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Parenting in a Pandemic:
Parental Distress During COVID-19 Lockdown

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Abstract

Objective: The present aim to examine parents' distress (parental stress, anxiety, and depression) and associated risk and protective factors across demographic subgroups in the parental population during the strict distancing protocols following the onset of the COVID-19 pandemic.

Methods: In this cross-sectional, epidemiological study, 2868 parents completed an online survey two weeks after the distancing protocols were established, containing demographic variables, measures of parental and psychological stress, and risk factors related to the experience of the COVID-19 lockdown.

Results: Among the 2,868 participating parents, mothers (vs. fathers), parents living with more than one child, and parents with pre-existing psychiatric diagnosis reported higher levels of parental stress, as well as parents who report higher levels of burnout, anger towards their child(ren), difficulty working from home and lower social support. Almost 25% of parents reported anxiety and depression at clinical significance. These symptom levels were predicted by parents' age, gender, psychiatric diagnosis, number of children, and parental stress levels. Parents who were home with their children and predominantly followed distancing protocol by socially distancing from public activity and peers reported significantly higher symptoms of depression (29%) and anxiety (27%), compared to parents who did not isolate in the same manner (i.e., depression 13% and anxiety 15%). Hierarchical multiple regression analyses revealed that the most important predictor of parental stress was the angry at child predictor, which uniquely explained 41% of the variation in parental stress. The most important predictor for both symptoms of anxiety and depression was pre-existing psychiatric diagnosis, which explained respectively 39% and 38% of the variation in symptoms. Together pre-existing psychiatric diagnosis, parental role and parental age accounted for 72% of the variance in both symptoms of anxiety and depression.

Conclusion: The present study reveals that home confinement during the restricted lockdown period is related to markedly high levels of parental stress, in addition to symptoms of depression and anxiety in parents. Given the detrimental effects of depression, anxiety, and parental stress on the quality of life, morbidity rates, as well as adverse child outcomes and the potential risk of child abuse and neglect, these results suggest that appropriate action should be taken to impede further development of these symptoms, as well as developing interventions aimed at vulnerable subgroups and other relevant factors associated with increased parental stress.

Keywords: COVID-19 lockdown, parental stress, depression, anxiety, angry at child

Introduction

In the first half of 2020, the world witnessed the global coronavirus disease (COVID-19) outbreak. For millions of parents and their children, everyday life changed dramatically, as entire cities worldwide were placed under mass quarantine to slow the spread of a viral infection to protect vulnerable groups. The estimation that more than 220 million children and adolescents, including 47 million preschoolers, were home confined only in China (1) illuminates only a fraction of the dimensions of how many families worldwide were affected by the global crisis.

Globally, the pandemic has led to novel circumstances for family life and increased burdens and strain on parents. At the same time, they must combine working from home and childcare, while simultaneously engaging children in homeschooling, all in an environment of quarantine and social isolation. In such major disruptions in daily life routines, there are reasons to be concerned about how parents' psychological well-being is affected by parental stress, which commonly refers to the maladjusted relationship between parenthood demands and perceived abilities to cope with these demands (2, 3). The reality of everyday life as a parent is itself a demanding task and many parents experience stress specifically related to their roles as parents (4, 5). The stresses and strains parents are experiencing in response to the demands of parenthood under severe and historically rare occurrences, when entire populations are quarantined, are, however mainly unexplored.

Although we expected several studies to cover this particular field during the current years, some crucial time-sensitive studies have provided valuable insight into the impact of the ongoing global pandemic on parents' experienced levels of parental distress. Among them, a study examined the impacts of the COVID-19 pandemic concerning parental stress and child abuse potential among 183 parents, which showed that greater COVID-19-related stressors and high anxiety- and depression symptomatology, were associated with higher parental perceived stress (6). Greater parental support and perceived control during the pandemic was further associated with lower perceived stress and child abuse potential (6). A study which explored the effect of risk factors associated with the COVID-19 outbreak experiences on parents' well-being among Italian 854 parents, reported that parents who found more difficulties in dealing with quarantine showed more stress (7). Similarly, a study among 1,226 Italian parents reported that 84% of the parents reported clinically alarming distress levels and 17% significant parenting-related exhaustion during lockdown (8). Also, a study among 420 American parents showed that parents who reported higher rates of caregiver burden during the early months of the COVID-19 pandemic, reported higher rates of generalized anxiety and depression symptomatology (9). A previous study, which compliments these recent studies, is the Sprang & Silman study (10), which investigated traumatic stress responses among 398 parents and their children with varying disease-containment experiences (10). The finding that the clinical cutoff score for posttraumatic stress disorder (PTSD) criteria were met in 25% of the isolated or quarantined parents, suggests that quarantine and isolation could be traumatizing to a significant portion of parents.

Researchers have also stressed the psychosocial impact of the ongoing health crisis, specifically how the pandemic imposes situational- and socio-cognitive predictors of perceived parental stress. Among the stresses are the potential harm that is associated with parental burnout, which refers to the condition of intense exhaustion related to prolonged and high levels of parental stress appearing due to the perceived discrepancy between parenthood demands and the resources available (5, 11). The loss of pleasure and efficacy in one's

parental role and the emotional distancing from one's children, which is associated with parental burnout, are, in turn, risk factor for abusive and harsh parenting (5, 11, 12). Specifically, higher levels of burnout are associated with higher levels of anger expression (13–15). Parenting stress and anger expression have also been found to be strongly associated with abusive parenting and child abuse potential (16–19). Several studies have further addressed the risk of harsh and abusive parenting as a function of exhaustion and stress during the COVID-19 pandemic. Lawson and colleagues who investigated factors associated with child maltreatment during the COVID-19 pandemic among a sample of 342 parents reported that parents who experienced depression in response to having lost their job and who previously psychologically maltreated their children were more likely to maltreat their children psychologically during the pandemic (20). Similarly, Chung et al. (21) reported that parental stress was a significant mediator in the relationship between the perceived impact of COVID-19 and parent-child closeness and harsh parenting.

Perceived parental exhaustion and stress may also be affected by socio-cognitive factors, including the lack of parenting self-efficacy and social support from family and close relations that has been limited during the physical distancing period. The literature has identified parents' perceived social support as a sufficient protective factor for parental perceived stress (22, 23). Specifically relevant to the ongoing pandemic, one study among 1,451 Chinese parents indicate that social support negatively predicted the parents' state of anxiety reported during the COVID-19 pandemic, suggesting social support a protective factor for excessive anxiety among parents (24). The findings in a study among 277 Italian parents measured under the covid-19 lockdown are relevant to the self-efficacy domain. Relevant of the self-efficacy domain, is the findings in a study among 277 Italian parents measured under the covid-19 lockdown. The influences of parents' psychological distress were specifically found to be mediated by parenting self-efficacy (25). These results, taken together, suggest that the physical distancing protocols implemented during COVID-19 may have significant detrimental effects on the psychological well-being and perceived stress of parents.

The current study investigated parental stress, depression- and anxiety-symptomatology, and the associated risk and protective factors across different demographic subgroups of parents, two weeks after the physical distancing intervention following the onset of the COVID-19 pandemic was established. Firstly, we hypothesized that parents' experienced high levels of perceived parental stress and symptoms of anxiety and depression due to the novel social and environmental circumstances that are present during the lockdown period, based on time-sensitive studies that have provided valuable insight into the impact of the COVID-19 pandemic on parents' mental health and well-being (5, 7, 25). Secondly, on the basis of risk- and protective factors affecting parental stress (4, 53, 56), we hypothesized that pre-existing sociodemographic factors (i.e., parental role, age, marital status, number of children, and pre-existing psychiatric diagnosis) and COVID-19-related situational risk factors (i.e., burnout, angry at the child, and difficulty to work from home and worry) and protective factors (social support and self-efficacy) contribute to the level of perceived parental stress reported during the lockdown. In addition, we hypothesized that similar pre-existing factors and levels of parental stress were linked to reported prevalence of anxiety- and depression-symptomatology during the lockdown.

Method

Participants and study design

The survey was completed by a sample of 2868 parents (79.5% mothers), ($M = 40$ years, range 21-83 years). The inclusion criteria for participants were all parents living with one or more children in the household and/or with a person over 18 years with special care needs. All participants resided within the borders of Norway and were thus experiencing the same government-initiated physical distancing interventions, including isolation, quarantine, and lockdown of schools and kindergartens. Digital consent to take part in the study was required, as was being an adult over 18 years of age. Descriptive information for the sample is reported in Table 1.

The data collection lasted seven days from March 31 to April 7 (2020), which ensured that physical distancing protocols were held constant both two weeks before and during the data collection. The survey was first and predominantly disseminated through a Facebook Business algorithm to any adult parent residing in Norway and invited those who lived with one or more children and/or a child with disabilities (see full inclusion criteria above) to participate in the study. This algorithm disseminates the survey to a random proportion of the adult population available on Facebook (i.e., 85% of all adults in Norway). Seventy percent of the overall participants included in this study were obtained through this random selection technique. To reach the residual 15% of adults who were not on this platform, the survey was disseminated systematically through national, regional, and local platforms (i.e., newspapers, radio stations, and television) across the entire country. Consequently, we estimate having reached the spectrum of individuals across the adult parent population with this wide dissemination technique.

The stopping rule for data collection involved stopping data collection immediately if the government-initiated protocols interventions were changed or modified or when enough participants had responded given the power analysis. Additionally, the stopping rule involved stopping data collection instantaneously if any novel information was provided concerning forthcoming changes of non-pharmacological interventions, as such information may cause expectation effects biasing estimations. Consequently, the present study controlled for the impact of expectation effects.

This study is a part of the Norwegian COVID-19 Mental Health and Adherence Project. Ethical approval for the study was granted by the Regional Committee for Medical and Health Research Ethics and The Norwegian Center for Research Data. The pre-registered protocol can be found at [Clinicaltrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT04377074) (Identifier: NCT04377074).

Measures

The survey provided data on demographic characteristics, person-trait variables, cognitive variables, socio-cognitive variables, and situational variables related to the COVID-19 pandemic, as well as total scores of depression and generalized anxiety and items aimed to measure perceived parental stress. The list of items was administered in random order.

Demographic and situational variables. Demographic variables included sex, age of participants, the number of children in the household, and whether they had a current psychiatric diagnosis. Situational variables related to the consequences of the coronavirus pandemic and the social distancing interventions were collected, including experiencing difficulties in working from home and the presence of more anger aimed at child(ren).

All of the participants were parents who lived with their children. All were requested to be home with their children due to the closure of schools, kindergartens, workplaces, and stay-at-home orders nationally wherever possible. Participants were asked to what degree they adhered to this request to stay at home with children and predominantly socially distancing themselves. All parents were asked the number of days out of the last 14 days they had followed the government-initiated distancing protocols of socially distancing themselves from peers and public activity. Those who reported to have been home with children and socially distanced themselves for at least 10 of the last 14 days were coded as having predominantly followed distancing protocols.

Parental stress. The *Danish Parental Stress Scale* (Danish PSS; 26) was used to measure parental stress. The scale is developed as a short measure to obtain the perceived stress related to the role of being a parent. Danish PSS is divided into two subscales, namely the parental stress subscale (e.g., “*I feel overwhelmed by the responsibility of being a parent*”) and the parental satisfaction subscale (e.g., “*I enjoy spending time with my children*”). Three items from the parental stress subscale were chosen by a panel of clinical experts through a consensus process, with the aim of avoiding topological overlap and reducing the response burden on participants. Parents were asked to rate the following statements on a five-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5); 1) *I feel overwhelmed by the responsibility of being a parent*, 2) *The major source of stress in my life is my child(ren)*, and 3) *It is difficult to balance different responsibilities because of my child(ren)*. Higher scores on the presented items indicate greater parent-related stress. The items showed high reliability, with a Cronbach’s α of 0.77. Parental satisfaction subscale was not applied in the study.

Symptoms of depression and anxiety. In terms of psychological symptoms, validated screening measures were used to obtain depressive and generalized anxiety symptoms. Symptoms of depression were obtained through *The Patient Health Questionnaire* (PHQ-9; 27). This measure is routinely used to assess symptoms of depression in accordance with the diagnostic criteria for major depressive disorder and consists of nine items scored on a four-point Likert scale (0 – 3), for example “*Feeling down, depressed, or hopeless*”. Higher scores on the PHQ-9 indicate greater depression severity and scores above and including 10 is considered to be the cut-off associated with the presence of a depressive diagnosis (27). A reliability analyses revealed high reliability, with Cronbach’s α of 0.88. *The Generalized Anxiety Disorder 7* (GAD-7) (28) was used to obtain symptoms of generalized anxiety symptoms, encompassing seven items scored on a four-point Likert scale (0 – 3), for example “*Feeling nervous, anxious or on edge*”. Scores range from 0 to 21, and higher scores indicate greater anxiety severity. A commonly used cut-off to indicate the presence of an anxiety

diagnosis is scores above and including 8. This cut-off for GAD-7 is validated for determining the presence of an anxiety disorder in a Norwegian context (29), and it thus used in the present study. The items showed high reliability, with Cronbach's α of 0.88.

Self-efficacy. To obtain measures of self-efficacy, two items from the general self-efficacy scale (GSES) (30) were used. The 10-item scale is aimed to assess the individual's beliefs regarding their ability to cope with a variety of difficult demands and daily hassles. Two items from this scale were included in the present study; "*I can always manage to solve difficult problems if I try hard enough*" and "*I am confident that I could deal efficiently with unexpected events.*" The statements were scored on a four-point Likert scale from 0 (*not at all true*) to 4 (*exactly true*). Higher scores are associated with more self-efficacy. The reliability analysis revealed a Cronbach's α of 0.68.

General worry. *The Cognitive-attentional Syndrome Questionnaire* (CAS-1; 31) was used to obtain measures of general worry and rumination. The scale consists of items aimed to measure positive and negative metacognitions, and unhelpful coping strategies. For the scope of this study, one item: "*Worrying helps me cope*", was selected. The participants were asked to score this statement on an eleven-point Likert-scale ranging from *not at all agree* (0) to *strongly agree* (100), and consequently higher scores on this single item indicate more worrying and rumination.

Burnout, social support, and anger aimed at child(ren). The level of burnout was measured by asking respondents if they during the two past weeks "*have felt burned out or in the proximity of feeling burned out*", whereas social support was measured by asking the parents to rate the following statement; "*I have received sufficient social support of immediate people in close relationships*". The items were scored on a four-point Likert-scale ranging from *not at all agree* (0) to *almost every day* (4), and thus higher scores indicate greater burnout severity and greater social support, respectively.

Additionally, anger aimed at child(ren) was measured by asking respondents "*if they were angrier and frustrated toward their child(ren) than usual during the two past weeks*". The item was scored on a five-point Likert-scale ranging from *not at all agree* (1) to *strongly agree* (5), and higher score is associated with more anger towards their children during a two-week period.

Statistical analyses

Statistical analyses were performed using RStudio Software (version 1.2.5042). We used an alpha level of .01 for all statistical tests. First, descriptive statistics, levels of parental stress and prevalence rates for depression and anxiety across different subgroups were computed. The level of parental stress among different subgroups (i.e., parental role, marital status, number of children and pre-existing psychiatric diagnosis, education level and occupation), was assessed using independent sample t-tests. A one-way analysis of variance was used to explore the level of parental stress among different age-groups. Chi-square statistics were computed for comparing age groups.

Second, a two-step hierarchical multiple regression model was conducted with parental stress as the dependent variable to explore the influence of risk and protective factors/predictors on parental stress. A second hierarchical multiple regression model was performed to explore the predictors of depressive and anxiety symptoms. Pre-existing factors (i.e., parental role, parental age, marital status, number of children and pre-existing psychiatric diagnosis) were entered at step one and level of parental stress was entered at step two in the regression model. In the regression analyses, multicollinearity and other assumptions were checked, in particular, if the multicollinearity assumption was violated (if $VIF < 5$ and $Tolerance > 0.2$) (32). Given the large sample size, a more conservative significance criterion of .01 was pre-defined. Furthermore, part correlation was reported,

which is a measure of the strength of the relationship between two continuous variables, while controlling for other variables. Thus, the part correlation makes it possible to investigate the relative strengths of the predictors.

The survey involved voluntary participation, thus being susceptible to over- and under-sampling of certain subgroups. To take the most conservative and accurate approach concerning inference to the adult population, all over- and under-represented subgroups were assigned appropriate post-stratification weights proportionate to the distribution of each subgroup in the population. More weight was assigned to underrepresented units and less weight to overrepresented units. Sex, education, geographic region, and ethnic distribution proportionate to each ethnic group were weighted to represent their exact distributions and frequencies in the population. Figure 1 presents the precise distributions used for the calculation of these post-stratification weights. Post-stratification weights were assigned using the R-package “survey.” An iterative algorithm (i.e., raking ratio estimation) was further used to avoid the circumstance in which the matching of the distribution of one factor unmatched the distribution of other factors. This iterative algorithm post-stratifies factors by turn, leading to a converging set of weights for each factor that matches the population distribution. All the main analyses (i.e., prevalence estimations and all three regression models) and the estimates provided involve the use of this representative, weighted, and adjusted sample.

Moreover, the sensitivity analyses involving solely the participants obtained through random selection. Approximately 70% of the participants in the present study were randomly obtained, leaving 30% of the participants in the main analysis non-randomly reached. Consequently, we selected a random and post-stratified proportion (i.e., subsample) of only those participants who were obtained by the random selection technique through the Facebook Business algorithm. This was used in sensitivity analyses to assess further the robustness and the replicability of the main results stemming from the original sample. These sensitivity analyses were additionally conducted following the matching of the demographic subgroup to their exact distribution in Norway (e.g., sex, education levels, marital status, and psychiatric diagnosis). The degree to which these sensitivity analyses involving randomly selected participants replicated the main findings will be reported.

Results

Levels of Parental Stress

Table I shows the mean levels of parental stress across different subgroups in the sample. Mothers (vs. fathers), parents living with more than two children in the household, high-educated parents, parents with a pre-existing psychiatric diagnosis and parents who were currently employed, reported significantly higher levels of parental stress. In our sample, 452 (16%) of the parents reported having a pre-existing psychiatric diagnosis, which reflects the lower end of the known rate of psychiatric disorders in the adult population of Norway; between 16 to 25% (33). Among the four age-groups, the highest levels of parental stress were reported by the youngest parents (age group 21–44 years). An one way analysis of variance (ANOVA) showed that the effect of age was significant, $F(3,2864) = 54.05, p = .001$. Post hoc analyses, using the Scheffé post hoc criterion for significance, indicated a significant difference, $p < .001$, in levels of parental stress between the two youngest age groups (21–30 years, 31–44 years) and age group three (45–64 years).

The parents who reported that they were home with their children and predominantly followed the distancing protocols by socially distancing from public activity and peers at least 10 out of 14 days, had significantly higher levels of parental stress ($M = 7.24, SD = 3.18$),

compared to parents who did not isolate in the same manner ($M = 6.55$, $SD = 2.95$), $t(2863) = -4.83$, $p < .001$.

Symptoms of Depression and Anxiety

The mean level of depression was $M = 6.48$, $SD = 5.21$ and anxiety, $M = 5.24$, $SD = 4.35$. Symptoms of depression- and anxiety above the diagnostic cutoff among the participating parents are reported in Table 2. For the total sample, the reported prevalence above standardized cutoff levels was 25.36% for depression and 24.12% for anxiety. The prevalence of both depression and anxiety symptoms was highest among the youngest parents (age group 21–30 years). An ANOVA showed that the effect of age was significant for depression, $F(3,2864) = 25.35$, $p < .001$. Post hoc analyses, using the Bonferonni post hoc criterion for significance, indicated a significant difference, $p < 0.01$ in levels of depression between the youngest group 21-30 and rest of the age categories. The same pattern was present for anxiety with an overall effect of age $F(3,2864) = 26.97$, $p < .001$, and Bonferonni post hoc test revealing significant differences between the youngest age categories and age group three (45-64). The parents who reported that they were home with their children and predominantly followed the distancing protocols by socially distancing from public activity and peers at least 10 out of 14 days, had significantly higher symptoms of depression (29%) $t(2863) = -6.37$, $p < .001$. A similar trend was also found for the percentage of parents meeting the diagnostic cut-off (%) for anxiety (27%), compared to parents who did not isolate in the same manner (15%), $t(2863) = -6.31$, $p < .001$.

Predictors of Parental Stress

Regression statistics are reported in Table 3. The hierarchical multiple regression revealed that at step one, the most important predictor of parental stress was parental age, which explained 21% of the variation in parental stress and. Pre-existing psychiatric diagnosis also contributed significantly to the regression model accounted for 12% of the variation in parental stress. Finally, number of children explained an additional 11% of the variation in Parental stress. Neither parental role (mother vs. father) and marital status were significant predictors of Parental stress.

The most important predictor of parental stress added at step two, was the Angry at child predictor, which uniquely explained 41% of the variation in parental stress. Burnout explained 11% of the variation in parental stress. Similarly, Social support an additional 11% of the variation in parental stress. Together the three independent variables accounted for 63% of the variance in Parental stress. Neither worry or self-efficacy were significant predictors of Parental stress. A second hierarchical multiple regression was conducted with depressive- and anxiety symptoms as the dependent variable. Parental role and age, pre-existing psychiatric diagnosis, number of children and marital status was entered at step one of the regression and parental stress was entered as risk factor at step two. As shown in Table 4, the hierarchical multiple regression revealed that at step one, the most important predictor of symptoms of anxiety was pre-existing psychiatric diagnosis, which explained 39% of the variation in symptoms of anxiety. Parental role (mothers vs. fathers) also contributed significantly to the regression model accounted for 17% of the variation in symptoms of anxiety. Finally, parental age explained an additional 16% of the variation in symptoms of anxiety. Together the three independent variables accounted for 72% of the variance in symptoms of anxiety. Number of children and marital status were not significant predictors of symptoms of anxiety.

A similar trend was revealed for the symptoms of depression, where the hierarchical multiple regression revealed that at step one, the most important predictor of symptoms of depression was pre-existing psychiatric diagnosis, which explained 38% of the variation in

symptoms of depression. Parental role (mothers vs. fathers) also contributed significantly to the regression model accounted for 16% of the variation in symptoms of anxiety. Finally, parental age explained an additional 18% of the variation in symptoms of anxiety. Number of children and marital status were not significant predictors of symptoms of anxiety.

Together the three independent variables (pre-existing psychiatric diagnosis, parental role and parental age) accounted for 72% of the variance in both symptoms of anxiety and depression.

Sensitivity analysis was conducted to investigate the robustness of the main findings. The results from the sensitivity analyses involving only the randomly obtained participants with subgroups precisely matched to population parameters revealed indifferent prevalence estimates for depression (22.63%) and anxiety (21.40%) as compared to the full sample (25.38% and 24.12%), respectively, revealing nearly identical estimates as the main findings and providing further support for the robustness of the presented results. Furthermore, the main findings from the regression analysis were replicated in the sensitivity analysis.

Discussion

The present study adds to the literature on time-sensitive studies investigating parental distress among subgroups in the parental population during the COVID-19 lockdown. Overall, the finding that almost 25% of the parents reported both anxiety and depression at clinical significance and that they have felt burned out, reflect the burden and detrimental disruption of daily life routine that parents have experienced during the COVID-19 lockdown. In our study, mothers, reported more parental stress compared to their male counterparts. A similar gender difference was found for anxiety- and depression symptomatology, where more mothers reported symptoms of anxiety (36%) and depression (34%) above cutoff points, than fathers (14%). Nevertheless, parental role was not a significant predictor of parental stress. The tendency that mothers experience more stressed and burned out during COVID-19 lockdown, is consistent with results reported in a comparable study, with a large sample size ($N = 1,226$), where mothers showed significantly higher psychological distress than fathers (8). Similarly, mothers significantly reported higher parental burnout than fathers during COVID-19 lockdown in a study among Iranian parents (34). This gender gap in experienced parental distress, may indicate that mothers experience more stress due to pressures of caregiving responsibilities and burden, than fathers when attempting to balance work and family. This pattern is consistent with studies indicating that men maintain more distinct boundaries between employment and domestic activities than home-working women did (35). However, of interest, an opposite trend was reported in a similar study among American parents, where fathers reported higher rates of generalized anxiety and depression than mothers (9), indicating that gender gaps differ according to cultural differences. An additional finding in the current study was that the most important predictor of parental stress was parental age, which explained 21% of the variation in parental stress. Younger parents aged 21-44 years reported significantly higher levels of parental stress. The highest levels of symptoms of anxiety and depression symptoms was found among the youngest parents (21–30 years), with 37% reporting symptoms above cutoff points for anxiety and 38% for depression.

These findings may reflect a general vulnerability among younger parents, with less experience at parenting, as well as the increased burden of having younger children to care for. Our study's findings corroborate those of Marchetti and colleagues (36), who found that greater parenting-related exhaustion was predicted by having younger children. In addition, this finding among young parents, is also supported by research suggesting that younger age

is more associated with postnatal depression (37, 52). Also, number of children explained an additional 11% of the variation in parental stress.

The tendency that parents with a pre-existing psychiatric diagnosis reported significantly higher levels of parental stress, accompanied by the tendency that pre-existing psychiatric diagnosis explained 12% of the variation in parental stress, and 39% and 38% of the variation in symptoms of anxiety and depression, respectively, suggests that people with preexisting mental health conditions may be more susceptible to stressors associated with COVID-19 lockdown, as also suggested in preliminary studies (38, 39). In addition, burnout as risk factor further explained 11% of the variation in parental stress. Social support, which is considered as a sufficient protective factor for parental perceived stress (22, 23), further explained an additional 11% of the variation in levels of parental stress, which is in line with the literature suggesting social support a protective factor for excessive anxiety among parents (24). A similar trend was, however, not found for self-efficacy.

Our findings further demonstrate that higher levels of parental stress were associated with more depression- and anxiety symptomatology. The presented prevalence of anxiety and depression symptoms is consistent with research highlighting the detrimental mental health consequences of isolation and quarantine in the general population (40, 54, 55). Among the studies where mental health responses among quarantined parents during the COVID-19 pandemic have been explored specifically during lockdown-periods, the results are comparable with findings which indicate a significant linkage between COVID-19-related stressors, high symptoms of anxiety and depression and parental perceived stress (6). Specifically, among the studies with a high sample size, who have reported a significant linkage between parents' caregiver burden and anxiety- and depression symptomatology among quarantined parents (7, 9) and that greater parenting related exhaustion was predicted by parental psychological distress (41).

Twenty-nine percent of the participating parents in the current study reported that they were angrier at their child(ren) than usual during the lockdown period. Also, the most important predictor of parental stress was the angry at child predictor, which uniquely explained 41% of the variation in parental stress. Thus, it could be that the increased burden on parents due to home confinement has led to more anger expression and perceived burnout, significantly associated with parental stress, which in turn is significantly associated with depression and anxiety symptoms. These findings are in accordance with a considerable amount of literature indicating that anger and parental stress are strongly associated (17-19) and that higher levels of burnout are associated with higher levels of anger expression (13-15). There have been, and still is, an extensive social concern among experts about the well-being of children, during the ongoing pandemic, who are acutely aware of their parents' and caregivers' levels of stress, depression, and anxiety (42-44). Stress experienced by adults is often mirrored in children; children look to parents and significant adults regarding how to manage their emotions and react following a disaster (45). Given the adverse outcomes of these disorders on children (46-48), such as an increased risk for emotional disorders in the offspring, this may be a cause of concern and will be important to monitor in the forthcoming period.

School closing and social distancing may be the best defense against an outbreak before an effective vaccine can be developed and produced in large quantities. The efficacy of such mitigation strategies in impeding viral transmission chains has been debated frequently in the wake of the ongoing COVID-19 pandemic (49, 50). In particular, recent studies suggest that school closures alone would prevent around 2–4% of deaths during coronavirus outbreaks and have concluded that they have low effects on viral transmission chains compared to other social distancing interventions (51). Simultaneously, the present study suggests that these lockdown strategies are associated with a detrimental impact on parental mental health,

including high levels of parental stress and symptoms of depression and anxiety, in particular for those who adhere to containment strategies. In fact, parents who followed the distancing protocols, including being home with their children had significantly higher symptoms of anxiety and depression compared to those who were less at home. Thus, being home and adhering to the protocols made it more likely that a given parent met the criteria for clinical depression.

Taken together, the current study's findings add to the existing literature by providing novel knowledge on the mental health impacts of the currently employed mitigation strategies, which are identical across countries and continents. Additionally, the COVID-19 pandemic provides historically rare opportunities for studying mental health responses among different subgroups in the population, including parents. These opportunities also give rise to possibilities to improve mental health services specifically aimed at well-being and mental health among parents and families. The findings in preliminary studies, as the current one, have several implications for policy on both meso- and macro-level considerations and represent potential aims for clinical interventions. Informative research on the mental health implications of the current mitigation strategies on parents and families are strongly needed for policy makers to evaluate the impact of these strategies and subsequently make informed decisions aimed at reducing viral transmission and protecting the vulnerable while simultaneously protecting parents and children against adverse mental health outcomes. The high level of reported parental distress among the isolated parents in the current study, taken together with findings reported in other recent studies on parenting-related stress during COVID-19 lockdown, strongly suggests that public health professionals conducting post-pandemic surveillance for mental health responses should consider the identification of mental health problems in parents and their children. An evaluation of parental stress and psychopathology levels further provides a foundation informing what parents are struggling with during the present pandemic, informing the development of interventions to reduce these increases in parental stress and mental health responses. Moreover, the association between parental stress and anger documented in current and recent studies, which is further associated with increased risk of child abuse and neglect, especially among the youngest children, urges the need for health care providers to integrate children's welfare in future risk reduction and preparedness. Because pandemics represent a unique social crisis and do not include congregate sites for prolonged support and recovery, they require specific response strategies to ensure the mental health needs of parents and their children.

Strengths and weaknesses of the study

The current study capture time-sensitive information regarding the detrimental effects of distancing protocols on parental distress and explored the relationship of parental stress and multidomain factors during the COVID-19 lockdown in a large and random sample. Similar protocols are applied globally, making its findings generalizable across cultures employing similar protocols. Another strength of the present study includes the large and random sample of parents experiencing identical government-initiated interventions across the measurement period. No further information was given concerning modification of these strategies, controlling for expectation effects. The lack of pre-pandemic baseline measures from the sample and the cross-sectional nature impairs the ability to draw causal conclusions based on the results. This issue may be solved in future research by investigating parental stress across multiple time points. Also, some variables (i.e., burnout, social support and anger aimed at child(ren)) were measures on unvalidated single items. Although full scale items would capture specific constructs more sufficient, single items are useful to capture specific constructs without compromising practical constraints, including survey length and respondent burden) which again may compromise sample size.

Conclusions

Novel evaluations, including cost-benefit analyses of the effectiveness of the current mitigation strategies on viral transmission chains compared to their aversive associations with mental health, are warranted. Moreover, the results of the present study support the notion that mental health problems may be piling up as a consequence of the pandemic, with isolation, the work burden on parents, and the stress potentially caused by the loss of income and employment revealed to be associated with increased mental health problems. In addition to the immediate impacts revealed by the present study, there is a need for forthcoming studies to monitor long-term aversive mental health outcomes among parents and children. It will be important to investigate how predictors measured at an earlier point will predict mental health outcomes generally and parental stress, specifically after a longer period with the applied mitigation strategies. This research highlights the importance of considering the aversive impact of social distancing interventions on families across the world during the fight against the coronavirus disease and thus provides timely information to clinicians and health policy makers.

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Table I. Mean Level of Parental Stress Across Subgroups

	<i>N (%)</i>	PS <i>M (SD)</i>	<i>p</i> - value	<i>t</i> -value or <i>F</i> -value	Effect size
Total sample	2,868	6.86 (3.11)			
Parental role			<.001	5.77	.29
Mother	2,278 (79.4)	7.2 (3.2)			
Father	587 (20.5)	6.3 (2.9)			
Parent age			<.001	54.94	
21-30	359 (12.5)	7.4 (3.1)			
31-44	1,728 (60.3)	7.3 (3.1)			
45-64	768 (26.8)	5.7 (2.8)			
65+	13 (0.5)	5.2 (2.6)			
Marital status			.90	0.12	.01
Married/cohabitating	2,447 (85.2)	6.88 (3.15)			
Single parent	421 (14.7)	6.88 (3.15)			
Number of children			<.001	3.96	.20
1 child	2,407 (83.9)	6.99 (3.13)			
2 or more children	461 (16.1)	7.63 (3.19)			
Pre-existing psychiatric diagnosis			<.001	5.69	.31
Yes	452 (7.82)	7.7 (3.4)	.		
No	2,416 (3.1)	6.7 (3.1)			
Occupation			.016	2.39	.11
Employed	2,241 (78.1)	7.12 (3.11)			
Unemployed	627 (21.9)	6.77 (3.27)			

Note. All reported inferential statistics are based on the weighted and representative sample
 PS = *The Danish Parental Stress Scale*, Effect sizes are calculated based on Cohen's *d*.

Table 2. Prevalence of Depression- and Anxiety Symptoms Above Diagnostic Cutoff Across Subgroups

	<i>N (%)</i>	<i>N (%)</i> PHQ-9	<i>N (%)</i> GAD-7
Total sample	2,868	659 (25.4)	667 (24.1)
Parental role			
Mother	2,281 (79.5)	519 (36.3)	480 (34.0)
Father	587 (20.5)	209 (14.55)	210 (14.6)
Parent age			
21-30	359 (12.5)	123 (38.5)	122 (37.6)
31-44	1,728 (60.3)	420 (26.5)	434 (25.9)
45-64	768 (26.8)	115 (16.8)	111 (14.3)
65+	13 (0.5)	1 (8.6)	0 (0.0)
Marital status			
Married/cohabitating	2,447 (85.3)	509 (21.9)	532 (21.9)
Single parent	421 (14.7)	150 (37.5)	135 (32.0)
Number of children			
1 child	2,407 (83.9)	566 (26.3)	571 (25.1)
2 or more children	461 (16.1)	93 (19.8)	96 (18.2)
Pre-existing psychiatric diagnosis			
Yes	548 (19.1)	338 (61.7)	312 (57.0)
No	2,317 (80.8)	390 (16.8)	378 (16.3)
Occupation			
Employed	2,090 (72.8)	363 (17.4)	383 (18.3)
Unemployed	775 (27.2)	365 (47.1)	307 (40.0)

Note. All reported inferential statistics are based on the weighted and representative sample
 PHQ-9 = The Patient Health Questionnaire; GAD-7 = The Generalized Anxiety Disorder 7.

Table 3. Summary of Hierarchical Regression Analysis for Variables Predicting Parental Stress

Variable	<i>B</i>	<i>SE</i>	<i>p</i>	sr ²	<i>R</i> ²
Step 1					.08
Parental role (mother/father)	-.17	.18	.32	.03	
Parental age	-.07	.01	<.001	.21	
Pre-existing psychiatric diagnosis	.93	.26	<.001	.12	
Number of children	.45	.12	<.001	.11	
Marital status	-.09	.25	.72	.01	
Step 2					.39
Worry	.02	.05	.64	.01	
Burnout	.48	.10	<.001	.11	
Angry at child	1.06	.07	<.001	.41	
Social support	-.32	.08	<.001	.11	
Difficulty to work from home	.11	.06	.05	.06	
Self-efficacy	-.11	.07	0.12	.04	

Note. All reported statistics are based on the weighted and representative sample

Table 4. Summary of Hierarchical Regression Analysis for Variables Predicting Depressive and Anxiety Symptoms

Variable	<i>B</i>	<i>SE</i>	<i>p</i>	sr ²	<i>R</i> ²
PHQ-9					
Step 1					.27
Parental role (mother/father)	-1.84	.31	<.001	.17	
Parental age	-.09	.02	<.001	.16	
Pre-existing psychiatric diagnosis	5.49	.46	<.001	.39	
Number of children	-.39	.18	.03	.06	
Marital status	-1.07	.45	.02	.08	
Step 2					.35
Parental stress	.51	.05	<.001	.30	
GAD-7					
Step 1					.25
Parental role (mother/father)	-1.43	.25	<.001	.16	
Parental age	-.09	.01	<.001	.18	
Pre-existing psychiatric diagnosis	4.32	.37	<.001	.38	
Number of children	-.22	.14	.12	.04	
Marital status	-.29	.37	.43	.03	
Step 2					.32
Parental stress	.39	.04	<.001	.28	

Note. All reported statistics are based on the weighted and representative sample

Figure 1. Post-stratification weighting of participants.

Sample characteristics	Population distribution used for the calculation of post-stratification weights
<p>Sex</p> <ul style="list-style-type: none"> - Female (79.51%) - Male (20.49%) <p>Geographic region</p> <ul style="list-style-type: none"> - Eastern Norway (58.67%) - Western Norway (27.92%) - Mid-Norway (9.98%) - Northern Norway (3.42%) <p>Education</p> <ul style="list-style-type: none"> - Did not complete Junior High School (0.03%) - Completed Junior High School (2.58%) - Completed High School (18.36%) - Currently studying (4.92%) - Completed University Degree (74.10%) <p>Ethnicity</p> <ul style="list-style-type: none"> - Native (94.59%) - Non-native (Overall 5.41% across different subgroups) <p>Proportion of healthcare and social workers</p> <ul style="list-style-type: none"> - Health care workers (22.90%) - Others (77.10%) 	<p>Sex</p> <ul style="list-style-type: none"> - Female (49.77%) - Male (50.23%) <p>Geographic region:</p> <ul style="list-style-type: none"> - Eastern Norway (58.32%) - Western Norway (20.28%) - Mid-Norway (15.95%) - Northern Norway (5.45%) <p>Education</p> <ul style="list-style-type: none"> - Did not complete Junior High School (0.10%) - Completed Junior High School (25.30%) - Completed High School (37.00%) - Currently studying (6.70%) - Completed University Degree (30.90%) <p>Ethnicity</p> <ul style="list-style-type: none"> - Native (85.59%) - Non-native (Overall 14.10%, weights assigned precisely to each appropriate subgroup) <p>Proportion of healthcare and social workers</p> <ul style="list-style-type: none"> - Health care workers (12.70%) - Others (87.30%)