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A replication study to evaluate parental internalizing symptoms as predictors of anxiety symptoms

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ABSTRACT

Parental internalizing symptoms have been linked to children's anxiety symptoms, but findings on the differential influence of mothers and fathers symptoms are mixed. The current study aims to replicate and extend previous findings by examining the role of parental internalizing symptoms in older youth with a broader range of anxiety disorders. Youth aged 12 to 18 years (Mage = 15.3 years, SD = 1.3, 76.5% female) with anxiety disorders were recruited from two community health clinics. Before receiving the intervention, the youth (n = 90), mothers (n = 79), and father (n = 50) reported the youth's anxiety symptoms, while parents also reported their own internalizing symptoms. Multiple regression models examined parental internalizing symptoms as predictors of youth anxiety symptoms. Neither father- nor mother-rated internalizing symptoms predicted youths self-rated anxiety symptoms (adj. R2 = 0.05), failing to replicate findings from previous research. However, in line with previous research, maternal internalizing symptoms did predict mother-rated child anxiety symptoms (adj. R2 = 0.23). The findings suggest that for older youth, the parents perception of youth anxiety may be shaped by their own internalizing symptoms. For clinicians, this highlights the importance of multiple informants and not over-relying on parental ratings when working with older youth.

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Anxiety disorders are one of the most common mental health issues in children and adolescents (hereafter youths) (Merikangas et al., 2010; Polanczyk et al., 2015). These disorders negatively impact important developmental areas, including social and general functioning (Creswell & Cartwright-Hatton, 2007; Settipani & Kendall, 2013). Family and parental factors, such as parental anxiety and depression symptoms, influence anxiety disorders in youth (Hirshfeld-Becker et al., 2012; Reeb et al., 2015) and internalizing symptoms (Gabriel et al., 2020). Better understanding of how parent internalizing symptoms affect youth anxiety symptoms may aid in improving treatment and prevention of youth anxiety disorders. Thus, an important aim for clinical researchers is to identify and extend knowledge on how parental mental health symptoms affect youth anxiety.

Previous research has identified an association between both paternal and maternal depression symptoms and youth internalizing disorders (Connell & Goodman, 2002; Hirshfeld-Becker et al., 2012; Wickersham et al., 2020). Findings are mixed, and an important ongoing discussion is whether there are differential effects of maternal and paternal internalizing symptoms on the type and severity of child internalizing symptoms (Hirshfeld-Becker et al., 2012; Wickersham et al., 2020). Some have argued for the unique importance of maternal internalizing symptoms in understanding youth internalizing symptoms (Natsuaki et al., 2014). Others have argued for the importance of paternal internalizing symptoms and highlighted how these inhibit the traditional masculine role of aiding youth in achieving independence (Bögels & Perotti, 2011). Recently, Fjermestad et al. (2020), in a clinical study of 182 children (age 8–15) found paternal, but not maternal, internalizing symptoms to correlate with and predict child-rated anxiety symptoms in a sample of children referred to community clinics. These findings support the unique importance of paternal internalizing symptoms.

Despite the strengths of the Fjermestad et al. study, the study has certain limitations. The first limitation is the age of participants. The study included children aged 8–15 years, with the final sample having a mean age of 11.5 (*SD* = 2.1) (Wergeland et al., 2014). Thus, the findings from Fjermestad et al.

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(2020) apply to children and young adolescents but may not generalize to older adolescents aged 13–18. A second limitation of the Fjermestad study is that they only included youth with a primary diagnosis of generalized anxiety disorder, social anxiety disorder, or separation anxiety disorder. Thus, findings may not generalize to youth with primary anxiety disorder of specific phobia, panic disorder, agoraphobia, or the anxiety-related disorder of obsessive-compulsive disorder.

In addition to extending the scope of the Fjermestad et al. study, there is a need to investigate whether results can be replicated in a different setting. Such replications of results are necessary to determine what findings are reliable and which are simply observations occurring by chance (Laws, 2013). Due to the necessity of replication studies, some have termed them the gold standard of science (Jasny et al., 2011). Unfortunately, psychology has had a history of not meeting this gold standard, with an estimated 98.03% of findings not being replicated (Makel et al., 2012). To ensure the credibility and usefulness of research, there has been a call for more replication of studies within psychology (Laws, 2013; Youngstrom et al., 2019).

The current study describes a replication-attempt and extension of the study by Fjermestad et al. (2020) that included a broader range of internalizing disorders and older youths. The aim of the study was to further the understanding of the relationship between parental internalizing symptoms and children's anxiety symptoms in clinical samples of children with anxiety disorders. Our research questions paralleled those of Fjermestad et al. (2020) and were the following: to what extent are internalizing symptoms in mothers and fathers associated with children's anxiety levels? As was done by Fjermestad et al. (2020), this question was investigated separately for child self-, mother- and father-rated child anxiety symptoms. To replicate Fjermestad et al. (2020), we controlled for child age and sex. Child sex was included in Fjermestad et al. (2020) due to the potential differential effects of paternal internalizing symptoms on boys. Age was included to follow Fjermestad et al. (2020) and to reflect the different roles of parents in different stages of a child's life.

Method

Participants and procedure

The study was a clinical open trial at two community clinics in southern Norway. The sample comprised 90 youths, 79 mothers, and 50 fathers. The youths were between 12 and 18 years old (M_{age} = 15.3 years, SD = 1.3; 76.5% female). See Table 1 for background information. Parent educational level and occupational status were determined from parent self-reports. The level of education and occupational status was determined by the parent with the highest level and status. Family composition was determined from parent and youth reports. The families participated in a clinical study of a novel treatment named *RISK*. The treatment was designed to include all types of anxiety disorders and anxiety-related obsessive-compulsive disorder (OCD). Participants were informed about the study during routine intake procedures, suggesting presence of anxiety disorder. Recruitment took place between 2017 and 2019 at the community-based clinics for child and adolescent mental health that are part of the national health services in Norway, where the

Table 1. Demographic and clinical characteristics of the sample.

Characteristic	n	%	M	SD
Age			15.29	1.32
Gender				
Female	69	76.5		
Male	21	23.5		
Family composition				
Two-parent household	39	43.8		
Divorced, shared custody	32	35.6		
Single parent	19	20.5		
Parents' highest education				
Primary school	2	1.7		
Trade school	26	28.7		
Secondary school	26	28.7		
College	36	41.9		
Parent occupational status				
Full-time	67	74.0		
Part-time	4	4.1		
Subsidized	17	19.2		
Under education	2	2.7		
Principal diagnosis				
Social phobia	47	52.4		
Obsessive-compulsive disorder	17	19.0		
Generalized anxiety disorder	12	13.1		
Panic disorder and/or Agoraphobia	7	8.4		
Separation anxiety disorder	4	4.8		
Specific phobia	2	2.4		
Child anxiety symptoms				
SCAS-C			42.36	15.29
SCAS-M			29.33	17.26
SCAS-F			15.92	16.57
Parent symptoms				
PHQ-M			4.77	4.25
PHQ-F			2.00	3.60
GAD-M			3.22	3.37
GAD-F			1.37	2.42
Composite-M			9.07	6.91
Composite-F			6.14	6.44

Note. SCAS : spence children's anxiety scale; C: child; M: mother; F: Father; PHQ: patient health questionnaire; GAD: generalized anxiety disorder-7 questionnaire; Composite: composite score of PHQ and GAD. The sample consisted of 90 youth, 79 mothers and 50 fathers.

treatment was offered as the recommended care for youth with an anxiety disorder. Recruitment was facilitated by clinicians working at the clinics that were part of the group that delivered the intervention. Inclusion criteria were meeting diagnostic criteria for any anxiety disorder or OCD as determined by the ADIS-IV (Silverman & Albano, 1996). Eligibility was assessed through diagnostic interviews (ADIS-IV-C/P) conducted with both youth and parents administered by trained clinicians. Participants were excluded if intellectual disability, autism spectrum disorder, ongoing self-harm, suicidal ideation, or psychotic disorder were present. Questionnaires were administered in person at the clinics as part of the procedure to assess eligibility. They were completed by participants using pen and paper in the presence of a study coordinator or therapist, who was available to provide clarification if necessary. Written informed consent was obtained for the entire sample, and the Regional Ethics Committee for research with human subjects approved the study (reg. nr. 2017/1367). All data was anonymized before analysis, and original questionnaires and raw research data were stored securely and only accessible by the first author (TB). See Bertelsen et al. (2022) for further details.

Measures

The Spence Children's Anxiety Scale (SCAS; (Spence, 1998)), child and parent versions, were used to assess youth anxiety symptoms. The SCAS was completed by children (SCAS-C; $n = 90$), mothers (SCAS-M; $n = 79$), and fathers (SCAS-F; $n = 50$). The SCAS includes 38 items rated on a 4-point, yielding a maximum total score of 114. Internal consistency (Cronbach's α) in the current sample was good to excellent (Children $\alpha = 0.90$; Mothers $\alpha = 0.85$, Fathers $\alpha = 0.71$).

The Patient Health Questionnaire depression scale (PHQ-9; (Kroenke et al., 2001)) was used to assess parental depression symptoms. The PHQ-9 was completed separately by mothers ($n = 79$) and fathers ($n = 50$). The PHQ-9 comprises 9 items rated on a 4-point scale, with a maximum total score of 27. Internal consistency in the current sample was (Mothers $\alpha = 0.84$; Fathers $\alpha = 0.86$).

The GAD-7 (Spitzer et al., 2006) was used to assess parental depression symptoms. The GAD-7 was completed separately by mothers ($n = 79$) and fathers ($n = 50$). The GAD-7 comprises 7 items rated on a 4-point scale with a maximum total score of 21. The GAD-7 has demonstrated excellent reliability and convergent validity (Johnson et al., 2019). Internal consistency in the current sample was (Mothers $\alpha = 0.85$; Fathers $\alpha = 0.81$).

To closely resemble the study by Fjermestad et al. (2020), the two scales were combined to form a composite parental internalizing scale. This combined scale is strongly correlated ($r = 0.61$-0.71) with the DASS questionnaire used by Fjermestad et al. (2020). This composite scale was assessed using confirmatory factor analysis that indicated the scale was significantly different from the baseline model ($\chi^2 = 341$, df = 104, $p < .0001$). This scale showed excellent internal consistency (Mothers $\alpha = 0.91$; Fathers $\alpha = 0.89$). We used Norwegian-translated versions of all measures.

Statistical analyses

Before analysis, power calculations were conducted using the G*Power 3 software (Faul et al., 2007). Based on the values reported by Fjermestad et al. (2020), the current study had 0.79 power to replicate the findings on correlations and 0.91 power to replicate the findings on regression coefficients.

To comply with Fjermestad, preliminary analyses were performed to investigate possible violations of the assumptions of normality and outliers in the statistical analyses. No outliers were identified. All variables except SCAS-C were non-normal based on Shapiro-Wilks tests (all p-values $< .05$). To handle the non-normal distribution, Wilcoxon signed-rank, and Mann–Whitney U-tests were used instead of student's t-tests, and Spearman's ρ was used in place of Pearson's r. Wilcoxon signed-rank tests were performed to compare self-rated internalizing symptoms, including depressive and anxiety, for mothers versus fathers. Signed-rank tests were also used to compare mothers versus fathers' parent-rated child anxiety symptoms. Mann–Whitney U-tests were used to assess mother-, father- and youth-rated youth anxiety symptoms for boys versus girls. For the regressions, we also tested assumptions of normality and outliers, however, here residuals were normal, and the regressions were carried out assuming normality (See Figure 1 for QQ-plots of residuals).

Besides those fathers that did not participate, there was a minimal amount of missing data (4%), and the Littles MCAR test indicated that the data was MCAR ($p = .32$).

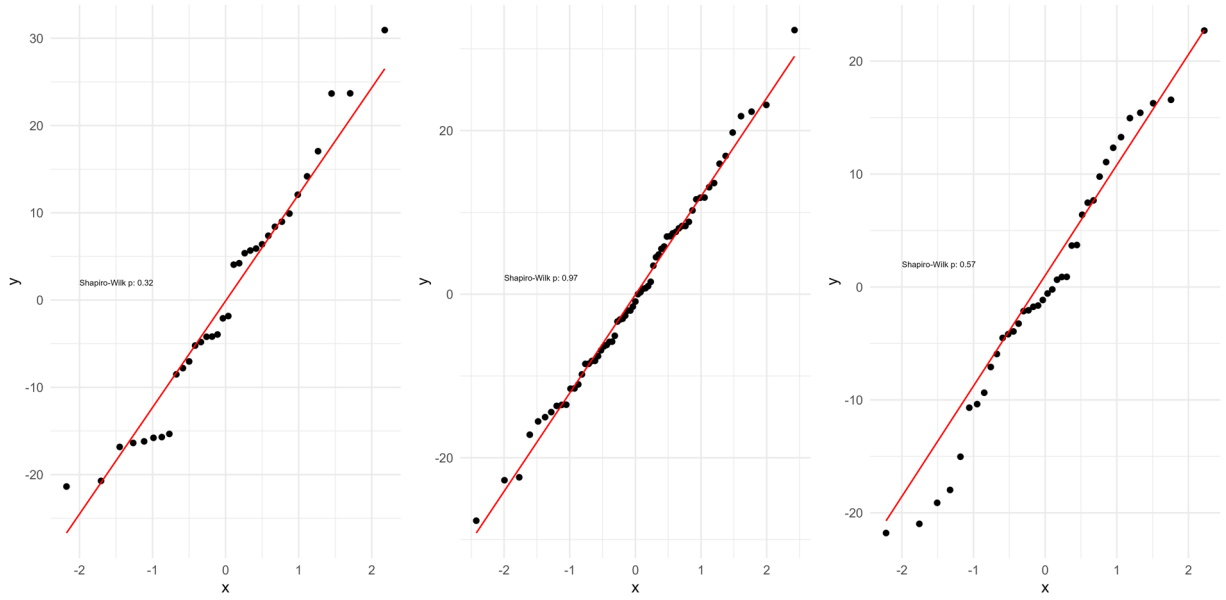

Figure 1. QQ-plots of residuals for regressions on SCAS-C, SCAS-M and SCAS-F.
Note: Left to right the figures represent QQ-plots of multiple regressions on SCAS-C, SCAS-M and SCAS-F.

Results

Descriptive statistics

Descriptive statistics for child anxiety (SCAS-C/M/F) and parent internalizing symptoms (PHQ-F/M, GAD-M/F, and Composite-M/F) are displayed in Table 1. There was a significant difference between Mothers and Fathers ratings of anxiety ($W = 628$, $p < .0001$), between Mothers and children ratings of anxiety ($W = 2407$, $p < .0001$), and between Fathers and child ratings of anxiety ($W = 2859$, $p < .0001$). Age was not significantly associated with father-, mother- nor child-rated anxiety symptoms, but was associated with lower paternal depressive, anxiety, and overall internalizing symptoms (all p-values $< .05$).

Maternal and self-rated anxiety was higher for girls than for boys (both $p < .05$). There was no difference between sexes on paternal ratings of anxiety. Mothers had significantly higher levels of depressive symptoms than fathers ($W = 2247$, $p < .0001$). Mothers had significantly higher levels of anxiety symptoms than fathers ($W = 1890$, $p < .0001$). Mothers had significantly higher combined internalizing scores ($W = 453$, $p < .0001$).

Primary results

Correlations between youth and parent anxiety ratings are described in Table 2. Mothers rating of childrens anxiety symptoms were significantly associated with childrens self-rated anxiety symptoms, whereas fathers ratings of anxiety symptoms were not. Furthermore, fathers' internalizing symptoms, but not mothers', were significantly correlated with children's self-rated anxiety. No parental internalizing symptoms were associated with child-rated anxiety symptoms. Mothers depressive, anxiety and combined internalizing symptoms were associated with higher mother-rated child anxiety ($p < 0.001$). Fathers depressive, anxiety and combined internalizing symptoms were associated with higher father-rated child anxiety ($p < 0.001$).

To replicate the methods of Fjermestad et al. (2020), three multiple regression models were run (see Table 3). Although our data was not normally distributed, residual errors were normally distributed and analysis was conducted under assumptions of normality. In the first model for child self-rated anxiety symptoms (SCAS-C), the predictors were mothers' and fathers' self-rated internalizing symptoms (Composite internalizing), child age, and child gender. This model explained 5.0% of the total variance (adj. R^2) in child self-rated anxiety symptoms. Neither mothers' nor fathers' internalizing symptoms significantly predicted the child self-rated anxiety symptoms, nor did the child age or gender.

In the second model, mother-rated child anxiety symptoms (SCAS-M) were the dependent variable, and predictors were mothers' self-rated internalizing symptoms, child age, and child gender. This model explained 23.0% of the total variance in mother-rated child anxiety symptoms. In this model, maternal internalizing symptoms significantly

Table 2. Correlations between child (n = 90) anxiety symptoms, parent internalizing symptoms (n = 79 mothers; 50 fathers), child age and child gender.

Variables	n	1	2	3	4	5	6	7	8	9	10	11
1. SCAS-C	90	–	0.43***	−0.09	0.14	−0.97	0.12	−0.09	0.14	−0.13	0.14	−0.22
2. SCAS-M	79		–	0.14	0.62***	−0.04	0.54***	0.05	0.63***	0.01	−0.05	−0.29**
3. SCAS-F	50			–	0.01	0.69***	−0.01	0.72***	0.01	0.80***	−0.16	−0.12
4. PHQ-M	79				–	0.07	0.78***	0.17	0.96***	0.12	−0.11	−0.13
5. PHQ-F	50					–	0.01	0.74***	0.05	0.92***	−0.22	−0.01
6. GAD-M	79						–	0.15	0.92***	0.06	0.02	−0.17
7. GAD-F	50							–	0.17	0.91***	−0.22	−0.16
8. Comb-M	79								–	0.09	−0.05	−0.16
9. Comb-F	50									–	−0.24*	−0.06
10. Child age	90										–	0.16
11. Child gender	90											–

Notes. SCAS: spence children's anxiety scale; C: child; M: mother; F: father; PHQ: patient health questionnaire; GAD: GAD-7 questionnaire; Composite, composite score of PHQ and GAD. *Correlation is significant at the $p < 0.05$ level; **Correlation is significant at the $p < 0.01$ level; ***Correlation is significant at the $p < 0.001$ level.

Table 3. Multiple regression models predicting child anxiety symptoms for children, mothers and fathers.

			95 % CI		
Dependent variables	Predictors	*B*	*LL*	*UL*	*p*
SCAS-C	Composite-M	0.32	−0.25	0.88	0.26
	Composite-F	−0.46	−1.16	0.25	0.202
	Child age	1.28	−1.32	3.88	0.328
	Child gender	−8.13	−16.95	0.69	0.07
SCAS-M	Composite-M	1.06	0.57	1.55	<0.001
	Child age	0.17	−1.92	2.37	0.87
	Child gender	−7.38	−14.96	0.21	0.056
SCAS-F	Composite-F	1.62	0.95	2.38	<0.001
	Child age	0.34	−2.09	2.8	0.771
	Child gender	−4.26	−12.41	3.89	0.30

Notes. SCAS: spence children's anxiety scale; C: child; M: mother; F: father; PHQ: patient health questionnaire; GAD: GAD-7 questionnaire; Composite: composite score of PHQ and GAD. CI: confidence interval; LL: lower limit; UL: upper limit.

predicted mother-rated youth anxiety symptoms, whereas youth gender and age did not. In the third model, the dependent variable was father-rated child anxiety symptoms (SCAS-F), and the predictors were fathers' self-rated internalizing symptoms, child age, and child gender. This model explained 25.0% of the total variance in father-rated youth anxiety symptoms. In this model, paternal internalizing symptoms significantly predicted father-rated youth anxiety symptoms, whereas child age and gender did not.

To perform a replication of the Fjermestad et al. study, we also conducted regression-analyses of SCAS-C predicted by mother internalizing symptoms and SCAS-C predicted by father internalizing symptoms. Neither of these were significant predictors of SCAS-C, and these models decreased R^2 compared to Model 1.

Discussion

We performed a replication-attempt and extension of previous literature, examining the relationship between parent internalizing symptoms and child anxiety symptoms in a clinical sample of children with anxiety disorders. Neither the mother nor father internalizing symptoms were associated with the children self-rated anxiety symptoms. Contrary to the findings from Fjermestad et al. (2020), neither mothers' or fathers' internalizing symptoms were significant predictors of child-rated anxiety in combined or separate models. These findings underscore the importance of replication of studies and indicate that parental internalizing symptoms do not play a significant role in children anxiety symptoms in youths aged 12–18.

Similar to Fjermestad et al. (2020), the findings of maternal internalizing symptoms association with mother-rated anxiety symptoms in children were replicated. Both simple correlations and regression models found that higher maternal internalizing symptoms were associated with higher mother-rated children anxiety symptoms. Contrary to Fjermestad et al. (2020), we found significant associations between paternal internalizing symptoms and father-rated child anxiety symptoms. Overall, these results indicate that parents rating of their childs anxiety symptoms reflects their own internalizing symptoms more than the childs own perception of

their anxiety symptoms. This is in line with theories of informant bias, which suggest that parents' reports of their childs mental health may be affected by parents own emotional states (De Los Reyes & Kazdin, 2005). This has clinical implications and suggests that when parents report on older youths anxiety, clinicians should carefully consider whether this reflects actual youth anxiety or to what degree it is influenced by parents own distress.

Our findings are contrary to studies suggesting that parental factors pose a risk for youth with anxiety (Fjermestad et al., 2020; Hirshfeld-Becker et al., 2012). This may partially be explained by the age of children included in studies. Generally, the inter-rater disagreement between parents and youth increases with youth age (De Los Reyes & Kazdin, 2005). In line with this, it was found in this study that youths rated their anxiety markedly higher than parents. A simple explanation for this disagreement is that as youths get older, they spend more time with peers, and parents play a less influential role than when they were younger. This simple explanation may also explain why our findings differ from those of Fjermestad et al. (2020) and others. Youth may not be as influenced by parents internalizing symptoms when they are older because they are less reliant on their parents and, to an increasing degree, use their peers as a support network.

Another issue is the lack of control for multiple testing in both studies. In the study by Fjermestad et al. (2020), there was no description of correction for multiple testing, hence, our study was conducted also without correction for multiple testing. If Fjermestad et al. (2020) had used Bonferroni-correction 9/14 significant findings would not have been significant. Using the more lenient Benjamini-Hochberg procedure (Benjamini & Hochberg, 1995) 6/14 significant findings would not have been significant. This may explain why the Fjermestad et al. (2020) results were not replicated since a stricter statistical approach would not have indicated that maternal or paternal internalizing symptoms predicted youth anxiety symptoms. If correction for multiple testing had been applied to our study, the correlation between father composite internalizing and child age would no longer be significant, while all other results would remain significant.

The strengths of this replication study were the similarity in sample demographics, good power to replicate findings, and extending previous findings by including an older age group. An older age group in the replication study is advantageous as it allows us to assess whether previous findings generalize across older youth. However, this also poses some restrictions on conclusions on replication and non-replication of findings, as these may be a consequence of differences in the sample. Another limitation is that the original study by Fjermestad et al. (2020) used the DASS questionnaire to assess parental internalizing symptoms, whereas the current study used different questionnaires to assess the same symptoms. Although these questionnaires are strongly correlated ($r = 0.71$; Peters et al., 2021) and should conceptually capture the same phenomena, minor differences in psychometric properties may affect conclusions. Additionally, data were collected via self-report measures, which may introduce response bias. The sample, while similar in demographics to the original study, may not fully represent the broader population, limiting generalizability. A final limitation, like the original study, is that all participants were Caucasian and ethnic Norwegian. Thus, future research should further replicate findings and extend them to other ethnic and national groups.

Clinical significance

Findings from previous studies were not replicated in a sample with slightly older adolescents. That is, neither mothers nor fathers internalizing symptoms were associated with children's self-rated anxiety symptoms in a clinical sample of children with anxiety disorders. The main implication is that clinicians should not spend undue time assessing parents internalizing symptoms when working with clinically anxious youth of a certain age. In clinical work, resources are limited, and any time spent on assessing parental symptoms is taken away from time that could be spent doing the most effective interventions (Whiteside et al., 2020). When treating youth older than 12 years, clinicians should focus on the youth and only spend time with parents to the extent that they interfere with treatment (i. e. through family accommodation, see (Kendall et al., 2020)). Further studies should assess how parental internalizing symptoms are associated with youth anxiety symptoms across other ethnic and national groups.

Authors' contribution

Thomas B. Bertelsen: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft. Åshild Tellefsen Håland: Writing – Original draft, Review & Editing, Supervision, Conceptualization, Resources, Supervision, Project administration, Funding acquisition.

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Data availability statement

The participants of this study did not give written consent for their data to be shared publicly, so due to the sensitive nature of the research supporting data is not available.

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