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Review

The modifiable biopsychosocial drivers of psychological distress for adolescents with asthma: Implications for Clinical Care

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Educational Aims

The reader will be able:

- To review the evidence of biopsychosocial drivers of psychological distress and asthma in adolescents.
- To examine the clinical implications of causes of psychological distress in asthma care in adolescents.

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ABSTRACT

Purpose: Overwhelming distress exceeds the capacity of healthy coping strategies to feel better using healthy coping strategies alone, resulting in the use of unhealthy coping strategies. Unhealthy coping strategies may exacerbate asthma symptoms and asthma can contribute to overwhelming distress. This study aimed to review the modifiable drivers of overwhelming distress in adolescents with asthma.
Methods: The biopsychosocial drivers of psychological distress for adolescents with asthma were explored within the domains of the modifiable biopsychosocial model of health and wellbeing.
Results: Asthma in adolescents is associated with problems in the domains of environment, developmental outcomes, sense of belonging, health behaviours, coping, and treatment of illness.
Conclusions: The relationship between asthma and psychological distress highlights the need for holistic treatment of asthma. Further research is needed to establish causation between variables and to investigate whether interventions that address either asthma symptoms or biopsychosocial drivers of distress can improve both factors.

INTRODUCTION

Asthma is a significant health problem that contributes to the global burden of disease [2]. The prevalence of asthma is higher in children and adolescents than adults [1–4], and the rate seems to increase over childhood (e.g., 10.2% in 6–7-year olds; 11.3% in 13–14 year olds) [3]. Adolescents with asthma have higher rates of psychological distress than adolescents who do not have asthma [5,6]. One Australian study, for example, found more than 50% of adolescents with asthma had high levels of psychological distress [6]. Many of the causes of psychological distress are common across adolescents with and without asthma, for example, self-consciousness and body image problems [6]. However, some stressors are illness-related [6]. Psychological distress can impair cognitive functions needed for educational outcomes, including attention [7], behavioural inhibition [8] memory [9], planning [10] and flexible decision making [11]. Understanding the asthma-specific determinants of psychological distress is therefore critical for optimal outcomes for adolescents.

Abbreviations: ED, Emergency Department; EIB, Exercise-Induced Bronchoconstriction; IgE, Immunoglobulin E; PA, Physical Activity; PROMIS, Patient-Reported Outcomes Measurement Information System; QoL, Quality of Life.

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BIOPSYCHOSOCIAL MODEL OF HEALTH AND WELLBEING

While there are genetic, biological, social and psychological contributors to psychological distress, optimal clinical care requires an understanding of which factors are modifiable [14,15]. The Biopsychosocial Model of Health and Wellbeing provides an overview of the biological, social, and psychological domains and components that are associated with health and wellbeing healthy environments, developmental competencies, sense of belonging, health behaviours, coping, resilience, and treatment of illness [12,13]. Problems in one or more of this areas is associated with overwhelming psychological distress. Overwhelming distress is unpleasant emotions that exceed the capacity of healthy coping strategies (i.e. self-soothing, relaxation/distraction, social support and professional support) to reduce the distress [14]. When distress exceeds the capacity of healthy coping strategies, people use unhealthy coping strategies to feel better (i.e. negative self-talk, harmful activities, social withdrawal, and suicidality) [15]. Chronic psychological distress during childhood and adolescence is associated with lifelong relationship problems [16], employment problems [17,18] and psychiatric illness in adulthood [19,20]. Chronic use of unhealthy coping strategies to reduce overwhelming distress can result in harm, including disorders developed from unhealthy coping harmful activities (e.g. eating disorders, substance use disorders), criminal charges (e.g., from aggression) and death by suicide. The Biopsychosocial Model of Health and Wellbeing therefore, provides a useful framework to examine the asthma-specific drivers of psychological in adoelscents to inform clinical care.

MODIFIABLE ASTHMA-RELATED BIOPSYCHOSOCIAL DRIVERS OF PSYCHOLOGICAL DISTRESS

Healthy environments

Allergens, and irritants in the physical environmental can exacerbate asthma symptoms. These include allergen-specific immunoglobulin E antibodies [21], airborne irritants, foods (e.g., eggs, cow's milk, and nuts), dust mites, mould, and pollen, animal dander [22,23]. Airborne irritants that exacerbate asthma include aerosols or chemical fumes, cigarette smoke. Viral infections can also trigger asthma symptoms [23].

Social environment factors: A healthy environment also includes a social environment that supports the health and wellbeing of the child or adolescent. A systematic review that included 25 studies of parents and caregivers of children with and without asthma found greater psychological distress in parents and caregivers of children with asthma [25]. The reason for the increased distress in these parents is unknown. Parental psychological distress (in particular, maternal distress) adversely affects asthma severity, control, and medication adherence in children—the reasons are not well understood [24]. In contrast, emotional support by parents is associated with increased perception of treatment control, reduced stress, and a reduced risk of emotional issues in children [26]. A systematic review of 106 studies found that conflict in peer and family relationships (e.g. teasing, arguing, disagreements) is related to increased self-reported asthma symptoms [26]. Professional support also impacts asthma outcomes. Empathetic relationships between patients and physicians that include clear communication, confidentiality, and shared decision-making also important to this population, and promotes honest disclosure of information by young people with chronic disease [69].

The economic environment also affects psychological distress and asthma-care outcomes. Economic disadvantage can be particularly challenging for treating asthma as optimal treatment requires regular preventative pharmacotherapy [27,28] and is associated with poor treatment adherence [26,29]. For parents, childhood asthma can also have indirect economic impacts such as work absences, lost productivity, and healthcare costs [30]. Prevalence of delayed or unmet needs for care due to financial barriers in the United States, for example, is estimated at 8–26.6.% for adolescents [27]. These threats to a healthy environment for adolescents with asthma can increase asthma symptoms and psychological distress.

Developmental competencies

Adolescence is a developmental period that includes widespread biological, physical, and psychological changes [31,32]. Developmental competencies needed to be achieved during childhood for health and wellbeing are a stable sense of identity, emotional and behavioural regulation, interpersonal skills and problem-solving skills [13]. Adolescents with asthma frequently have problems across all four developmental competencies—identity, emotional and behavioural regulation, interpersonal and problem-solving. An increasing desire for independence and rejection of parental modelling [26,35]; difficulty organising time, forgetfulness, conflict with parents and confusion over responsibility of medication-taking [35], increased perception of barriers [36]; difficulty adequately expressing their health concerns or communicating their experience of symptoms [37], perceived social stigma [26]; and lack of engagement in medication decision-making [35] all contribute to issues in these domains. The importance of social feedback for identity formation during adolescence can lead to self-perceptions of being different from their peers and sickly [33], which is related to greater morbidity [33]. A qualitative review of 5 studies found that people with asthma, like individuals with other chronic diseases, thought their condition threatened their autonomy, and in turn their sense of identity [34].

Sense of belonging

Feeling included and valued is a core component of health and wellbeing. A sense of belonging through peer support is associated with medication adherence [26]. Supportive environments are associated with better self-management, asthma control, and improved quality of life [26]. However, many children and adolescents with asthma report feeling socially isolated because of their illness [26,38]. Qualitative studies report adolescents experiencing social isolation due to their diagnosis and a desire not to be seen as an "ill person" or to be treated differently [35]. One qualitative study found that adolescents struggled with the incongruity of being accepted socially, and managing their condition [39]. Strategies used by some to feel a sense of belonging include ignoring symptoms and not taking medication in public [35,39].

Health behaviours

Health behaviours—sleep, nutrition and physical activity—are key components of wellbeing and asthma management [26]. Psychological distress has a bidirectional relationship with health behaviours, contributing to problems and problems causing distress. Distress and rumination can disrupt sleep onset and cause maintenance insomnia and inadequate sleep can contribute to mood dysregulation. Inadequate nutrition can disrupt mood regulation and eating can be used as a coping strategy to reduce distress. Inadequate physical activity affects mood and psychological distress can make it challenging to be active.

Inadequate sleep quality and quantity are more common in adolescents with asthma, as is distress before sleep onset and

maintenance insomnia problems [40,41]. Poor quality sleep is related to increased asthma symptoms [42] and psychological distress [43]. A recent experimental study [42] found that when adolescents had 6.5 hours of sleep per night, they reported more asthma symptoms and quality of life than those who had 9.5 hours sleep.

Nutrition plays a role in the management of asthma in adolescents [44,45]. Consumption of adequate amounts of fruits and vegetables has been associated with a reduced risk of developing asthma, as well as increased asthma control, likely due to components such as antioxidants, fibre, polyunsaturated fatty acids, and vitamin D which may affect immune pathways. In contrast, dairy consumption has been associated with an increased risk of asthma exacerbation. A recent meta-review reported that Mediterranean and vegan diets which encourage consumption of fruits, vegetables, legumes, and whole grains, and reduce emphasis on animal products (namely saturated animal fat and dairy products), may reduce the risk of asthma development and exacerbation [45].

Being overweight also increases the likelihood of having asthma [46,47], more asthma symptoms [48,49], greater asthma-related healthcare utilisation [50,51], and less responsiveness to inhaled corticosteroids [52,53]—all evidence of greater difficulty controlling asthma symptoms.

There is no evidence that adolescents with asthma are overall less physically active than adolescents without asthma [54,55]. In addition to the general health benefits, physical activity in adolescents is associated with better lung function scores, fewer asthma exacerbations, hospital admissions, school absenteeism, and asthma medication usage [55–58]. In contrast, a meta-analytic review of 11 cross-sectional studies found that low physical activity was associated with new-onset asthma and increased asthma symptoms [56]. Physical activity, however, can trigger asthma symptoms of exercise-induced bronchoconstriction leading to the avoidance of physical activity to prevent symptoms [55]. Additionally, uncontrolled asthma can make physical activity more difficult, which also results in avoidance. These unpleasant experiences are greater in adolescents with asthma who are also overweight or obese [55].

Coping

While the Health Theory of Coping suggests that all coping strategies are useful for the purpose of reducing distress [59], strategies can be considered healthy or unhealthy depending on their risk of adverse consequences. For example, healthy strategies include relaxing, distracting or self-soothing activities, social support, and professional support, while unhealthy strategies include harmful activities such as alcohol and drug use, as well as social withdrawal. A recent observational study [14] found that participants at all levels of distress used healthy coping strategies, turning to unhealthy coping strategies when the healthy strategies failed to reduce their distress.

A systematic review of 24 studies found that as with people generally, children and adolescents use a range of healthy coping strategies, including changing position, decreasing activity, taking fluids, relaxing activities such as listening to music, distracting activities such as watching TV, and social support. Interestingly, the review found that asthma patients tended to use different coping strategies than healthy participants and patients with other chronic illnesses. [60]. Similarly, a study of 553 Dutch adolescents aged 12–16 with asthma found that the use of healthy coping strategies prevented a decline in QoL scores [61]. Strategies such as thinking more positively about their condition resulted in higher QoL scores, while strategies such as increased worrying and restricting their lifestyle resulted in lower QoL scores. Positive QoL scores were also seen for adolescents who actively sought information.

Compared with their peers, adolescents with asthma are likely to use more unhealthy coping strategies, such as alcohol, smoking [62–64], and suicidality [65], indicative of overwhelming distress. One study found adolescents with asthma are more likely to smoke than healthy adolescents and continue to smoke to cope with distress [64]. Smoking is particularly problematic in this population as it increases the risk of asthma symptoms and exacerbations and causes a reduced response to asthma medication [62].

Resilience

Resilience is an innate capacity to bounce back after adversity [70]. A perception of one's resilience is important for health and wellbeing. The belief that you can do something—self-efficacy—improves actions [67]. There has been no research on the self-perception of resilience in adolescents with asthma directly. However, self-efficacy and outcome expectations for asthma treatment is associated with better treatment adherence in adolescents [36].

Treatment of illness

Early and effective treatment for biopsychosocial drivers of distress and asthma management is critical to minimise the impact of distress and symptoms on health and wellbeing. It is estimated that many adolescents with asthma have not been formally diagnosed or received treatment [66]. In addition to asthma-related morbidity, these adolescents are likely to be further disadvantaged through absenteeism from school, reduced activities and sleep disturbances [66]. Of those who have been diagnosed and received treatment, treatment adherence varies considerably; estimates range from 49% to 71% [35,68]. Nonadherence contributes to poor disease control and adverse asthma outcomes [36]. In addition to other economic and developmental competency barriers to treatment adherence, other factors associated with poor medication adherence in adolescents include treatment provision factors (lack of perceived need or effectiveness, not understanding how to use medication, forgetting to use medication, healthcare relationship), medication-related factors (e.g., difficulty using an inhaler, side-effects), and social factors (stigma) [26,29,69].

There is a bidirectional relationship between psychological distress and asthma treatment adherence. Psychological distress can impair treatment adherence [29]. Subsequently, asthma that is not adequately controlled can increase the risk of asthma exacerbations, increasing psychological distress [1,70]. Psychological distress may also negatively impact self-efficacy and symptom perception and, in turn, upon medication adherence and other health behaviours, including frequency of healthcare utilisation [71]. Treatment for psychological distress in people generally with asthma typically includes pharmacotherapy and/or psychotherapy for symptoms [72,73] rather than underlying drivers of distress. There is little research on interventions in children and adolescents [72,73].

IMPLICATIONS FOR CLINICAL CARE

This review of the biopsychosocial drivers of overwhelming distress that particularly relate to adolescents with asthma highlights its critical role in assessment and treatment—summarised in Table 1. This distress is not necessarily cause asthma symptoms and asthma may not necessarily cause the distress. However, as adolescence is the time for the onset of most mental illnesses that can have lifelong adverse impacts across functioning, the results

Table 1
Modifiable biopsychosocial domains and components of health and wellbeing and asthma-related vulnerabilities.

	Domain	Components	Asthma-related vulnerabilities
1	Healthy Environment	Physical, social, cultural economic	Allergens and irritants Parental distress Direct costs of medication/ treatment; Indirect financial costs of asthma
2	Developmental competencies	Healthy identity, emotional and behavioural regulation, interpersonal skills, problem-solving skills	Effect of illness on identity formation Behavioural regulation problems with asthma management Parent-child conflict related to medication Problems with responsibility for medication
3	Sense of belonging	Feeling connected to community	Social isolation due to asthma –perceived social isolation and physical isolation
4	Health behaviours	Sleep, nutrition, exercise	Increased likelihood of poor sleep, nutrition Low physicial activity associated with onset of asthma and increased asthma symptoms
5	Coping	Healthy and unhealthy strategies	More likely to use unhealthy coping strategies – alcohol, smoking, suicidality Unhealthy coping strategies exacerbate symptoms
6	Resilience	Sense of innate resilience	
7	Treatment of illness	Early and effective treatments for physical and psychological problems	Asthma is underdiagnosed Treatment adherence

have implications for asthma healthcare provision. Holistic care is warranted that includes:

1. A thorough biopsychosocial assessment for all children and adolescents presenting with asthma symptoms to understand holistic functioning of the adolescent and the context of the family. Ongoing monitoring is needed over time to monitor change.
2. Including children, adolescents and their parents in assessment and treatment planning to ensure the plan is understood, accepted and works for the family. Encourage and support autonomy as appropriate.
3. Coping assessment and planning with all adolescents to ensure they have a coping plan that works for them to cope when they are distressed [15].
4. Referral to and communication between medical, psychological and social service providers as needed to ensure holistic care.

CONCLUSION

This paper provided a narrative review of the literature on modifiable biopsychosocial factors of health and wellbeing that have been shown to be associated with asthma in children and adolescents. Although primarily correlational research, the relationships between asthma with psychological distress and drivers of distress highlights the need for holistic assessment and treatment of asthma. Longitudinal research that measures the domains of wellbeing is needed to better understand the interrelationships between drivers of distress and and asthma outcomes. Clinical trials are also needed to evaluate the extent to which amerliorating the drivers of distress indirectly impact asthma outcomes.

DIRECTIONS FOR FUTURE RESEARCH

Future research is needed to evaluate interventions that target the biopsychosocial drivers of psychological distress in adolescents on asthma and wellbeing outcomes. Longitudinal research that measures the domains of wellbeing is needed.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to disclose.

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