

Mental Distress of Parents of Children with Atopic Eczema during the COVID-19 Pandemic in Hong Kong

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Abstract

Background: Although wearing masks and frequent application of hand sanitizers were necessary during the COVID-19 pandemic, these practices negatively impacted the severity of eczema in children and caregivers' psychological well-being. **Aim:** To explore the prevalence of parental mental distress during the COVID-19 pandemic and examine the factors correlated with parental mental distress in Hong Kong. **Study design and method:** An explanatory sequential mixed-methods study was conducted for parents of children with AE in 2021. It consisted of an online survey and a follow-up phone interviews for a subset of survey participants. The online survey included baseline demographics of participants, questions related to their lives during the COVID-19 pandemic, their mental distress [quantified by the Chinese version of the Depression Anxiety and Stress Scale (DASS-21)] and eczema severity of their children [quantified by Patient-Oriented Eczema Measure (POEM)]. The telephone interview collected parents' in-depth accounts of the situation they reported. **Results:** 122 participants finished the online survey. 13 participants were phone-interviewed. 36.1%, 34.4%, and 39.3% of participants had depressive, anxiety and stress symptoms respectively. Factors correlated with parental mental distress during COVID-19 pandemic were i) worry about masks affect children eczema; ii) worry about school infection control measures affect children eczema; iii) reduced salary or loss job in COVID. **Conclusion:** Parents of children with eczema are vulnerable to mental distress during the COVID-19 pandemic. Public education and better collaboration between schools and parents are recommended.

Keywords: Mental Health; Eczema; Paediatric; COVID; Hong Kong; Parents.

INTRODUCTION

Atopic eczema (AE) is a prevalent paediatric skin disease, with chronic, relapsing, pruritic and inflammatory skin conditions attributed to skewed type 2 inflammatory response and the skin barrier dysfunction^[1]. The prevalence of AE occurred in children is up to 20% worldwide. AE has significant negative impacts on the quality of life (QoL) and mental health of paediatric patients

with chronic moderately active to severe AE and their parents^[2]. Mothers of children with more severe eczema tend to have a higher degree of stress than mothers whose children without AE^[3]. Apart from the parental stress, studies indicated that the QoL of caregivers such as sleep disturbance, self-exclusion of social activities, disturbance in family activities, and economic burden are significantly associated with the severity of their children's eczema^[4].

According to the recommendation by the WHO, frequent hand washing with soap or use of alcohol-based hand sanitizers are important precautions from being infected or spreading the Coronavirus Diseases (COVID-19). In Hong Kong, the Prevention and Control of Disease (Wearing of Mask) Regulation was implemented in July 2020 with strict restrictions on wearing masks in all indoor and outdoor public areas until further notice. Students are requested to wear masks at school most of the time and have frequent hand washing or use of alcohol-based hand rub. A child is estimated to wash his or her hands a minimum of 5-6 times for half-day schooling. Nevertheless, frequent hand washings can cause flare-ups of hand eczema. Moreover, prolonged wearing of masks would cause the development of contact dermatitis [6]. The flare-ups of eczema cause adverse impacts on quality of life (QoL), emotions and behaviours among children with eczema [6].

Many studies showed the relationship between psychological distress such as stress, anxiety and depressive symptom among the general population and COVID-19 across the world [7]. Studies also showed increased parents' emotional distress during the COVID-19 pandemic, increased parent-child conflict associated with more interaction at home [8]. However, to our knowledge, there was no study focused on the impact of the COVID-19 pandemic on the mental health of parents of children with atopic eczema. Hence a cross-sectional study was performed to assess the impacts of paediatric atopic eczema caregiving on parental mental health during the COVID-19 pandemic.

METHODOLOGY

Study Design

An explanatory sequential mixed-methods study consists of an online survey (via Qualtrics) administered in December 2020 (Part I) and a follow-up qualitative study conducted in January 2021 using individual semi-structured phone interviews with a subset of survey participants (Part II). The online survey aimed to examine the mental health of parents of children AE by the effect of the COVID-19 pandemic; the qualitative part was to explore the eczema caregiving needs and coping strategies in more detail. All respondents who participated in Part I and Part II are voluntary. The study was reviewed and deemed exempt from oversight by the Department of Social Work and Social Administration from The University of Hong Kong. The surveys and interviews were conducted in Cantonese. Informed consent was obtained written and orally for participants of individual phone interviews.

Data Collection

Part I: Internet-based questionnaires

In the quantitative phase, parents of children (age 2-11) with eczema were recruited using poster invitations through social

media (Facebook, WhatsApp and email). The invitation included brief description of the study, the URL and QR code link to a Qualtrics survey designed questionnaires. According to the study performed by Cheng *et al*, 45% of patients with atopic eczema have positive depressive screening [9]. 122 samples are necessary using the formula for the cross-sectional survey [10].

Sample size = $Z_{1-\alpha/2}^2 p(1-p) / d^2 = 4 \times 0.45 \times 0.55 / (0.09 \times 0.09) = 122$.

Measurements

The questionnaire included in the present study was mainly composed of four sections. 1) Sociodemographic characteristics; 2) The impact of the COVID-19 pandemic on families with children suffered from AE; 3) Severity of eczema using Patient-Oriented Eczema Measure (POEM). POEM is a validated scale to measure atopic eczema severity [11]. 4) Mental distress of parents using the Chinese version of the Depression Anxiety and Stress Scale (DASS-21) [12]. It is a validated scale with 21-item self-rate items designed to assess the three aspects of psychological distress of participants. Each subscale contains seven items to measure the constructs of depression, anxiety and stress. 4-point Likert scale (0=did not apply to me at all, 3=applied to me very much or most of the time) was applied for participants to rate the frequency and/or severity of symptoms over the previous week. The total scores of each subscale could be used as reference for identifying the high risk of developing mental problems of respondents.

Part II: Individual Phone Interviews

Based on the finding of the quantitative study, survey respondents were invited to participate in the follow-up individual telephone interview to collect parents' in-depth accounts of the situation they reported. Survey participants were voluntary to leave their contact for a follow-up interview from the online questionnaire. The individual interviews were conducted at the participants' preferable time. All interviews were conducted by semi-structured interview guide (Table 1). Each interview lasted around 45 minutes and consisted of open-ended questions to examine i) factors of participants' pediatric eczema caregiving experiences on their mental health; ii) how lives changes during the COVID-19 pandemic correlated to their mental health; iii) potential supportive factors to their psychological well-being in the eczema caregiving journey. Thematic analysis was adopted to identify commonalities, relationships, and differences in participants' responses [13]. Common themes were identified within different categories, facilitating a hierarchical coding method in which broad themes were identified to encompass more specific codes and/or patterns.

Statistically analysis

For online survey, all data were analysed by SPSS (Version

26.0, IBM Corp.). Independent t-test was used to compare the two continuous variables if normally distributed. Mann-Whitney test was used for comparison between two continuously variable if skew distributed. Chi-square test was used to compare categorical variables. Statistically significant is inferred as 0.05.

For individual phone interview, NVivo (version 12.0, QSR International) was used to facilitate data management, coding, formulating themes and analysis. All Interviews were conducted in Cantonese, audiotaped and transcribed verbatim.

Table 1: Semi-structural interview guide

- | |
|---|
| <p>a. Please briefly describe your experience of caring for a child with eczema?</p> <ul style="list-style-type: none">- What is the most challenging aspect?- What factors affect your mental health?- Which aspect of your life is most affected by taking care of a child with eczema?- Has caring for a child with eczema changed your relationship with others? If yes, please describe <p>b. When you encounter difficulties,</p> <ul style="list-style-type: none">- How do you feel? What are you struggling with?- How do you face those challenges and difficulties? <p>c. During the COVID-19 pandemic,</p> <ul style="list-style-type: none">- did it affect your mental health? If yes, please describe it?- Did those prevention measures affect your child's eczema?- Will those changes affect your care of children with eczema?- What method did you use to help you cope with the difficulties? Which methods are helpful? <p>d. Generally speaking, do you have any support when taking care of children with eczema?</p> <ul style="list-style-type: none">- How did you hope your family and friends support you?- How do you hope the community can support you? |
|---|

RESULTS

Part I: Internet-based questionnaires

Sample characteristics

129 participants finished the online survey. 7 participants were excluded due to incomplete data entry. 122 participants were included. 98 (80.3%) participants are mothers. 89 (73%) parents are in the age group 35 to 44. Education level of 81 (66.4%) parents are University. Half of participants have two or more children. Table 2 shows the study participants' sociodemographic characteristics.

The severity of eczema in children and related information

The perceived severity of paediatric eczema reported by parents, the POEM scores, and other related children eczema caregiving information are shown in Table 3.

The mental distress of participants during COVID-19

Among 122 participants, 44 of them had depressive symptoms, 42 of them had anxiety symptoms and 48 of them had stress symptoms. The prevalence of participants with depressive symptoms, anxiety symptoms, stress symptoms were 36.1%, 34.4% and 39.3% respectively.

Information regarding participants' lives during the COVID-19 pandemic

49 (40.2%) respondents reported an impact of COVID-19 on their children eczema. Table 4 shows the information regarding participants' lives during the COVID-19 pandemic.

Correlation between different factors and the presence of mental distress

Factors significantly correlated with depressive, anxiety and symptom simultaneously were i) reduced salary or loss job in COVID; ii) worry about masks affect children's eczema; iii) worry about school infection control measures affect children's eczema.

Factor significantly correlated with depressive and stress symptom simultaneously was less go out with children in previous week.

Factor correlate with depressive symptom only was respondent as eczema sufferer. Factor correlate with anxiety symptom only was respondent as the main carer. Factors correlate with stress symptom only were i) higher monthly expense on eczema; ii) children with special education need; iii) no maid at home. (Table 5).

Part II Individual Phone Interviews

Characteristics of participants and characteristics of eczema in children

13 survey respondents (12 females, 1 male) participated in semi-structured individual phone interviews. Table 2 shows the sociodemographic characteristics of the 13 participants. Table 3 shows the severity of eczema in children and related information of qualitative interview participants.

Summary of themes and subcategories derived from the interview data

Content analysis of the interview data identified three main themes, and subcategories were identified under each major theme. Table 6 shows these main themes and subcategories derived from the interview data.

Theme one: Factors of life changes during COVID-19 pandemic related to parental mental distress

A. Worry about use of mask and hand sanitizer adversely affect children eczema condition

All participants felt worried and stressed when need to apply alcoholic hand sanitizer on their children. Many participants tried different kinds of hand sanitizer, and some resulted in a flare-up of eczema. A similar situation occurred in choosing masks. All participants found it challenging to choose a suitable mask for their children, especially during the early phase of the pandemic. Some children had significant deterioration of facial skin condition after the use of masks. However, after a few months of experience, most participants could choose suitable masks and hand sanitizer for their children.

B. More conflicts due to work from home (WFH)

Many participants shared that they had more time to monitor their children when they WFH but it also triggered their mental distress related to non-stop scratching in children. Some parents shared that they preferred to work in the office because they had a moment of relief from the tension of monitoring their children "non-stop scratching".

C. More conflicts due to changes in social life in children

Eight participants mentioned that during the COVID-19 pandemic, fewer outdoor activities and school lives generate significant mental distress. Since children stayed at home more frequently and with fewer outdoor activities, they had less distraction from their skin condition. The frequency of scratching increased.

Theme two: parental mental distress induced by eczema caregiving process

A. Itchy and non-stop scratching

Most children with moderate to severe eczema scratch a lot: "scratch whole day". They would scratch to an extent of "skin bleeding" or "full of blood on the bed". Some children may "scream" or "cry continuously" when they feel very itchy. Some parents felt "angry", "stressful", "irritated", "crazy" when their children non-stop scratch. Some parents hit children's hands whenever they found their children scratch. Some parents kept an eye on their children since they worry that scratching would worsen their eczema. Many parents used long pants and bandages to cover itchy areas.

B. Sleep disturbance

Many children wake up and scratch a few hours at night. Most parents slept together with their children. Some parents kept hugging children or grabbing their hands while sleeping to prevent them from scratching. Scratching behaviours significantly affect parents' quality of sleep. Many parents scolded or even hit their children during tackling their children scratching. Many children have a better sleep after 5 am but parents need to work in the early morning. Most parents felt "very tired", "hopeless", "frustrated", "depressed" every day because of sleep disturbance.

C. Frequent change in treatment due to ineffectiveness

All parents agreed that steroid was the most effective treatment, but all of them worry about long-time side effects. Moisturizer is important for skincare, but all parents found it challenging to find a suitable cream. A common phenomenon was a significant improvement in skin for the first week after applying a new moisturizer, but skin deteriorated again next week. Another common practice among parents was to keep changing between western medicine and traditional Chinese medicine (TCM). Parents were hesitant to use topical steroids because of long term side effect. TCM was sometimes useful but sometimes it worsened the skin condition.

D. Marital conflicts in treatment alternatives and skincare management

The difference in opinions among spouses were common and mainly included i) whether they should follow western medicine or TCM; ii) frequency of using moisturizer; iii) whether to follow up in government clinic or private dermatologist (better medication but more expensive); iv) whether to receive allergic test. Many parents hoped to find the root cause and tried an allergic test but their spouse felt

that allergic tests were expensive and doubted their accuracy and usefulness. Those conflicts between spouses affected marital relationships and induced mental distress.

E. Food avoidance due to food allergy

Many participants avoided different kinds of food for their children in daily lives. The most common food to avoid are

eggs, milk and sugary food or beverages as triggers of eczema flare-up. They mainly worried about eczema flare-up when taking those foods. Most of them mainly have meals at home and seldom go to restaurants. Some parents bring their own food to avoid party food in social gatherings. Some parents avoided social gatherings with their children because of limited choice of food.

F. Comments from relatives, friends and strangers

Common questions/comments included "why the skin condition so bad?" "didn't you try that kind of cream?" "You should try to see that doctor/practitioner" when they met friends or relatives. Those questions or comments made parents feel "irritated" and "annoyed".

Theme three: Potential supportive factors to parental mental health in paediatric eczema caregiving

A. Gain useful information about treatment alternatives and skincare advice from peer sufferers by social media

Their commonly used social media were Facebook, WhatsApp or group chat on websites. Most parents felt psychological relief or gained empathy when they shared their eczema caregiving experience with other parents who also had children with severe eczema. Many parents felt social media have information on eczema and skincare management but it is difficult for them to differentiate whether that information is accurate or not.

B. Supports from family members or friends

Many participants reported that it is helpful if their family members help them to look after their children for a few hours. Those "free" times allows parents to physically and mentally relieve themselves.

C. Helps from the domestic helper

Many domestic helpers helped parents monitor skin conditions and applied medication/cream for children if both parents went to work. Some parents mentioned that a domestic helper is the most critical partner for tackling paediatric eczema.

Table 2: Participants' sociodemographic characteristics

Variables	Online survey (Quantitative n=122)	Phone interview (Qualitative n=13)
Male	24 (19.7)	1 (7.7)
Female	98 (80.3)	12 (92.3)
Age group	18 (14.8)	1 (7.7)
25-34	89 (73.0)	12 (92.3)
35-44	15 (12.3)	0 (0)
45-54		
Marital status	116 (95.1)	12 (92.3)
Married	6 (4.9)	1 (7.7)
Divorced / not married		
Educational level	1 (0.8)	0 (0)
Primary	24 (19.7)	1 (7.7)
Secondary	97 (79.5)	12 (92.3)
College/University		
Total number of Family member	2 (1.6)	1 (7.7)
2	44 (36.1)	5 (38.5)
3	56 (45.9)	6 (46.1)
4	14 (11.5)	1 (7.7)
5	6 (4.9)	0 (0)
Six or more		
Number of children in the family	53 (43.4)	6 (46.2)
1	65 (53.3)	7 (53.8)
2	4 (3.3)	0 (0)
3		
Number of children with eczema	108 (88.5)	13 (100)
1	13 (10.7)	0 (0)
2	1 (0.8)	0 (0)
3		
Children educational level		9 (69.2)
Kindergarten	65 (53.3)	2 (15.4)
P1	14 (11.5)	2 (15.4)
P2-P4	32 (26.2)	0 (0)
P5-P6	11 (9.0)	
Working status	35 (28.7)	5 (38.5)
Housewife	69 (56.6)	7 (53.8)
Full time	15 (12.3)	0 (0)
Part-time	1 (0.8)	0 (0)
Unemployed / fired	2 (1.6)	1 (7.7)
Other		
Domestic helpers (yes)	59 (48.4)	7 (53.8)
Number of working persons at home	1 (0.8)	0 (0)
0	44 (36.1)	7 (53.8)
1	72 (59.0)	6 (46.2)
2	5 (4.1)	0 (0)
3		
Household Income (HK\$)	4 (3.3)	0 (0)
<10000	10 (8.2)	0 (0)
10000-19999	16 (13.1)	3 (23.1)
20000-29999	18 (14.8)	5 (38.5)
30000-39999	12 (9.8)	2 (15.4)
40000-49999	58 (47.5)	3 (23.1)
>50000	4 (3.3)	0 (0)
Not enter		
Supportive services received (yes)	7 (5.7)	3 (23.1)
Psychiatric medical treatment (yes)	1 (0.8)	0 (0)
Children with special education need (yes)	15 (12.3)	1 (7.7)

Table 3: The severity of eczema in children and related information

Variables	Online survey (Quantitative n=122)	Phone interview (Qualitative n=13)
Eczema severity quantified by POEM*	10 (8.2)	0 (0)
Normal	19 (15.6)	0 (0)
Mild	55 (45.1)	8 (61.6)
Moderate	33 (27.0)	3 (23.0)
Severe	5 (4.1)	2 (15.4)
Very severe		
POEM score of children	12.5+/-6.8	15.1 +/- 5.6
Eczema child age	5.4+/-2.7	4.3 +/- 2.2
Expense on eczema treatment (HK\$/month)	500 (187-1312)	500 (200-1700)
Eczema Treatment received	44 (36.1)	6 (46.2)
Western medicine (without steroid)	56 (45.9)	6 (46.2)
Western medicine (topical steroid)	33 (27.0)	5 (38.5)
TCM (oral)	23 (18.9)	3 (23.1)
TCM (external ointment)	59 (48.4)	9 (69.2)
Self-purchased oral supplement	110 (90.2)	13 (100)
Self-purchased skincare products		
Respondent as the main carer	109 (89.3)	12 (92.3)
Sleep together with children in eczema	74 (60.7)	9 (69.2)
Respondent as an eczema sufferer	31 (25.4)	3 (23.1)

*Normal: POEM 0-2; Mild POEM 3-7; Moderate POEM 8-16; Severe POEM 17-24; Very severe POEM 25-28

Table 4: Information regarding participants' lives during the COVID-19 pandemic (N=122)

Variables	No. (%)
Perceived impact of COVID-19 on child's eczema (yes)	49 (40.2)
Contact COVID-19 at work	10 (8.2)
Go out with children last week (number of day)	18 (14.8)
0	84 (68.9)
1-3	18 (14.8)
4-6	2 (1.6)
7	
Attend school last week (yes)	27 (22.1)
Worry about disinfectants affect children 's eczema	17 (13.9)
Not worry	49 (40.2)
A little bit	14 (11.5)
Some	28 (23.0)
Quite a lot	14 (11.5)
A lot	
Worry about mask affect children's eczema	41 (33.6)
Not worry	42 (34.4)
A little bit	11 (9.0)
Some	21 (17.2)
Quite a lot	7 (5.7)
A lot	
Worry about school infection control measures affect children's eczema	41 (33.6)
Not worry	39 (32.0)
A little bit	9 (7.4)
Some	23 (18.9)
Quite a lot	10 (8.2)
A lot	
Attention on disinfectant on child' skin	13 (10.7)
Never	59 (48.4)
Rarely	26 (21.3)
Infrequent	14 (11.5)
Sometimes	10 (8.2)
Frequent	

Table 5: Factors significantly correlated with different kind of mental distress

Condition	Factor	Depressive symptom (n=44)	No depressive symptom (n=78)	P value	Anxiety symptom (n=42)	No anxiety symptom (n=80)	P value	Stress symptom (n=48)	No stress symptom (n=74)	P value
Factor correlate with depressive, anxiety and stress symptom simultaneously	<i>Change in salary in COVID Same</i>	29 (65.9) 15 (34.1)	69 (88.5) 9 (11.5)	0.003	29 (69.0) 13 (31.0)	69 (86.3) 11 (13.8)	0.023	34 (70.8) 14 (29.2)	64 (86.5) 10 (13.5)	0.034
	<i>Reduced / loss job</i>									
Factor correlate with depressive and stress symptom simultaneously	<i>Worry about masks affect children's eczema</i>	7 (15.9) 17 (38.6)	34 (43.6) 25 (32.1)	0.016	5 (11.9) 15 (35.7)	36 (45.0) 27 (33.8)	0.001	9 (18.8) 17 (35.4)	22 (43.2) 25 (33.8)	0.029
	<i>No worry</i>	7 (15.9)	4 (5.1)		5 (11.9)	6 (7.5)		6 (12.5)	5 (6.8)	
	<i>A little bit</i>	9 (20.5)	12 (15.4)		12 (28.6)	9 (11.3)		11 (22.9)	10 (13.5)	
	<i>Some</i>	4 (9.1)	3 (3.8)		5 (11.9)	2 (2.5)		5 (10.4)	2 (2.7)	
	<i>Quite a lot</i>									
	<i>A lot</i>									
	<i>Worry about school infection control measures affect children's eczema</i>	9 (20.5) 12 (27.3)	32 (41.0) 27 (34.6)	0.013	8 (19.0) 11 (26.2)	33 (41.3) 28 (35.0)	0.008	11 (22.9) 12 (25.0)	30 (40.5) 27 (36.5)	<0.001
	<i>No worry</i>	14 (31.8)	9 (11.5)		11 (26.2)	12 (15.0)		13 (27.1)	10 (13.5)	
	<i>A little bit</i>	6 (13.6)	4 (5.1)		7 (16.7)	3 (3.8)		9 (18.8)	1 (1.4)	
	<i>Some</i>									
<i>Quite a lot</i>										
<i>A lot</i>										
Factor correlate with depressive and stress symptom simultaneously	<i>Go out with children last week (number of day)</i>	3 (6.8) 35 (81.8)	15 (19.2) 48 (61.5)	0.011	5 (11.9) 31 (73.8)	13 (16.3) 53 (66.3)	0.765	3 (6.3) 38 (79.2)	15 (20.3) 46 (62.2)	0.027
	<i>0</i>	3 (6.8)	15 (19.2)		5 (11.9)	13 (16.3)		5 (10.4)	13 (17.6)	
	<i>1-3</i>	0	0 (0)		1 (2.4)	1 (1.3)		2 (4.2)	0 (0)	
	<i>4-6</i>									
	<i>7</i>									
Factor correlate with depressive symptom only	<i>Respondent as an eczema sufferer</i>	16 (36.4)	15 (19.2)	0.037	14 (33.3)	17 (21.3)	0.145	13 (27.1)	18 (24.3)	0.832
Factor correlate with anxiety symptom only	<i>Respondent as the main career</i>	42 (95.5)	67 (85.9)	0.1	41 (97.6)	68 (85.0)	0.032	43 (93.8)	64 (86.5)	0.204
Factor correlate with stress symptom only	<i>Monthly expense on eczema (HK\$)</i>	500 (225-1875)	500 (100-1162)	0.575	650 (400-2000)	500 (163-1000)	0.217	1000 (300-2000)	500 (100-1000)	0.041
	<i>Children with special education need</i>	6 (13.6)	9 (11.5)	0.735	7 (16.7)	8 (10.0)	0.287	10 (20.8)	5 (6.8)	0.021
	<i>Help from maid</i>	17 (38.6)	42 (53.8)	0.106	17 (40.5)	42 (52.5)	0.207	18 (37.5)	41 (55.4)	0.049

Shaded area: Not significant

Table 6: Summary of themes and subcategories derived from the interview data

Themes	Subcategories	Frequency (n/%)
Factors of life changes during COVID-19 pandemic related to parental mental distress	Worry about use of mask and hand sanitizer adversely affect children eczema condition	13 (100)
	More conflicts due to work from home (WFH)	8 (62)
	More conflicts due to change in children social life	8 (62)
Themes related to parental mental distress caused by children severity of eczema	Itchy and non-stop scratching	13 (100)
	Sleep disturbance	12 (92)
	Frequent change in treatment due to ineffectiveness	12 (92)
	Marital conflicts in treatment alternatives and skincare management	9 (69)
	Food avoidance due to food allergy	9 (69)
	Comment from relatives, friends and strangers	9 (69)
Potential supportive factors to parental mental health in paediatric eczema caring	Gain information about treatment alternatives and skincare management from peer sufferers by social media (e.g., Facebook, WhatsApp group chat)	13 (100)
	Support from relatives and friends	11 (85)
	Support from domestic helper	11 (85)

DISCUSSION

This study showed that mental distress is very common in parents of children with atopic eczema during the COVID-19 pandemic. Qualitative result of this study suggested that the presence of atopic eczema in children during the COVID-19 pandemic affects parents in multiple domains, including parent-child relationship, parental psychosocial functioning, marital relationships, parental sleep disturbance and financial burden. Those findings concurred with study about parental mental distress due to paediatric atopic eczema [14-17]. The prevalence of parents with any severity of depressive symptoms, anxiety symptoms, stress symptoms were 36.1%, 34.4% and 39.3% respectively. The prevalence is higher than that study findings before the COVID-19 pandemic. In the review performed by Yang *et al.* in 2018, around 30% of parents of eczema children felt stressed and anxious [18]. The prevalence found in this study is also higher than general population. In the study performed by Salari *et al.* in 2020, the prevalence of depression, anxiety and stress among the general population were 33.7%, 31.9% and 29.6%, respectively during the COVID-19 pandemic [19]. The higher prevalence of different kinds of parental mental distress during COVID-19 pandemic indicated COVID-19 pandemic and paediatric eczema have a synergistic effect that negatively impacts those eczema caregivers.

One of the reasons for the synergistic effect might be the worry about negative impact of wearing masks and use disinfectants on AE control of their children. This study showed that worry about masks and disinfectants that may affect children's skin conditions were the common factors that correlated with depressive, anxiety and stress symptoms. Frequent hand washing and the use of masks would exacerbate the severity of atopic eczema. Parents would cautiously use hand soap and masks before the COVID-19 pandemic, but it was unavoidable during the pandemic. Some children might need to continuously wear masks for many hours while going out and frequently wash their hands during school and in daily life. Those factors would unavoidably worsen the control of eczema and parents' anxiety. This postulation is supported by the cross-sectional study conducted by Meting *et al.* during COVID-19 [20]. The dermatological complaints about xerosis (dry skin) and worsening eczema significantly increased 2.44 and 3.57 times, respectively, during the COVID-19 pandemic. While control of atopic eczema in children correlates with parental mental distress, more frequent dermatological complaints reflect increased of mental distress in parents of children with eczema.

Another reason for the synergistic effect of the presence of eczema and COVID-19 is increased conflicts due to work from home (WFH), limited outdoor activities and limited school lives. As shown in qualitative result of this study, during the COVID-19 pandemic, parents, especially those who need to work, had more time to stay at home owing to changes in working patterns, or job status (e.g., unemployment). Engagement in work would distract the agitated feelings induced by eczema-caregiving

issues. On the other hand, schools were closed during the COVID-19 pandemic, and schooling changed to online teaching. Children needed to attend web-based lessons at home during school hours. Parents needed to provide extra guidance to their children in both learning and technical supports, which increase parent-child interaction. Those may also increase mental distress among parents. This postulation is supported by study by Horiuchi *et al.* that during COVID-19 pandemic, school closure, lack of physical activity and social isolation increase parent-child interaction and negatively impacted parental mental distress [21].

The findings of the current study showed that parents of children with eczema are vulnerable to mental distress during COVID-19 pandemic. As mentioned above, various factors are associated with the mental distress of parents in the eczema caregiving process. They include the social stigmatization, disruption in quality of life, dysfunctional family dynamics, inadequate scientific information on skincare products, many eczema myths, and self-blame suffered by childhood eczema caregivers. Public education and better collaboration between schools and parents are recommended. In Hong Kong, public education about the etiology of eczema, symptoms of children with eczema and the psychological needs of children and parents are limited. Besides, lessened social stigmatization in children would significantly improve parents' mental health. However, limited policy or public education are found to increase the awareness of special healthcare needs of children with eczema and the psychological sufferings encountered by the children and their caregivers. More resources provided by the government are recommended to this group of children with special healthcare need at school and social stigmatization in the general public. More educational programmes should be provided for parents and teachers regarding the choice and application of hypo-allergic surgical masks or hand sanitizers to children with eczema.

Result of qualitative and quantitative part of the study showed that many parents worry of mask and hand sanitizer may worsen eczema of their children. They also have limited information regarding treatment and skin-related care product. Many parents browse frequently on social media for information on masks and disinfectants. Parents were overwhelmed by extensive information on the internet in terms of accuracy, fairness and statistically validity. It is complicated for parents to buy a suitable product for their children with eczema. Excessive product choices without proper information guidance would exacerbate the mental distress of caregivers. More comprehensive and scientific information about different kinds of commonly used treatment methods and skin-related products should be provided by the government. Parents might feel less confused, save more time filtering the information and less mentally distressed.

There are a few limitations of the study. Convenient sampling affects the generalizability of this study. The present study

mainly focused on parents in Hong Kong. The situation of the COVID-19 pandemic in other parts of the world might be different from Hong Kong, limiting the generalizability of the results. However, quarantine requirements, work from home and home learning are common practices in many developed countries worldwide. The findings of this study likely reflect the situation in countries and cities with similar infection control practices as Hong Kong.

CONCLUSION

The findings of the current study showed that parents of children with eczema are vulnerable to mental distress during the COVID-19 pandemic. Public education and better collaboration between schools and parents are recommended.

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Competing interests

The author declares no competing interests.

Ethical approval statement

This research study has been ethically approved by the deputy medical superintendent Dr. Waqar Ahmed of the type-D hospital, Latambar, Karak, Khyber Pakhtunkhwa (No. 117/09/21 (Covid 19) and, No. 118/09/21 (Measles) dated: 14 September 2021).

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