively. There were no significant changes in the subscales from baseline to follow-up 2.

The categorical diagnosis showed that on the second and third measurements, respectively, 63.9% and 38.8% were flourishing, 32.2% and 41.6% were moderately mentally healthy and 0% and 2.7% were languishing (Table 3).

Change in negative mental health

A paired-samples *t*-test revealed that there was a significant decrease between baseline and follow-up 1 on the heiQ emotional distress domain of 0.21 points (95% CI: 0.14–0.27, $p < 0.001$). At follow-up 2, the emotional distress scores remained significantly lower than the baselines scores ($p = 0.004$) with a difference of 0.11 points (95% CI: 0.04–0.19). See Table 2.

Prediction of change in positive mental health from baseline to follow-up 1

Multiple regression analysis showed that the duration and co-morbidity of psoriasis contributed significantly to the prediction ($\beta = 0.146$, $p = 0.027$ and $\beta = 0.111$, $p = 0.051$, respectively). The heiQ emotional distress domain was not significantly associated with change in MHC scores ($\beta = 0.099$, $p = 0.101$). The model explained 35% of the variance, with change in MHC scores as the dependent variable (adjusted R^2). See Table 4.

Prediction of change in negative mental health from baseline to follow-up 1

After controlling for health-related emotional distress at baseline the multiple regression analysis showed that none of the variables included in the multiple regression analysis had the ability to significantly predict change in negative mental health. Positive mental health was not significantly associated with change in the heiQ emotional distress domain ($\beta = –0.092$, $p = 0.137$). The model explained 28% of the variance, with change in emotional distress scores as the dependent variable (adjusted R^2). See Table 5.

Table 2. *Bivariate correlations and mean for the different measures at baseline, and follow-ups 1 and 2, and Cronbach's alpha*

	Baseline *n* = 254 Mean (*SD*)	Follow-up 1 *n* = 242 Mean (*SD*)	*P* value	Follow-up 2 *n* = 209 Mean (*SD*)	*P* value	α	Total mental health	EWB	SWB	PWB
Total mental health (0–70)[a]	45.1 (14.1)	52.7 (11.7)	<0.001	45.5 (13.4)	0.26	0.92	–			
EWB (0–15)[a]	11.4 (3.2)	12.9 (2.3)	<0.001	11.4 (2.9)	0.77	0.88	0.82**	–		–
SWB (0–25)[a]	13.8 (6.1)	17.1 (5.2)	<0.001	14.1 (5.8)	0.18	0.88	0.91**	0.66**	–	
PWB (0–30)[a]	19.9 (6.5)	22.6 (5.7)	<0.001	20.1 (6.2)	0.32	0.83	0.92**	0.67**	0.72*	–
heiQ emotional distress subscale (1–4)[b]	2.2 (0.66)	2.0 (0.59)	<0.001	2.1 (0.61)	0.004	0.89	–0.38**	–0.45**	–0.33**	–0.31**

Notes: α = Cronbach's alpha; EWB = emotional well-being; SWB = social well-being; PWB = psychological well-being; [a]high = good; [b]low = good; *= significant at the 0.05 level; ** significant at the 0.01 level.

Table 3. *Effect of the intervention based on the three-category diagnosis of positive mental health*

	Baseline %	Follow-up 1%	Follow-up 2%
Flourishing	44.3	63.9	38.8
Moderately mentally healthy	49.8	32.2	41.6
Languishing	5.5	0	2.7

Table 4. *Multiple regression analysis (enter) with change in positive mental health from baseline to follow-up 1 as dependent variable and MHC, health-related emotional distress at baseline and clinical and socio-demographic variables as independent variables*

Independent variables	*β*	*p*
Health-related emotional distress (low = good)	0.099	0.101
Positive mental health	0.609	<0.001
Age	–0.083	0.206
Education	0.093	0.092
Gender	0.076	0.204
Living alone/co-habiting	–0.005	0.927
Previous climate therapy	0.093	0.100
PASI score	0.029	0.636
Duration of psoriasis	0.146	0.027
Co-morbidity	0.111	0.051

Table 5. *Multiple regression analysis (enter) with change in health-related emotional distress from baseline to follow-up 1 as dependent variable and health-related emotional distress, MHC at baseline and clinical and socio-demographic variables as independent variables*

Independent variables	*β*	*p*
Positive mental health	–0.092	0.137
Health-related emotional distress (low = good)	–0.559	<0.001
Age	0.069	0.313
Education	–0.085	0.141
Gender	0.021	0.736
Living alone/co-habiting	0.052	0.361
Previous climate therapy	–0.071	0.226
PASI score	–0.040	0.526
Duration of psoriasis	–0.024	0.727
Co-morbidity	–0.078	0.182

DISCUSSION

Main findings

Positive mental health is an important issue in the treatment of people with physical illnesses (Fredrickson, 2004; Keyes, 2005; Lamers *et al.*, 2011a). This study has evaluated positive and negative mental health in a Norwegian sample of people with psoriasis undergoing patient education in climate therapy. The main results show that positive mental health and health-related emotional distress improved significantly after climate therapy. Since all the three subscales of positive mental health changed significantly, it emphasizes that all these dimensions are important, and that the overall results are not a consequence of change in a single subscale. However, at the second follow-up, only health-related emotional distress remained significantly improved. While the duration of psoriasis and co-morbidity predicted greater improvements in positive mental health immediately after climate therapy, no predictors were identified for change in negative mental health

Previous research on people with psoriasis who have undergone climate therapy show positive short-term changes in patient perceptions of psoriasis severity (Mørk & Wahl, 2002) and quality of life (Wahl *et al*., 2005), but no long-term changes (Wahl *et al*., 2005). The present study supports this pattern of change through the short-term change in positive mental health. However, the improvement of the emotional distress-specific outcome (heiQ) lasted for at least 3 months. This is an important result, especially when we know that emotional distress is associated with a higher risk of suicide (Picardi *et al*., 2013).

The present study indicates that patient education in the context of climate therapy might promote positive changes in mental health. The proportion of languishing vanished and the proportion of flourishing increased between baseline and the first follow-up. In addition, negative mental health (emotional distress) decreased between baseline and the first follow-up. Because there was no control group, caution in drawing conclusions is required; however, it is reasonable to think that the whole program, including fellowship with like-minded people, promoted good mental health. Research shows that people with psoriasis may be isolated and have psychosocial problems (Sampogna *et al*., 2012). In climate therapy, patients need to engage productively with others (Box 1) and this, together with the rest of the program content, may decrease emotional distress and promote social integration, positive emotions and flourishing (Fredrickson, 2004; Keyes, 2003). People cannot be nurtured in isolation (Keyes, 2010), and Fredrickson (2004) argues that positive emotions can alleviate human languishing and seed human flourishing by broadening people's mind-sets and building their enduring resources.

In this study, there was a high proportion of flourishing, a moderate proportion of mentally healthy people and a low proportion of languishing people with psoriasis, compared with other studies (Keyes, 2005; Keyes *et al*., 2008). However, these results are not directly comparable because these studies used more general and varied population samples than the current study. It may be that the patients in our sample generally had a high level of well-being despite suffering from psoriasis. However, we must also take into consideration that baseline was measured at the patients' arrival on the Canary Islands; with 3 weeks of sun, bathing and fellowship with other patients in front of them, we cannot exclude an expectation effect. This may be a valid consideration at the second follow-up measurement, when the proportions of both flourishing and moderate mental health are lower than at baseline. In addition, languishing increased between follow-up 1 and follow-up 2. Follow-up 2 was conducted 3 months after patients returned home to their usual environment. After 3 months at home, their energy may have dropped, they were likely to be missing social support of the kind they had experienced in the Canary Islands, and the skin manifestations of the disease may have returned. This may

explain why the improvement in positive mental health was not sustained.

The present study reveals that at baseline, moderately health-related emotional distress (negative mental health) was significantly inversely correlated with positive mental health. Further, it was only negative mental health that was still significantly improved at second follow up. This findings support other empirical findings showing that the absence of psychological distress does not equate to the presence of mental health, because signs of positive mental health and symptoms of psychological distress are separate but related factors (Keyes, 2007; Keyes *et al*. 2008; Lamers *et al*., 2011b; Robitschek & Keyes, 2009; Westerhof & Keyes, 2010). The duration of psoriasis and co-morbidity contributed significantly to a change in positive mental health. People who have longer experiences with psoriasis and other health challenges may have actively adapted to their health situation and thus learned how to utilize the program and obtain better positive mental health, despite the limitations imposed by psoriasis and other health challenges. Fortune *et al*. (2005) suggest the possibility of adversarial growth in patients and their families and recognize that psoriasis can leave the individual transformed in ways that may not be universally negative. These results may indicate that it is important to improve people's active adaptation to their health situation. Investigation of positive mental health-promoting factors in general, as well as health-related emotional distress, may help to improve positive and negative mental health. Further, while duration of psoriasis and comorbidity predicted positive mental health in the present study none of the socio-demographic and clinical variables were identified as predictors for change in negative mental health. This supports the study of Westerhof & Keyes (2010) suggesting that the predictors for negative and positive mental health might be distinct. Further, their study revealed that such as age, being married and number of physical conditions predicted negative mental health and this was not confirmed in the present study.

Patient education is a major part of climate therapy. The program content shows that such education is a high priority in the treatment of psoriasis itself, with emphasis on liniment, sun treatment and salt-water bathing. In addition, education is given special attention in the areas of athletics, nutrition, relaxation and self-care. It is obligatory to participate in physical activity and nutrition sessions, and physical activity is also stressed in the group sessions (see Box 1). Hence, the patient education component specifically targets symptoms, the disease and its disabilities, rather than positive mental health issues. This may explain why improvement was seen only in the health-related emotional distress-specific outcome at the second follow-up. A general symptom and disease approach does not result in generalizable improvement in important areas of positive mental health that are critical to all patients, regardless of their specific disease. To improve the mental health of people with psoriasis, treatment of symptoms is important, but the mental health outcome might also improve if treatment also focuses on other factors, such as positive mental health. Research on positive mental health ("flourishing" vs. "languishing") indicates that the lack of positive mental health may have the same detrimental consequences on one's functioning as does the presence of illness (Keyes, 2005). This strongly suggests that if good mental health is an important objective for treatment such as for people with psoriasis, disease-specific patient education must include additional components that provide reliable and stable improvements in positive mental health. For instance, the present patient education component does not explicitly focus on positive mental health. A suggestion is to include positive mental health in the discussion group (see Box 1) by discussing how to take an active role in promoting one's own positive mental health in everyday life.

The next important research step for psoriasis is to investigate how to promote positive mental health in the context of home. Sustained interventions may be necessary because deep-rooted behavior patterns take time to change, and a premise for real change is that people must accept that they need to be actively involved in their own change process. Such a process may start in climate therapy with a group discussion of how patients can promote positive health in everyday life, with a focus on being sensitive to their own needs. Positive psychology interventions (Bolier, Haverman, Westerhof, Riper, Smit & Bohlmeijer, 2013; Vella-Brodrick, 2013) and salutogenic talk-therapy groups (Langeland & Vinje, 2013) are examples of interventions that may foster, nurture and promote positive mental health and thus may represent significant long-term value in the lives of people with psoriasis.

Strengths and limitations

Although research in the positive mental health field is growing rapidly, few studies have applied the positive perspective on mental health for a specific population such as people with psoriasis and investigated mental health as a two continua model in an intervention study. Accordingly, this study contributes to contemporary research in psychology. However, in the present study negative mental health is defined as emotional distress using a subscale of heiQ. A broader and more specific measure of negative mental health could have been better to use, such as an anxiety and depression scale including aspects of functioning. In addition, a methodological limitation of this study is the lack of a control group, which limits any conclusions about cause and effect that may be drawn from this study. Further, 89 patients did not want to participate in the study and we had no opportunity to evaluate the reasons why. Hence, we do not know whether this has influenced the results. The high level of the flourishing in the present study leads us to ask whether the present study's sample is a specially selected group. However when taking the strict inclusion criteria and the socio demographic variables such as education (60% with primary school) into consideration we do not think that is probable.

CONCLUSION

This study underlines the importance of a dual continua model of mental health focus in the treatment of people with psoriasis, and challenges patient education programs to include interventions that focus on mental well-being, in addition to symptom-specific emotional distress. We suggest that the promotion of

positive mental health should be integrated into the patient education and the climate therapy program for people with psoriasis and also sustained in the patients' home context.

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