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The psychosocial impacts of vitiligo, psoriasis, and alopecia areata on pediatric patients

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Abstract

Children and adolescents with chronic cutaneous conditions are at risk of experiencing adverse psychosocial effects such as anxiety, depression, and loneliness. The well-being of these children's families may also be impacted by their child's condition. It is important for the quality of life of patients and their families to better understand the psychosocial impact caused by pediatric dermatologic conditions and interventions that help mitigate these effects. This review summarizes the psychological impact of the common pediatric dermatological disorders, vitiligo, psoriasis, and alopecia areata, on children and their caregivers. Studies examining quality of life, psychiatric conditions, and other measures of psychosocial impact in children and caregivers, as well as those evaluating the effectiveness of interventions aimed at addressing psychosocial effects, were included. This review highlights the increased risk that children with these conditions have in experiencing adverse psychosocial effects including quality of life impairment, psychological pathology, and social stigmatization. In addition, the specific risk factors within this population that are associated with increased negative effect such as age and severity of disease are discussed. This review demonstrates a need for increased support of these patients and their families and additional research on the effectiveness of current interventions.

Keywords: adolescent, age of onset, anxiety disorders, autoimmune disorders, caregivers, child, depressive disorder, disease burden, quality of life, social environment

Introduction

Children with dermatologic conditions may experience several adverse psychosocial effects such as depression and anxiety which may impact their long-term development, particularly if they are subjected to stigmatization and bullying. Family members, especially parents, may also be impacted by their children's conditions. Vitiligo, psoriasis, and alopecia areata constitute three chronic common cutaneous disorders in the pediatric population that have been studied in this regard. The authors conducted a comprehensive review of the available English literature on pediatric vitiligo, psoriasis, and alopecia areata, and included all articles discussing the psychosocial impact of these diseases on children and families. Herein, we concisely review the psychosocial impact of vitiligo, psoriasis, and alopecia areata in children and their families, as well as discuss the existing interventions to address them.

Discussion

Vitiligo

Vitiligo is a chronic autoimmune disorder of depigmentation related to an acquired loss of epidermal melanocytes. Lesions typically arise symmetrically on the face, upper chest, hands, elbows, knees, axillae, and/or perineum [1]. Its distribution can be segmental, localized, or generalized. Vitiligo affects approximately 1% of the United States population and is equally prevalent

among men and women [2]. It often presents in childhood or young adulthood, with approximately 50% of cases being diagnosed before 20 years of age [1]. Patients with other autoimmune conditions, particularly thyroid disease, are at increased risk. The pathophysiology of vitiligo is not completely understood but genetic and immunologic factors are likely to play a role [3]. Treatment is aimed at stabilization of active disease and re-pigmentation, and patients exhibit varying responses.

Childhood is a crucial time for psychosocial development including identity formation. Given the visibility of these lesions to others, pediatric skin conditions like vitiligo can be devastating for affected children. Pediatric patients with vitiligo experience high rates of depression and adjustment disorders. They are subjected to teasing and often have difficulty making friends and are noted to have limited play with others [4-7]. One study from Turkey found that in a group of 30 vitiligo patients aged 8-18, 90% had at least one psychiatric diagnosis when evaluated by a psychiatrist [8]. Quantitative studies either partially or exclusively investigating children with vitiligo have shown a prevalence rate of depression and/or adjustment disorders ranging from 7% to 60% [8-23]. One study from the United States of 396 patients found depression and anxiety prevalence rates of 40.9% and 68.1% in pediatric vitiligo patients, respectively, compared to 13.6% and 31.8% in controls [9]. Moreover, a study from Saudi Arabia of 57 adolescents with vitiligo found a depression prevalence rate of 22.8% [18]. Interestingly, several studies from Turkey of pediatric vitiligo patients demonstrated conflicting results on this subject. Bilgic et al. compared depression, anxiety, and quality of life (QoL) in 41 pediatric vitiligo patients and 46 controls aged 8-18 years, divided into age groups of 8-12 years and 13-18 years [4]. Quality of life was evaluated using the Pediatric Quality of Life Inventory (PedsQL), a measure of health-related quality of life (HRQoL) validated for pediatric patients with chronic conditions. This tool evaluates patient perception of the impact of disease and treatment on physical, mental, and social well-being through a 15-item assessment that includes inquiry into patients' clinical symptoms, feelings about their disease, parameters related to school and

social functioning, and support levels from friends and classmates [24]. The authors found higher depression scores in children in the 8-12 age group only but no other significant QoL differences between them and controls. Notably, this study excluded patients with psychotic disorders, developmental disorders, and mental retardation from the study. A more recent study by Onen et al. included 41 pediatric vitiligo patients and 30 controls aged 9-16 years found significantly worse QoL based on PedsQL scores (including school functioning as well as emotional and social well-being) in patients compared to controls but no differences between groups regarding depression or anxiety scores [25]. Erdogan et al. compared anxiety and depression scores in 29 pediatric vitiligo patients and 30 controls aged 7-17 years, and found significantly higher depression in vitiligo patients compared to controls [26]. They found no difference in anxiety scores and the authors suggest this is because some patients were only affected on concealed body parts. They also found a 36.6% prevalence of attention-deficit/hyperactivity disorder in vitiligo patients. Ucuz et al. conducted a study comparing 30 pediatric vitiligo patients and 30 controls aged 8-18 years based on inventory scores and interviews with a psychiatrist [8]. They found anxiety to be significantly higher in the vitiligo group but found no significant difference in depression between the two groups based on inventory scores. However, interviews by a psychiatrist suggest higher depression than anxiety in vitiligo patients, with 43.4% of vitiligo patients identified as having a depressive disorder; the authors conclude by emphasizing the importance of professional evaluation as opposed to a questionnaire. They did not find PedsQL scores to be significantly different between the two groups; however, 50% of patients reported their disease caused difficulties in their social lives. Further, the authors point out that not all children had lesions on visible body parts, but due to the small sample size they did not sub-analyze QoL according to visibility and non-visibility.

Quality of life impairments in pediatric vitiligo patients are common and multifaceted. The Children's Dermatology Life Quality Index (CDLQI) is one validated tool that measures the psychosocial

impact of dermatologic conditions on children [26,27]. It takes into account symptoms, feelings of self-consciousness, effects on schoolwork and activities, social interactions (including subjection to teasing and bullying), and treatment inconvenience. Comprised of 10 questions on a 3-point scale with a maximum score of 30, a higher score indicates greater QoL impairment. One study from the United States used the CDLQI in an online questionnaire completed by 250 parents found that vitiligo lesions did not bother approximately half of children 14 years of age or younger but bothered 96% of adolescents 15 to 17 years old [6]. The most bothersome sites according to both children and their parents were the face and legs. An affected total body surface area of 25% or greater was associated with higher levels of sleep impairment, self-consciousness, difficulty with friendships and schoolwork, and subjection to teasing or bullying. Lesions on the face and arms were more associated with subjection to teasing or bullying than on other body areas. Lastly, development of vitiligo after 10 years of age was also associated with increased QoL impairment. Interestingly, the authors note that patients for this study were recruited from vitiligo support groups and therefore, may have more psychosocial disturbance regarding their disease than other vitiligo patients.

Furthermore, a study from Germany administered the CDLQI to 74 children (50 male, 24 female) ranging from 7 to 17 years of age [5]. The authors found higher QoL impairments in pediatric vitiligo patients as compared to controls, although the magnitude of impairment was not very high, with a mean of 2.8 in patients versus 0.6 in controls out of a possible 30 points. In addition, 66.2% of children were distressed by their vitiligo, 44.6% had experienced nasty comments, and 21.7% had been bullied. They also found that 93.2% had experienced at least mild stigmatization, which the authors conceptualize as a reduction of the patient's identity to their disease followed by negative response from others. Experiences of stigmatization were evaluated through inquiring into remarks by others about their condition and receipt of negative comments and bullying. In addition, 65.2% of patients were either currently or intermittently bothered by their disease,

24.4% had either quite often or very often concealed their lesions, and 29.7% avoided specific situations, such as swimming, because of their vitiligo. The study also found that higher CDLQI scores, indicating a higher degree of QoL impairment, in vitiligo patients were related to related factors such as social stigmatization, concealment of lesions, facial depigmentation, avoidance of situations because of vitiligo, and a negative family history for vitiligo. Lastly, the children identified their best friends and family, especially mothers, as their greatest sources of support.

The impact of childhood vitiligo can persist into adulthood as well. A study from the Netherlands administered a questionnaire comparing social and psychosexual development and current HRQoL administered to 232 young adults (75 male, 157 female) aged 18-30 years with childhood vitiligo and to controls [28]. The questionnaire administered to participants consisted of the social development and psychosexual development scales of the Course of Life questionnaire which evaluates developmental stages of young adults who have grown up with a chronic disease, the SF-36 which is a 32-item general HRQoL questionnaire, the Skindex-29 which is a 29-item dermatology-specific HRQoL questionnaire, and study-specific questions inquiring into negative childhood experiences surrounding vitiligo and recommendations for care improvements. The authors found that social and psychosexual development and HRQoL did not differ between groups, suggesting that having childhood vitiligo does not have an impact on HRQoL or social and psychosexual development in young adults. However, when the data was further stratified by whether or not the patient reported negative childhood experiences associated with their vitiligo, the authors found an association with more social development problems and a higher HRQoL impairment in early adulthood. Negative childhood experiences included feeling shame, avoidance of intimacy, and social isolation. When asked which interventions they believe could have alleviated their negative experiences, respondents cited personal coaching, contact with fellow patients, and psychological/psychiatric support.

In addition to patients themselves, parents can suffer from depression, anxiety, and QoL impairments attributable to their children's vitiligo. A survey of 118 parents of pediatric patients with vitiligo found depression and anxiety prevalence rates of 26% and 42%, respectively, in caregivers [29]. Moreover, this study demonstrated a significant correlation between poor QoL according to CDLQI scores in pediatric vitiligo patients and the presence of depression and anxiety in their caregivers. A study from Germany found higher levels of anxious and depressive moods in parents of children with vitiligo as compared to controls, and participants cited the unpredictable nature of disease progression as contributing to their anxiety [30]. A study from Turkey showed that parents had higher depressive but not anxious symptoms as compared to controls [25]. A study from China showed parents of pediatric vitiligo patients have been shown to have lower self-rated health measurements evaluated by the Self-Rated Health Measurement Scale (SRHMS), a 48-item question that investigates self-rated physiologic, psychologic, and social health. In addition, overall QoL scores were evaluated by the Dermatitis Family Impact Questionnaire (DFI), a 10-item questionnaire that inquires into the impact of the patient's vitiligo on family relationships, activities, and finances compared to controls. Women experienced more impairment than men according to SRHMS scores [31]. One study from the United States showed that increased affected body surface area, lesions on the hands and legs, and younger patient age are all associated with impaired QoL in parents as determined by the Quality of Life in a Child's Chronic Disease Questionnaire (QLCCDQ), a 15-item questionnaire to evaluate QoL of parents of children with a chronic disease and Family Dermatology Life Quality Index (FDLQI), a 10-item questionnaire to evaluate QoL of family members of patients with chronic dermatosis. The authors suggest this may be due to more parent involvement in managing more severe or visible vitiligo [32].

Several interventions have been developed to lessen the psychosocial impact of vitiligo in children [33]. Cosmetic camouflage, or the skilled use of makeup to disguise skin lesions, represents one such modality [34-36]. One study from Canada trained 38

children 5 years or older (including 9 with vitiligo) on how to use cosmetic camouflage for visible pigmentary and vascular lesions and measured QoL changes associated with its use by CDLQI [37-38]. The authors found significant QoL improvements at one and 6 months after the intervention across all diagnoses and skin types: patients with pigmentary lesions demonstrated specific improvements in sleep and leisure measures. Long-term use varied, but 84.2% and 65.8% of patients reported at least monthly use of camouflage at one month and 6 months, respectively. In addition, patients with pigmentary lesions were more likely to continue use at 6 months as compared to patients with vascular anomalies. Although cognitive-behavioral therapy has been shown to improve QoL and alleviate social anxiety in adult patients with vitiligo [37-38], no studies have been performed in pediatric patients thus far and its efficacy may be limited by age. Support groups and children's camps can also serve as adjunctive psychosocial interventions, but most of the existing literature on their efficacy has been conducted on patients with other dermatologic conditions like atopic dermatitis and alopecia areata [39,40]. One dermatology team from the United States conducted group visits for 30 pediatric patients of color and their parents that included 12 patients with vitiligo. Prior to the group visit, 90% of children and 85% of parents stated they knew few others with vitiligo. A post-session survey revealed the majority of patients and their parents found the visits helpful and would attend another group visit [41]. More research is needed to investigate these and other interventions in children with vitiligo and other dermatologic conditions.

In summary, results conflict on whether pediatric patients with vitiligo have higher rates of anxiety, depression, and QoL impairment. Larger affected area, later development of disease, and negative experiences associated with the disease are associated with increased QoL impairment. Supportive treatments such as cosmetic camouflage and group dermatology visits have shown positive results.

Psoriasis

Psoriasis is a chronic, inflammatory dermatosis that can affect the skin, nails, and joints. Lesions can be

highly variable in both morphology and distribution but are classically described as well-circumscribed erythematous papules or plaques with a silver-to-white scale distributed in a symmetric fashion on the scalp, elbows, knees, lumbosacral area, and umbilicus. In almost one-third of the cases, the onset of psoriasis occurs during childhood [42]. The prevalence of pediatric psoriasis varies by age, gender, and geographic location, but is estimated to affect 128 of every 100,000 children in the United States [43]. The pathogenesis of psoriasis is multifactorial and incompletely understood, though it is believed to begin with dysregulated T cell activation and a resultant inflammatory cascade driving hyperproliferation of keratinocytes [44]. First-line treatment includes topical corticosteroids or vitamin D3 analogues, but more severe or refractory disease can be treated with phototherapy, oral agents (methotrexate, cyclosporine, retinoids), biologics, or combination therapy [45].

Psoriasis has a significant effect on patients' mental health. In adults, patients report social stigmatization, increased stress, and occupational disability. They are also at higher risk for depression, suicidal ideation, and impaired quality of life [46]. Similarly, psoriasis causes a significant mental health burden in pediatric patients. One large study utilizing health claims data of 7,404 pediatric patients with psoriasis showed that psoriasis was associated with a 23% increased risk for developing depression, 32% increased risk for developing anxiety, and 55% increased risk for developing bipolar disorder according to documentation of a psychiatric diagnosis or prescription of a psychiatric medication [47]. This was further supported by a recent study utilizing health claims data which found that children with psoriasis had a higher prevalence of comorbid psychiatric conditions (depression, bipolar disorder, anxiety, suicidal ideation, substance abuse) than non-psoriasis children (16.91 and 10.18 per 1000 patients, respectively), [48]. Additionally, when compared with controls, children with psoriasis had significantly higher incidence rates for any psychiatric condition, depression, and suicidal ideation (incidence rate ratios: 1.16, 1.17, 1.70).

From a QoL perspective, psoriasis is one of the most debilitating chronic dermatologic conditions

affecting children. Children with psoriasis had significantly lower scores on the PedsQL (75.5 versus 83.9 in controls) compared to healthy controls, indicating a lower QoL [49]. Additionally, patients with psoriasis were found to be at 2.7 times higher risk for having impaired QoL according to CDLQI score than those with vitiligo, though at lower risk than those with atopic dermatitis [29]. Even in the context of chronic, non-dermatologic conditions, studies have shown that psoriasis has an impact on CDLQI scores in a manner comparable to conditions like diabetes, enuresis, asthma, epilepsy, and renal disease [50]. It is difficult to directly compare QoL across different diseases given the significant heterogeneity present in both study design and disease-specific validity. For instance, commonly used instruments like the CDLQI can serve as a baseline for comparing QoL or highlight a disease's impact, but they often have items that are not valid across the spectrum of dermatologic disease such as itch or pain.

Patients with higher disease severity scores and longer duration of disease are more likely to have worse anxiety and depression [49]. However, this relationship is not as clear when it comes to QoL. Studies comparing psoriasis severity with QoL scores show that greater severity and area affected is correlated with CDLQI scores indicating worse QoL; similarly, QoL improvement according to CDLQI score is correlated with improvements in Psoriasis Area and Severity Index (PASI) and Body Surface Area (BSA) scores [29,51,52]. However, these studies showed weak correlations between PASI scores and CDLQI scores and between total affected area and CDLQI scores [29]. Even patients with mild psoriasis have been found to have significant QoL impairment according to CDLQI, suggesting that although disease severity has an effect on QoL, it does not fully explain it [51]. One explanation may be that the social stresses associated with psoriasis are major drivers of mental health and QoL impairment. In one study of adults with psoriasis, Fortune et al. found that the stress of anticipating other people's reactions to their psoriasis had the greatest contribution to disability according to the Psoriasis Disability Index (PDI), a 15-item scale evaluating self-reported disability in daily activities, employment,

and relationships in patients with psoriasis [53]. Similarly, another study looking at 128 adult psoriasis patients found that clinical status and physical symptoms rarely impacted psychological distress [54]. Interestingly, if patients reported increased fatigue, perceived helplessness, or less social support, they were more likely to experience psychological distress.

Pediatric patients with psoriasis seem to be more vulnerable to the psychosocial impact of their disease than adults. Patients who were diagnosed at younger ages had worse lifetime CDLQI scores (worse QoL), were more likely to believe that their psoriasis caused depression and were more likely to hide their psoriasis [55]. This was supported by another study that showed that diagnosis at older ages was protective against developing social anxiety [56]. The underlying cause of these differences has not been well studied, though it is possible that adults have more robust coping skills than children.

Some studies suggest that the most important intervention dermatologists can have is simply improving their skin disease [57,58]. Bullying and teasing has been shown to often be appearance-driven, affecting children with visible skin diseases [58]. There is also evidence to suggest that active disease is a barrier to personal relationships and that treatment can improve relationships. Though this has not been specifically studied in psoriasis, it has been investigated in atopic dermatitis, another chronic inflammatory skin condition [59]. Additionally, there is some evidence that joining support groups can improve QoL. In one study of 32 atopic dermatitis patients, attending a support group for atopic dermatitis was associated with an overall improvement in QoL according to CDLQI as well as marked improvement in the subcategories of the CDLQI for relationships and leisure [60]. For psoriasis, numerous resources for finding support groups are offered by organizations like the National Psoriasis Foundation, Psoriasis Association, Psoriasis Help Organization, and the Sparklestone Foundation [57]. One group studied patient QoL after attending dermatology appointments in which a clinical psychologist was present for psychological support

[61]. Quality of life was assessed before and after the appointment using the Teenagers' Quality of Life Index (T-QoL), an 18-item questionnaire designed to measure impact of skin disease on QoL in adolescents that assess self-image, physical and psychological well-being, and relationships. They also administered a survey about patients' experience at the clinic. The authors do not report a statistically significant change in QoL after the visit, which they attribute to the small sample size, but do report that 100% of patients answered that they were "very satisfied" or "satisfied" with their experience. Health care providers should be well-informed of the burden of skin disease on mental health and QoL. Even though there are no formal guidelines for intervention, providers should be empathetic and serve as advocates for their patients, providing support and resources for their patients.

In summary, pediatric patients with psoriasis are shown to be at higher risk of anxiety, depression, and other psychiatric disorders. Quality of life is impacted in children with psoriasis, particularly those diagnosed at an earlier age, but evidence conflicts on whether QoL impairment is related to severity of disease. There is little research on supportive treatment, but psychological support during appointments has been received positively by patients.

Alopecia areata

Alopecia areata (AA) is an autoimmune disease of the hair follicle resulting in patchy, non-scarring hair loss. It most commonly presents suddenly as one or two focal, well-circumscribed, and asymptomatic alopecic patches on the scalp, although severely affected individuals may have involvement of the entire scalp (alopecia totalis) or entire body (alopecia universalis), [62]. The lifetime incidence of AA is approximately 2%. Although men and women are affected equally, AA tends to present earlier in men (mean age of incidence of 31.5 years versus 36.2 years), [63]. Interestingly, one study investigating the prevalence of AA in pediatric dermatology patients found AA to be more common in girls and to account for approximately 0.9% of patient diagnoses [64]. There is an increased incidence in patients with a history of autoimmune conditions, atopy, and Down

syndrome [62,65]. The pathogenesis has been attributed to loss of immune privilege in the anagen hair follicle, with inflammatory immune cells triggering premature entry into the telogen phase [62]. A variety of topical, intralesional, and systemic therapies are available [66]. The course is widely variable and although many patients eventually experience spontaneous hair regrowth, recurrence is also common [62].

Higher rates of anxiety and depression have been demonstrated in pediatric and adult patients with AA [56-76]. One study involving structured interviews of 12 AA patients ranging in age from 6 to 17 years old found that 7 (58.3%) and one (8.33%) met criteria for anxiety disorders and dysthymia, respectively [67]. However, self-reported anxiety and depression scores were interestingly within normal limits in these same patients [67]. Liakopoulou et al. found that patients with AA were more likely to be anxious, depressed, withdrawn, aggressive, and delinquent compared to controls [68]. In particular, girls were more likely to have anxiety and/or depression [68]. A study of children with AA who were identified by referral to psychiatry and evaluated by a psychiatrist found that 78% of patients met criteria for at least one psychiatric disorder with major depressive disorder (50%) being most common, followed by obsessive-compulsive disorder (35.7%), and specific phobia (28.6%), [69]. One study found separation anxiety and social phobia to be more common in children with AA than controls. This study also found anxiety symptoms to be more common in children with AA than with vitiligo [23]. Furthermore, there is evidence to suggest that young children have significantly higher generalized and situational anxiety as well as depression scores as compared to controls, whereas adolescents only had higher situational anxiety scores [70]. The authors suggest this difference in depression scores between children and adolescents may result from immature coping skills in children, changes in psychiatric status during puberty, or perhaps a lack of appropriate scales to measure psychiatric well-being in adolescents. The risk of depression was also observed in a study of 32 pediatric AA patients which found that 6.3% exhibited signs of self-reported depression [72]. In a

large epidemiological study of psychiatric comorbidities in 5,117 patients with AA, Chu et al. demonstrated an increased risk of depression in patients less than 20 years old [73]. Lastly, it should be noted that one study of 31 children and adolescents with AA found no significant differences in self-rated anxiety and depression scores among AA patients, epilepsy patients (serving as a chronic illness control), and their healthy siblings, suggesting that patients' environment has a substantial impact as well [74].

Alopecia areata has also been associated with significant QoL impairments in children [49,67,69,73,74]. Christensen et al. surveyed parents of younger children with AA as well as adolescent patients themselves about bullying and the social impact of their disease [75]. They found that 23% of patients had experienced more than one episode of bullying, with boys being more commonly bullied than girls. In addition, those with more severe disease (i.e., alopecia totalis or universalis) had lower frequencies of bullying than those with milder disease. Another study, however, found the severity of AA to be correlated with impaired patient QoL according to CDLQI score and family QoL measured by the Dermatological Family Impact Scale (DeFis), a 15-item scale to investigate the QoL of families of patients with chronic dermatosis [23]. Again, it should be noted that the CDLQI scale inquires specifically into symptoms such as itchiness and soreness, thus the burden of AA may be underestimated by this scale. In another report, 48% of patients reported being embarrassed by their AA and another 33% stayed home at least once from school because of their disease [75]. Among adolescents, almost half had experienced moderate-to-severe embarrassment about their AA and said that it had affected their involvement in activities. Lastly, almost all adolescents worried about the effects of AA on their parents, reporting that their parents were concerned and 29.6% of patients believed their AA was a significant cause of worry in their homes.

A study of the QoL impact of AA on adults and children found that 78.1% of children ages four to 16 years reported some level of QoL impairment

according to CDLQI score, with feelings of self-consciousness and choice of clothing issues being particularly severe [77]. Poor QoL also correlated with higher scores on a depression screen. Furthermore, having a history of ever being seen by a mental health provider predicted worse QoL. Parents of affected children often reported a higher level of QoL impairment according to FDLQI scores than patients themselves. In families of children with AA, the burden of care was great, spending more than \$5,000 on treatment for AA was associated with worse QoL in family members. The authors suggest this financial expense may exacerbate the emotional burden of disappointment associated with AA. In addition, families of children had worse QoL than families of adults.

In their aforementioned study, Bilgic et al. found parent-rated psychosocial HRQoL according to PedQL scores was significantly poorer in young children with AA as compared to controls [69]. Moreover, adolescent patients self-reported impairment in both the psychosocial and physical components of HRQoL. This model found that severity of AA on the scalp had a negative predictive effect on HRQoL and length of disease had a positive predictive effect on HRQoL. Additionally, another cross-sectional study revealed that 76.7% of 126 children with AA developed QoL impairments according to CDLQI scores [72]. Interestingly, there has been investigation into how school children without AA perceived those with the condition as well as the associated social ramifications [77]. When initially viewing a photograph of a patient with AA, 20% of children in school grades between kindergarten (K) and 3rd grade were visibly uncomfortable, with another 27% displaying surprise and shock. When interviewed in pairs, children were more likely to express discomfort and more likely to admit they would be “scared” or “shocked” if a classmate lost all of their hair. In contrast, none of the children in grades 5 through 8 revealed any apparent discomfort. When asked if they thought patients with AA were sick or dying, 42% of participants in grades K through three and 54% in grades 5 through 8 believed the child was sick and another 21% in grades K through three believed they were dying. Those in grades three or less were

more likely than older children to think that the child was dying and more likely to state that they would be afraid to be physically close to someone with AA. These results may aid in explaining the negative social interactions such as bullying reported by children with AA.

Although effective treatment is not always possible, it is often the best therapy for long-term psychosocial improvement [66,79]. However, many of the mentioned supportive interventions may serve as useful adjuncts to medical treatment in AA, such as therapy, support groups, and children’s camps. One study investigated the factors which draw children with AA and their parents to support groups and demonstrated that seeking to connect with fellow patients and to support friends or family members were the most common reasons for attendance [80]. All survey respondents acknowledged the importance of socializing with other AA patients. Young adult patients with AA have been shown to be more likely to see a mental health provider than adults over the age of 50 years, suggesting that younger AA patients (potentially including adolescents) should be connected with appropriate resources [81]. However, there is a paucity of literature regarding the efficacy of therapy, support groups, or other similar supportive treatment modalities in pediatric AA patients. More research is needed to investigate how to best support children and adolescents with AA to minimize its adverse psychosocial impact.

In summary, most studies found higher rates of anxiety and depression in pediatric patients with AA, as well as other psychiatric disorders. Pediatric AA patients and their parents experience QoL impairments and many children have experienced bullying and embarrassment due to their disease. Patients and their parents find it important to socialize with other AA patients at support groups, but more research is needed into the efficacy of supportive treatments.

Conclusion

Children with vitiligo, psoriasis, and alopecia areata are at higher risk of experiencing adverse

psychosocial effects that may negatively impact their long-term development and wellbeing. Our review highlights increased rates of depression, anxiety, and QoL impairment for pediatric vitiligo, psoriasis, and AA patients. Pediatric patients with vitiligo were found to be subjected to bullying and social stigmatization, and this correlated with an affected area of 25% or greater and lesions on the face or arms. Older pediatric vitiligo patients were more bothered by their lesions and development of vitiligo after age 10 was associated with increased QoL impairment. Psoriasis patients experienced QoL impairment, associated with severity and affected BSA are at risk of Obsessive Compulsive Disorder (OCD) and specific phobia. Quality of life impairment correlated with scalp severity in AA patients and patients who had AA for longer had better QoL scores. Pediatric patients with AA report bullying and embarrassment, with male AA patients with milder disease at higher risk of being bullied. Supportive

treatments including support groups, group appointments, and psychologist presence during appointments positively impact patients.

It is important to continue to appreciate the psychosocial impact of chronic cutaneous diseases, particularly in the pediatric population in which children are forming their identity. Recognition and understanding of these complications are crucial for practitioners in order to screen patients and their families and to potentially direct them to appropriate mental health resources. There are significant psychosocial effects of these chronic cutaneous conditions on children and their families and it is important to identify interventions that may minimize their long-term consequences.

Potential conflicts of interest

The authors declare no conflicts of interest.

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