Dermatology Practical & Conceptual

Atopic Dermatitis in Individuals of Asian and African Ancestry: A Scoping Systematic Review

Chiedu Enechukwu Ufodiama[1, 2, 3], Blessing Fabowale-Makinde[4], Christine Elise Kleyn[1,2]

1 Department of Dermatology, Salford Royal Hospital, Northern Care Alliance NHS Foundation Trust, Salford, UK
2 Dermatology Centre, Salford Royal Hospital, Manchester NIHR Biomedical Research Centre, University of Manchester, Manchester, UK
3 Wythenshawe Hospital, Manchester University NHS Foundation Trust, Manchester, UK
4 Medway Maritime Hospital, Medway NHS Foundation Trust, Gillingham, Kent, UK

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Corresponding Author: Chiedu Ufodiama, Salford Royal Hospital, Email: Chiedu.ufodiama@doctors.org.uk

ABSTRACT

Introduction: Atopic Dermatitis (AD) affects individuals from all ethnicities and backgrounds. It has the highest global disease burden of dermatoses. There is a widely held belief that the presentation of AD is not described well in individuals with non-European ancestry in peer-reviewed literature. However, to our knowledge, this has not been investigated previously.

Objective: To quantify the number of peer-reviewed literature describing the appearance of clinical features of AD in non-European ancestry, particularly those originating from the Asian and African continents.

Methods: A systematic scoping review between December 2020 and January 2021 was performed to quantify the number of studies describing AD in individuals of African and Asian ancestry.

Results: Sixteen studies were identified. None of the studies provided a clear description of AD in our population groups. Two studies described features of lichen planus like-AD in African American individuals. All studies reported on observed clinical features of AD.

Conclusions: The review confirmed a lack of literature describing AD in populations of non-European heritage. It should encourage authors to make a deliberate effort to describe the appearance of clinical features of AD to enable understanding of how they may differentiate in individuals originating from different parts of the globe.

Introduction

Atopic dermatitis (AD) is a chronic, inflammatory, immune-mediated skin disease that has the highest disability adjusted life years globally, of all dermatoses [1,2]. Its adverse impact on quality of life is experienced by individuals irrespective of their ancestry.

In the United Kingdom (UK), 11.8% of the population identified as being from Black, Asian, or other (non-White) ethnic groups and 2.2% identified as mixed ethnicity. An increase of ethnic diversity in the UK with more individuals reporting non-European ancestry is predicted, which further highlights the need to assess skin accurately regardless of ethnicity [3-5.

Widely used criteria to diagnose AD are based on the Hanifin and Rajka criteria (HRC), or a derivative thereof, however, the limitations of HRC have been previously reported [6]. These include that the HRC is based predominantly on a European population although the UK Working Party Criteria (UKC) endeavored to adjust for this [7]. Consequently, descriptions or definitions used historically may not accurately reflect the appearance of AD in all individuals.

Objectives

In view of the abovementioned disparities, we conducted a scoping systematic review to assess the extent of currently available peer-reviewed literature which describes AD lesions in individuals of non-European ancestry.

Methods

The review included results from EMBASE (OVID), MEDLINE (OVID, PubMed) and a free text search (("Atopic Dermatitis" AND ("Africa* OR Asia*)) of the first 10 pages of Google© during December 2020 and January 2021 and follows the PRISMA extension for scoping systematic reviews (PRISMA-ScR) checklist [8]. The search protocol was registered on the Open Science Framework (Registration DOI: 10.17605/OSF.IO/UCK97).

The search strategies included English language, peer-reviewed literature (Supplementary tables S1, S2). Search terms can be found in the supplementary tables. Exclusion criteria included non-English language, conference abstracts, communication letters and textbook chapters.

The primary outcome was to quantify the number of studies describing the clinical features and presentation of AD in individuals of African and Asian ancestry. Secondary outcomes were to identify how frequently features of AD (as previously outlined in "Taylor and Kelly's Dermatology for Skin of Color" [9]), including pigmentation, erythema, lichenification, follicular prominence, site(s) of lesion(s), crusting, scales, lichenoid presentation were documented, and whether comparisons were made to European skin types (phototype I-III).

Two independent researchers (CEU and BFM) independently searched the databases according to the inclusion and exclusion criteria. EK was the third reviewer and acted as arbitrator in disagreements.

Results

Study Selection

The search strategy (Figure 1) identified 16 articles for full screening and appraisal (Table 1).

Study Characteristics of Included Papers

Twenty-five per cent of papers identified were either observational studies or reviews, 19% were cross-sectional studies and 13% were case reports (Figure 2). A systematic review, an epidemiological survey and a case series each represented 6% of the remaining selection. Clinical features of AD in individuals from eight different geographical skin types were described (Figure 3).

Description of Clinical Features

Aspects of the clinical features of AD were described by 6 studies (Table 2). Saleh et al and Summey et al both described clinical features of lichen planus-like AD in African American individuals. Saleh described lesions as "lichenified hyperpigmented violaceous polygonal papules and plaques" that presented on the palms, whilst Summey described "brownish gray-purple plaques" [10,11]. Lopez Carrera et al reports that African Americans may present with less obvious erythema that may appear reddish blue or purple violaceous with a flexural predominance [12]. In addition, perifollicular accentuation, papulation, scaling, lichenification and pigmentary changes were described as being more prominent. Similarly, Vachiramon et al reported features of AD may be more subtle in African American children with scattered papular lesions occurring in an annular distribution on extensor surfaces and trunk [13]. A greater tendency for obvious post inflammatory hyper and hypopigmentary changes was also noted. Furthermore, AD, in a south-eastern Nigerian population, has been described as scattered, micropapular, annular lesions localized to hair follicles on the extensors, with associated hyperpigmentation and lichenification [14]. Moreover, Kaufman et al, in a review of AD in a global† population describe more

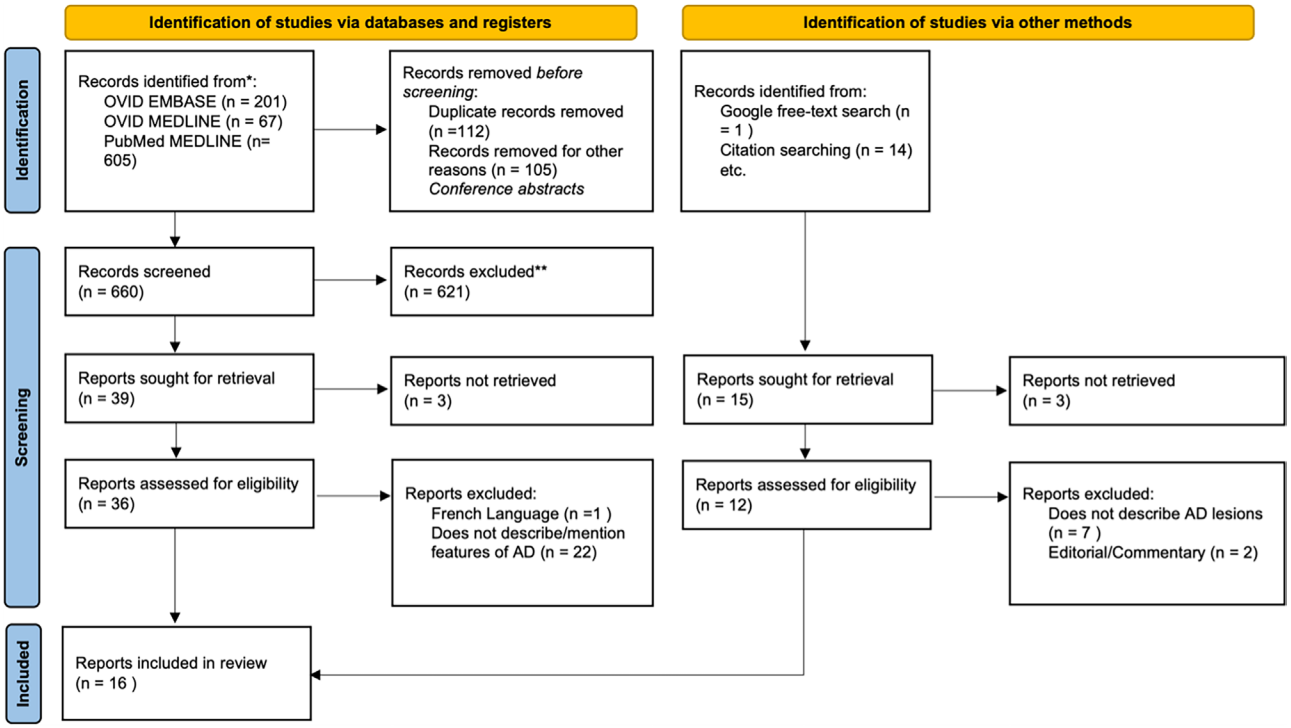

Figure 1. Adapted PRISMA flow diagram of the retrieved studies. Three databases were screened, a review of the citations and a Google© free text search was conducted. Once completed, as illustrated above, 16 studies were included.

well-demarcated lesions and increased scaling and lichenification in Asian individuals [15].

Reported Clinical Features

Site of lesion, lichenification and erythema were the most reported. All studies reported at least one clinical feature of AD (Table 2). All papers reporting on African American or African individuals noted pigmentary changes, whilst erythema was often reported in studies of individuals from the Asian continent. Often clinical features were reported in tabular form, which outlined the frequency of presentation that they occurred.

Comparison to Skin on Individuals With European Ancestry

Five studies reported comparisons with skin of European ancestry (Table 2). No study made comparisons with reference to the Fitzpatrick scale. Yew et al compared clinical features of AD from several regions to European studies. They reported higher prevalence of erythroderma, truncal, extensor, scalp, and auricular involvement in individuals from East Asian as compared to those from Europe. Truncal involvement and lichenification were also reported to be more prevalent in individuals from southeast Asia as compared to Africa where a higher prevalence of papular lichenoid lesions were reported. Vachiramon et al compared pathophysiology, clinical presentation, and treatment of AD between African American children and Caucasians (European American), they reported on the difficulty of initially diagnosing AD in African American children, citing lack of erythema as well as differences in distribution of lesions as contributing to diagnostic challenges. Studies by Kaufman et al. and Silverberg et al utilize European skin as a reference to contrast features seen in other global skin types [15,16].

Conclusions

The majority of included studies were observational or non-systematic literature reviews, thus the strength of evidence was relatively poor [17]. AD in individuals with African ancestry were the most reported population and these studies often referenced a paper by Nnoruka when reporting the clinical features of AD [14]. It was important to include reviews, to give a true appreciation on the depth of peer reviewed description of AD in non-European ancestry that were available and accessible.

The primary outcome was to quantify the number of peer-reviewed literature that described clinical features of AD in non-European individuals. Six studies described certain features of AD in non-European individuals; these were

Table 1. Studies included in the scoping review. Sixteen studies were identified; those with African descent (African, African-American, African Carribbean) were the most the reported demographic. Some studies grouped by continental regions, whilst others identified individual countries. Most studies which were included were observational.

Title	Author	Year	Demographic/Country	Study Type
Lichenoid and other clinical presentations of atopic dermatitis in an inner city practice.	Allen et al. [23]	2008	African American	Case report
Atopic dermatitis in infants and children in India	Dhar et al [24]	2010	Indian	Review
Atopic dermatitis in diverse racial and ethnic groups-Variations in epidemiology, genetics, clinical presentation and treatment.	Kaufman et al [15]	2018	Asian, White, African descent	Review
Adult-onset atopic dermatitis: a cross-sectional study of natural history and clinical manifestation	Kulthanan et al [18]	2007	Thailand	Cross-sectional study.
The clinico-epidemiological profile and the risk factors associated with the severity of atopic dermatitis (AD) in eastern Indian children.	Kumar et al [25]	2000	India (East Indian)	Epidemiological study
Minor cutaneous features of atopic dermatitis in South Korea	Lee et al [26]	2008	South Korea	Observational study
Clinical features of Adult/Adolescent Atopic Dermatitis and Chinese Criteria for Atopic Dermatitis	Liu et al [27]	2016	China	Observational study
Epidemiology, Diagnosis, and Treatment of Atopic Dermatitis in the Developing Countries of Asia, Africa, Latin America, and the Middle East: A Review.	Lopez Carrera et al [12]	2019	East Asia, Southeast Asia, Latin America, North Africa, Sub-Saharan Africa, middle east	Review
Current epidemiology of atopic dermatitis in south-eastern Nigeria	Nnoruka [14]	2008	Nigeria	Observational study
A Rare Case of Lichen Planus-Like Atopic Dermatitis Involving the Hands.	Saleh et al [10]	2020	African American	Case report
Distribution of atopic dermatitis lesions in United States adults	Silverberg et al [16]	2004	Caucasian/White, African-American/Black, Hispanic, Multiracial/other	Cross-sectional study.
Lichen planus-like atopic dermatitis: expanding the differential diagnosis of spongiotic dermatitis	Summey et al [11]	2007	African American	Case series
Clinical analyses of atopic dermatitis in the aged	Tanei et al [28]		Japan	Observational study.
Atopic dermatitis in African American children: addressing unmet needs of a common disease.	Vachiramon et al [13]	2012	African Descent (African American, African, and African Caribbean)	Review
Prevalence and clinical features of adult atopic dermatitis in tertiary hospitals in China	Wang et al [29]	2017	China	Cross-sectional study.
A systematic review and meta-analysis of the regional and age-related differences in atopic dermatitis clinical characteristics	Yew et al [30]	2019	Americas (US, Mexico, Colombia), East Asia (China, Japan, Korea), South East Asia (Singapore, Thailand), India, Middle East (Iran), Europe (Bosnia, Denmark, Finland, France, Germany, Italy, The Netherlands, Norway, Poland, Romania, Sweden, Switzerland, Turkey, UK, Multiple sites), Africa (Nigeria, South Africa, Tunisia), Australia	Systematic Review and Meta-Analysis

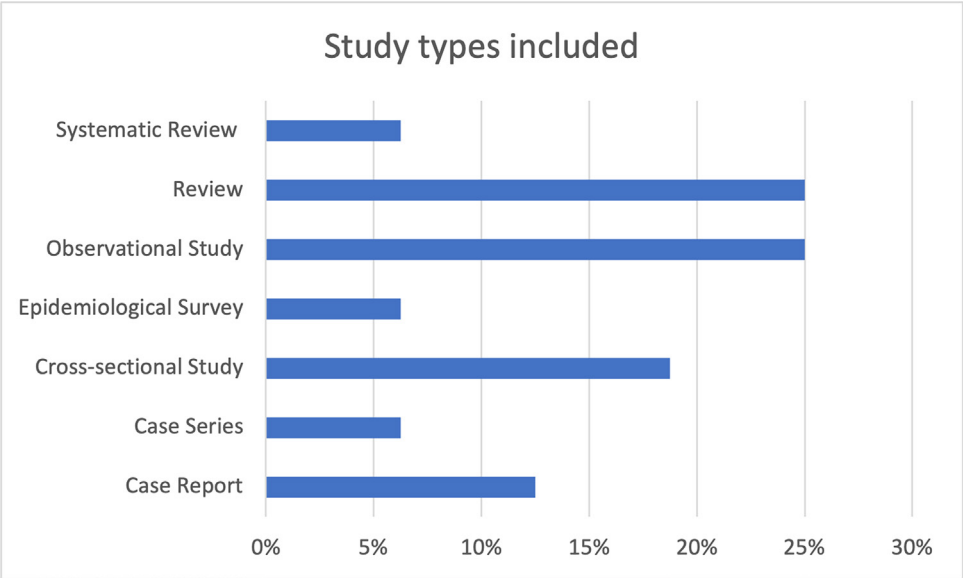

Figure 2. Proportion of the types of peer-reviewed studies included. Observational studies and review articles were the most identified studies with each representing 25% (N = 4) of identified works respectively.

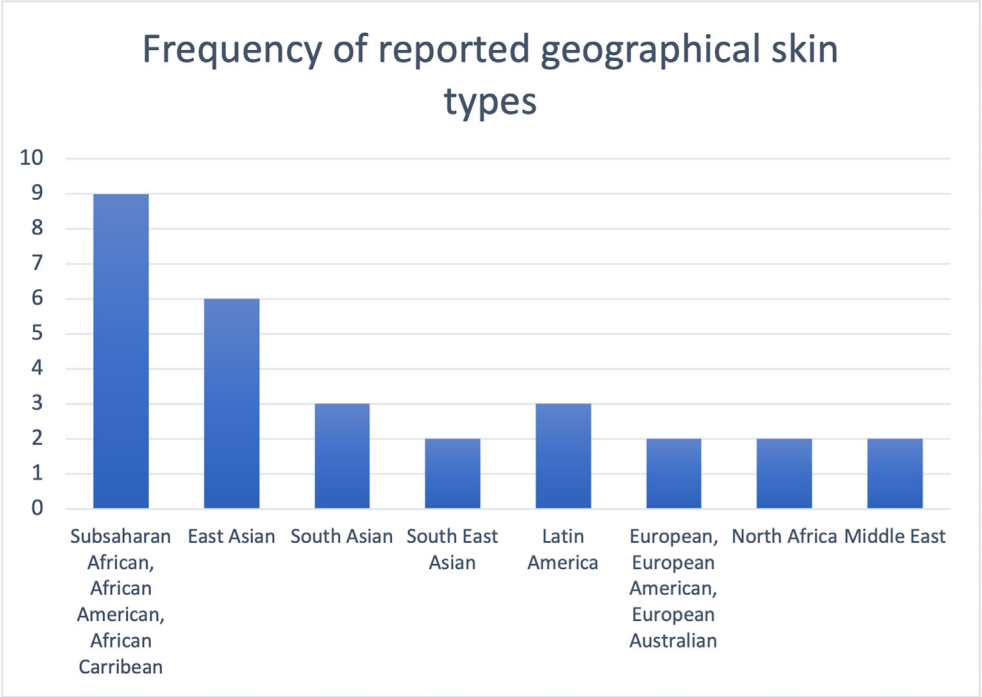

Figure 3. Frequency of geographical skin types reported in included studies. Studies were grouped to allow for the data to be meaningfully assessed; 9 out of 17 studies identified reported on individuals with African descent.

primarily comments on the lack of erythema and the presence of hyperpigmentation. The case reports on lichen-planus like AD presented the most plausible example of comprehensive description on the morphological appearance of AD in non-European individuals. Across all included studies, site of lesion, erythema and lichenification were the most reported clinical feature. Follicular prominence and pigmentation were also described; their association with AD in individuals of sub-Saharan African descent has previously been reported by others [9].

Five studies used European criteria/skin type as a point of reference when comparing AD to skin types of different non-European ancestries. Kulthanan et al studied the clinical features of adult-onset AD in Thai patients. In their discussion, they concluded that most clinical features of adult-onset AD in their population were very similar to what had previously been reported in non-Asian populations [18].

Conducting the study presented challenges, including to the categorization of skin types. We adopted the approach of

Table 2. Summary of individual study findings. Six of 16 studies included described the characteristics of one or more clinical features reported by the author. Lichenification, erythema and site of lesion were the clinical features that were most commented upon. Only 5 studies included made comparable reference to European skin types

	Year	Clinical Features Described	Clinical Features Reported								Comparison to European Skin types
			Pigmentation	Erythema	Lichenification	Follicular Prominence	Sites of lesion	Crusting	Scales	Lichenoid Presentation	
Allen et al	2008		☐				☐			☐	
Dhar et al	2010			☐		☐	☐		☐		
Kaufman et al	2018	☐	☐	☐	☐	☐	☐		☐	☐	☐
Kulthanan et al	2007				☐	☐	☐				
Kumar et al	2000				☐		☐				
Lee HJ et al	2008				☐	☐					
Liu et al	2016										
Lopez Carrera et al	2019	☐	☐	☐	☐	☐					
Nnoruka	2008	☐	☐	☐	☐	☐	☐				
Saleh et al	2020	☐	☐	☐	☐		☐				
Silverberg et al	2004						☐				
Summey et al	2007	☐	☐		☐		☐			☐	☐
Tanei et al	2008			☐	☐		☐				
Vachiramon et al	2012	☐	☐	☐	☐	☐	☐			☐	☐
Wang et al	2017			☐			☐				
Yew et al	2019			☐	☐		☐	☐	☐	☐	☐

categorizing skin based on geographical regional skin types – combining groups based on historic continental ancestry with the aim of objective categorization [19].

To conclude, this scoping review confirms the paucity of literature describing the appearance of AD in non-European populations. It is recognized that there is limited research and dermatology educational resources in non-European populations and there is significant scope to achieve equity irrespective of ancestry or skin tone [19-21].

Limitations

The study was limited due to only including English-language literature furthermore the use of search engines was at risk of regional search engine bias [22].

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