Prevalence of Atopic Dermatitis in Nigeria: A Systematic Review and Meta-analysis

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ABSTRACT

Background: Atopic dermatitis (AD) is a common inflammatory skin disorder in Nigeria, and the scare availability of data on its prevalence has limited response to its burden in Nigeria.

Objective: This study aims to estimate the prevalence of AD in Nigeria through systematic review and meta-analysis.

Methods: A literature search of PubMed, African Journal Online and Google Scholar for hospital-based and community-based studies with prevalence data on AD published between January 2000 and December 2020 was conducted. Diagnosis of AD was either by the dermatologist or use of specified criteria. Inverse variance heterogeneity method, a modified random effect meta-analysis was used to estimate the pooled overall prevalence of AD in community-based and hospital-based studies, as well as in each region (north and south), and in children.

Results: Among the 1,966 references evaluated, 18 hospital-based and 6 community-based studies from 16 states in Nigeria were selected, corresponding to a total of 50,673 patients. Half of the selected studies were on children only, while the other half was on children and adults. Analysis was done based on these two groups of studies; studies of AD on adults only was not found. The prevalence of AD in school-based studies was 3% (95%CI=0-9) and in hospital-based studies was 10% (95%CI=7–14). Hospital-based prevalence in northern Nigeria was 15% (95% CI=14-16) and 8% (95%CI=7–9) in southern Nigeria. For hospital-based studies done in paediatric population (few weeks to 19years old), prevalence of AD was 16% (95%CI=12–20).

Conclusion: The findings of this review suggest the burden of AD in Nigeria is increasing. Further epidemiological studies on childhood AD and research on adulthood AD are needed. There is also need to assess the features of doctor-diagnosed AD and how it compares with established diagnostic criteria.

Keywords: Atopic dermatitis, prevalence, Nigeria, systematic review, meta-analysis

Prévalence de la dermatite atopique au Nigeria: une revue systématique et une méta-analyse

Abstrait:

Contexte: La dermatite atopique (DA) est un trouble inflammatoire de la peau courant au Nigeria, et la disponibilité effrayante des données sur sa prévalence a limité la réponse à son fardeau au Nigeria.

Objectif: Cette étude vise à estimer la prévalence de la MA au Nigéria par le biais d'une revue systématique et d'une méta-analyse.

Méthodes: Une recherche documentaire de PubMed, African Journal Online et Google Scholar pour des études hospitalières et communautaires avec des données de prévalence sur la DA publiées entre janvier 2000 et décembre 2020 a été effectuée. Le diagnostic de la DA a été soit par le dermatologue, soit par l'utilisation de critères spécifiés. Méthode de l'hétérogénéité de variance inverse, une méta-analyse à effet aléatoire modifiée a été utilisée pour estimer la prévalence globale regroupée de la DA dans des études communautaires et hospitalières, ainsi que dans chaque région (nord et sud) et chez les enfants.

Résultats: Parmi les 1 966 références évaluées, 18 études hospitalières et 6 études communautaires de 16 États du Nigéria ont été sélectionnées, ce qui correspond à un total de 50 673 patients. La moitié des études sélectionnées portaient uniquement sur des enfants, tandis que l'autre moitié portait sur des enfants et des adultes. L'analyse a été

effectuée sur la base de ces deux groupes d'études; les études sur la DA sur les adultes seulement n'ont pas été trouvées. La prévalence de la DA dans les études en milieu scolaire était de 3 % (IC à 95 % = 0-9) et dans les études hospitalières de 10 % (IC à 95 % = 7-14). La prévalence en milieu hospitalier dans le nord du Nigéria était de 15 % (IC à 95 % = 14-16) et de 8 % (IC à 95 % = 7 à 9) dans le sud du Nigéria. Pour les études hospitalières réalisées dans la population pédiatrique (de quelques semaines à 19 ans), la prévalence de la DA était de 16 % (IC à 95 % = 12-20).

Conclusion: Les résultats de cet examen suggèrent que le fardeau de la DA au Nigéria augmente. D'autres études épidémiologiques sur la DA infantile et des recherches sur la DA de l'âge adulte sont nécessaires. Il est également nécessaire d'évaluer les caractéristiques de la DA diagnostiquée par un médecin et comment elle se compare aux critères diagnostiques établis.

Mots-clés: Dermatite atopique, prévalence, Nigéria, revue systématique, méta-analyse

Introduction

Atopic dermatitis (AD) is a recurrent pruritic inflammatory disorder affecting the skin of both children and adults.[1] Given the heterogenous and episodic nature of AD, its definition in cohort studies varies across the world. The Hanifin and Rajka criteria, United Kingdom Working Party criteria (UKWP), and the International Study of Asthma and Allergies in Childhood (ISAAC) criteria are validated diagnostic instruments used in clinical settings and research, but there are still calls for improvement and uniformity in the diagnosis of AD.[2] Meanwhile, diagnosis by a board-certified dermatologist is recognized as the most ideal, even though, it cannot be applied to large studies.[3] Basically, the diagnosis of AD depends on the age of the patient (infantile, childhood, adolescent/adult-onset), clinical characteristics (pruritus and eczematous lesions), and the exclusion of other dermatologic conditions such as seborrheic dermatitis, contact dermatitis, scabies, ichthyoses, cutaneous T cell lymphoma, etc.[4]

The prevalence of AD varies across the world and among age groups. The estimated prevalence in children is 15-20% while in adults is 1-3%.[5] According to the ISAAC, the prevalence of AD in children aged 6 to 7 years was 23.3% in Africa and 7.2% in the Middle East.[4] The global prevalence of AD in children aged 13 and 14 years was 12.8%, out of which a prevalence of 15.2% was observed in Africa.[4] Although ISAAC had a global outreach, it has been observed to have limitations, especially in tropical countries.[6] Prevalence of AD has been known to vary based on regional and ethnic differences. In Nigeria, studies on AD prevalence are quite limited and cannot be generalized since the studies were restricted to a specific region and setting. Also, most studies concentrate on the spectrum/pattern of skin diseases (AD included) seen in a specific period within a clinical setting or school setting. There is no nationwide study of AD and so, the overall prevalence rate of AD remains unknown. It is essential to understand the burden of AD in Nigeria, as this is important for healthcare planning and patient counseling.

This study aims to estimate the overall prevalence rate of AD in Nigeria by performing a meta-analysis on the systematic review of both hospital-based and community-based studies. The secondary outcome is to analyze the prevalence across the southern and northern regions of Nigeria.

Methods

Data extraction

This study on the prevalence of AD in Nigeria was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines. Two reviewers, BA and PI, extracted data independently after standardizing the extraction forms. Reviewers discussed and arrived at a consensus in case of any disagreement on which data should be included or excluded. Information extracted include the study location, study population, sample size, mean age, number of AD cases, and criteria used in AD diagnosis (dermatologist-diagnosed, Hanifin & Rajka, UKWP, or ISAAC criteria)

Data sources and selection criteria

A systematic collation of data from studies conducted in Nigeria and published from January 2000 to December 2020 was retrieved. The search was carried out on PubMed, African Journals Online (AJOL), and Google Scholar. Search terms include

atopic dermatitis, atopic eczema, Nigeria, prevalence, allergic disease, and epidemiology.

Inclusion criteria were cross-sectional, population/community- and hospital-based studies on atopic dermatitis in Nigeria, studies that provided secondary data on AD, for which AD was a secondary outcome, studies where AD was diagnosed by dermatologists or using a standardized and validated atopic dermatitis diagnostic instrument such as UKWP, Hanifin & Rajka, etc, studies on pediatric and adult age group. Clinical trials, intervention studies, review articles, and studies conducted before the year 2000 were excluded.

The results from these search engines were combined and stored in Microsoft Excel and duplicates were removed. Studies, whose main aim was to document the spectrum of skin diseases seen within a hospital or community setting but met the inclusion criteria were selected to avoid further restriction of the number of articles used in the meta-analysis. These studies would have provided the numerical data of AD diagnosed within the setting; enabling a manual calculation of AD prevalence in that setting. The denominators for all hospital-based studies were patients seen in dermatology clinics, that is, all dermatology cases seen at a given time. Additional studies were identified from manual searches of references in retrieved articles. If data were duplicated in more than one study, the most recent and complete was included. This study was exempted from approval from the institutional review board, as data were collated from published literature.

Quality assessment

To examine the quality of the selected studies, a standardized eight-item checklist for critical appraisal of prevalence/incidence studies of health problems[7] was done by the two independent investigators. The eight criteria which define this tool include: 1) if the study design is appropriate for the research questions, 2) if an unbiased sampling method was used, 3) if the sample size was adequate (for this review, we used a minimum sample size of 300), 4) if the study used standard measures, 5) whether outcome measurements were made by unbiased assessors, 6) if the response rate was adequate (>70%), 7) if confidence interval and subgroup analysis were stated, and 8) whether subjects were described. Each item received a score of 1 if a study met the criterion and zero if not met. The scores were summed up and had a range from zero to eight. The quality of the study was assessed as high-quality if the summed score is $\geqslant 7$, medium-quality if 4-6, or low-quality if <4.

Meta-analysis

The prevalence rate of AD was calculated for each study by the total number of persons with AD and the study size population obtained from the studies. For the hospital-based studies, the base population was all dermatology cases seen in the clinic. The study population was children only or children and adults. Analysis was done based on these two groups of studies; analysis of AD on adults only was not done. The inverse variance heterogeneity method, a modified random effect meta-analysis[8] was used to estimate the pooled prevalence of AD, owing to the expected heterogeneity between studies. I^2 was used to evaluate the heterogeneity of the studies. A value of 0% indicates no heterogeneity, while 1%-25% indicates low heterogeneity, 25-50% as moderate, and 51-80% as high heterogeneity.[8] Overall prevalence for hospital-based and community-based studies was analyzed. Study prevalence and 95% Confidence Interval (CI) were presented in forest plots. The Luis Furuya-Kanamori (LFK) index and Doi plots were used to assess publication bias.[9] Random-effects subgroup meta-analyses of hospital-based studies were done to compare the prevalence of AD by region (northern vs southern Nigeria) and pediatric age group. A pooled prevalence of school children aged 10 to 20years of age was analyzed and reported since the heterogeneity between these studies was <70%. A 2-sided P value < 0.05 was considered statistically significant. Analysis was performed using the MetaXL software in Microsoft Excel, version 5.3, Epigear International.[8]

Results

Study selection

A total of 1961 nonduplicate citations were identified in the initial database search and 5 additional records were identified from reference and related articles list; 1923 and 19 abstracts were excluded

during abstract and full-text review respectively. A final list of 24 studies met the inclusion criteria and had sufficient data for meta-analysis as outlined in Figure 1.

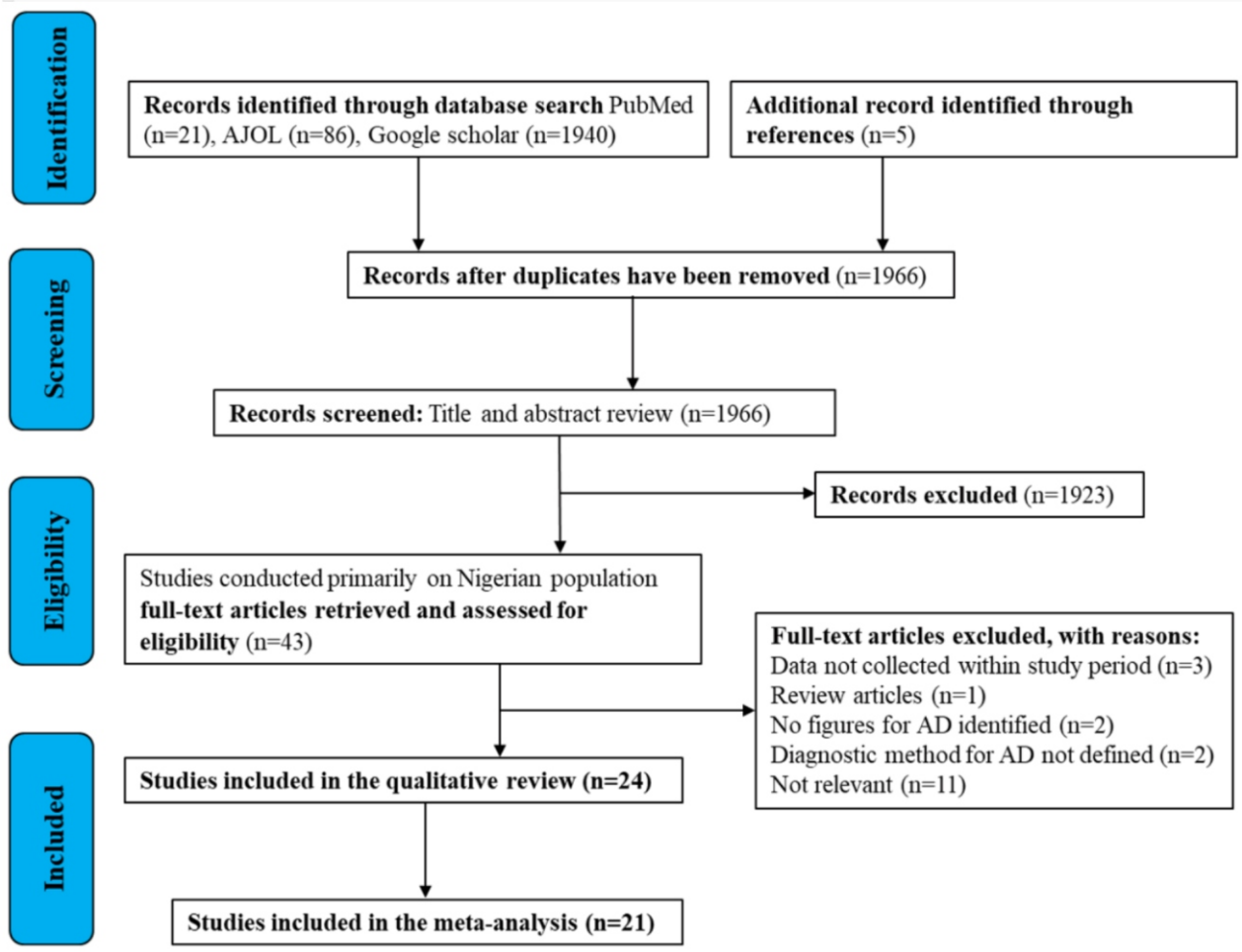


Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) study selection flow diagram.

Fifteen of the studies published AD as a secondary outcome, extracted data was from data on spectrum/pattern of skin disorders diagnosed within a defined period and group. Of the articles included, a sample population of 12 were children aged a few weeks to 20years, while the remaining 12 studies were on both children and adults. None of the studies reported AD in only adults.

Study characteristics

The 24 studies selected for this systematic review were published from 2004 to 2020 and included data collected from 1985 to 2018 (Table 1). Of these studies, 9 were conducted in the northern part of Nigeria[1,10,18-19,24-26,28-29] and 15 from the southern part.[11-17,20-23,27,28,30-31] One publication which reported data for 2 different population was also included.[27] Sample sizes of the study populations were between 162 and 12,013. Studies were conducted in 16 out the 36 states and the Federal Capital Territory of Nigeria (FCT); these were: 3 in Ibadan,[27,30] 2 each in Jos,[10,25] Kaduna,[18,24] Lagos,[14,15] Enugu,[16,23] Calabar[20,31] and Benin,[11,22] and 1 each in FCT,[1] Bida,[29] Ile-Ife,[16] Ilorin,[28] Maiduguri,[26] Ondo,[13] Osogbo,[21] Port Harcourt,[12] and Sokoto.[19] All the studies were cross-sectional in methodology, as there was no longitudinal study identified. Only 6 studies were community-based and reported on children in primary and secondary schools,[25,27,28,30-31] while the remaining were hospital-based studies located in tertiary health institutions. Diagnosis of AD was via doctor-diagnosis drawn from patient records retrospectively and prospectively[1,10-14,16-24,26,] and some studies were via doctor (dermatologist) diagnosis based on physical examination and questionnaire data.[15,25,28-31] The AD diagnostic criteria used by the studies were Hanifin and Rajka[16,24,29], UKWP[15,25] and ISAAC.[27]

Table 1: Descriptive characteristics of the studies included in the systematic review

ID	Author, year	Region	Year of data collection	Target population	mean age	Cases	Sample size	Location	Diagnosis by	Type of study
1	Okoro et al,[10] 2014	North	2012-2013	All	36.49±14.9	18	162	Jos	dermatologist	hospital
2	Onunu et al,[11] 2007	South	1985-2000	All	Not recorded	594	7519	Benin	dermatologist	hospital
3	Altraide et al,[12] 2008	South	2005-2007	0-16	Not recorded	34	247	Port Harcourt	dermatologist	hospital
4	Olanrewaju et al,[13] 2018	South	2016-2017	0-81	33.88±20.57	9	204	Ondo	dermatologist	hospital
5	Ayanlowo et al,[14] 2018	South	2004-2016	0-18	8.31±5.44	1042	6373	Lagos	dermatologist	hospital
6	Puddicombe et al,[15] 2018	South	2012-2013	0-16	4.71±3.6	47	228	Lagos	UKWP	hospital
7	Ibekwe et al,[1] 2018	North	2015-2017	All	22.6±3.4	93	698	Abuja	dermatologist	hospital
8	Nnoruka et al,[16] 2004	South	1998-2000	All	Not recorded	1019	12013	Enugu	Hannifin & Rajka	hospital
9	Oninla et al,[17] 2015	South	2009-2012	0-19	Not recorded	31	441	Ile-Ife	dermatologist	hospital
10	Yahya et al,[18] 2007	North	2000-2005	0-92	Not recorded	823	5537	Kaduna	dermatologist	hospital
11	Onayemi et al,[19] 2004	North	1999-2001	0-90	Not recorded	9	746	Sokoto	dermatologist	hospital
12	Henshaw et al,[20] 2015	South	2006-2012	0-84	27.7±17.2	66	1307	Calabar	dermatologist	hospital
13	Akinboro et al,[21] 2015	South	2005-2010	0-100	31.1±19.1	72	895	Oshogbo	dermatologist	hospital
14	Ukonu et al,[22] 2012	South	2006-2007	0-80	Not recorded	46	755	Benin	dermatologist	hospital
15	Onyekonwu et al,[23] 2016	South	2013-2014	All	29.53±17.46	25	387	Enugu	dermatologist	hospital
16	Mijinyawa et al,[24] 2006	North	2005	0-18	6.8±10.8	200	1200	Kaduna	Hannifin &Rajka	hospital
17	Otelahu et al,[25] 2014	North	2012	6_12	9.7yrs	9	390	Jos	UKWP	community
18	Ndabi et al,[26] 2018	North	2007-2017	All	Not recorded	218	1381	Maiduguri & Gombe	dermatologist	hospital
19	Falade et al,[27] 2009	South	2001-2002	6_7	Not recorded	120	2396	Ibadan	ISAAC	community
20	Falade et al,[27] 2009	South	2001-2002	13-14	Not recorded	242	3142	Ibadan	ISAAC	community
21	Oyedepo et al,[28] 2020	North	2017-2018	10_19	13.8±2.3	8	1300	Ilorin	dermatologist	community
22	Wey et al,[29] 2020	North	Not recorded	0-14	Not recorded	48	490	Bida	Hannifin & Rajka	hospital
23	Ogunbiyi et al,[30] 2009	South	2008	10_20	15.2±2.5	12	1415	Ibadan	dermatologist	community
24	Henshaw et al,[31] 2014	South	2013	13-19	Not recorded	3	1447	Calabar	dermatologist	community

According to the quality assessment checklist[7], only one study fulfilled "high quality" status[29], 19 studies were assigned as "moderate quality"[1,11,14,16-25,27-28,30-31] and the remaining 5 studies were grouped as "low quality" studies. (Table 2)

Table 2: Results of Quality Assessment Bias using guidelines for critically appraising studies of prevalence or incidence of a health problem.[7]

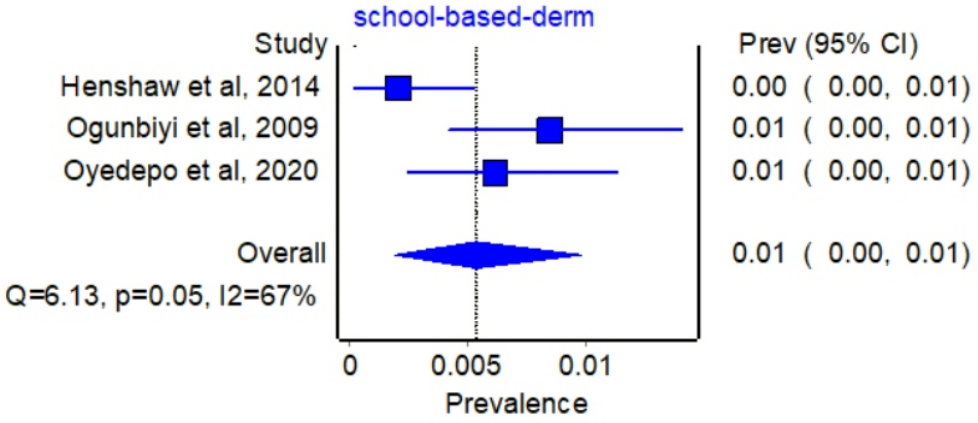
Study Author, year	Are the study methods valid?						What is the interpretation of the results?	What is the applicability of the results?	Quality
	a) Is the study design and sampling method appropriate for the research question?	b) Is the sampling frame appropriate?	c) Is the sample size adequate?	d) Are the objectives, suitable and standard criteria used for measurement of the health outcome?	e) Is the health outcome measured in an unbiased fashion?	f) Is the response rate adequate? Are the refusers described?	Are the estimates of prevalence or incidence given with confidence interval and in detail by subgroup, if appropriate?	Are the study subjects and the setting described in detail and similar to those of interest to you?	
Okoro et al,[10] 2014	*	-	-	-	-	*	-	*	Low
Onunu et al,[11] 2007	*	-	*	*	-	*	*	*	Medium
Altraide et al,[12] 2008	*	-	*	-	-	*	-	-	Low
Olanrewaju et al,[13] 2018	*	-	-	-	-	*	-	*	Low
Ayanlowo et al,[14] 2018	*	-	*	-	-	*	-	*	Medium
Puddicombe et al,[15] 2018	-	-	-	*	-	*	-	-	Low
Ibekwe et al,[1] 2018	*	-	*	-	-	*	*	*	Medium
Nnoruka et al,[16] 2004	*	-	*	*	-	*	*	*	Medium
Oninla et al,[17] 2015	*	-	*	-	-	*	-	*	Medium
Yahya et al,[18] 2007	*	-	*	-	-	*	-	*	Medium
Onayemi et al,[19] 2004	*	-	*	-	-	*	-	*	Medium
Henshaw et al,[20] 2015	*	-	*	-	-	*	-	*	Medium
Akinboro et al,[21] 2015	*	-	*	-	-	*	-	*	Medium
Ukonu et al,[22] 2012	*	-	*	-	-	*	-	*	Medium
Onyekonwu et al,[23] 2016	*	-	*	-	-	*	-	*	Medium
Mijinyawa et al,[24] 2006	*	*	-	*	-	*	*	*	Medium
Otelahu et al,[25] 2014	*	*	-	-	-	*	-	*	Medium
Ndabi et al,[26] 2018	*	-	*	-	-	*	-	-	Low
Falade et al,[27] 2009	*	*	*	*	-	*	-	*	Medium
Falade et al,[27] 2009	*	*	*	*	-	*	-	*	Medium
Oyedepo et al,[28] 2020	*	*	*	-	-	*	-	*	Medium
Wey et al,[29] 2020	*	*	*	*	-	*	*	*	High
Ogunbiyi et al,[30] 2009	*	*	*	-	-	*	-	*	Medium
Henshaw et al,[31] 2014	*	*	*	-	-	*	-	*	Medium

Prevalence of atopic dermatitis from the systematic review

The community-based prevalence rates of AD were generally lower ranging from 0.2% among adolescents in secondary school in Calabar[31] to 7.7% in secondary school students aged 13 to 14 years in Ibadan.[27] AD was diagnosed by dermatologist and ISAAC criteria respectively. The hospital-based studies reported higher prevalence rates ranging from 4.4% in Ondo state[13] to 20.6% in Lagos state.[14] AD prevalence was extracted from two-third (66.7%) of these hospital-based studies as the main aim of these studies was to document the spectrum/pattern of skin diseases seen within the clinic setting. Also, the prevalence rates reported in studies of children, aged a few weeks to 20years ranged from 0.2%[31] in teenagers (13 to 19 years old) to 20.6%[14] (0 to 18 years old) while that of studies that combined both children and adults ranged from 1.2%[19] in Sokoto to 15.8% in Northeastern part of Nigeria.[26]

Meta-analysis

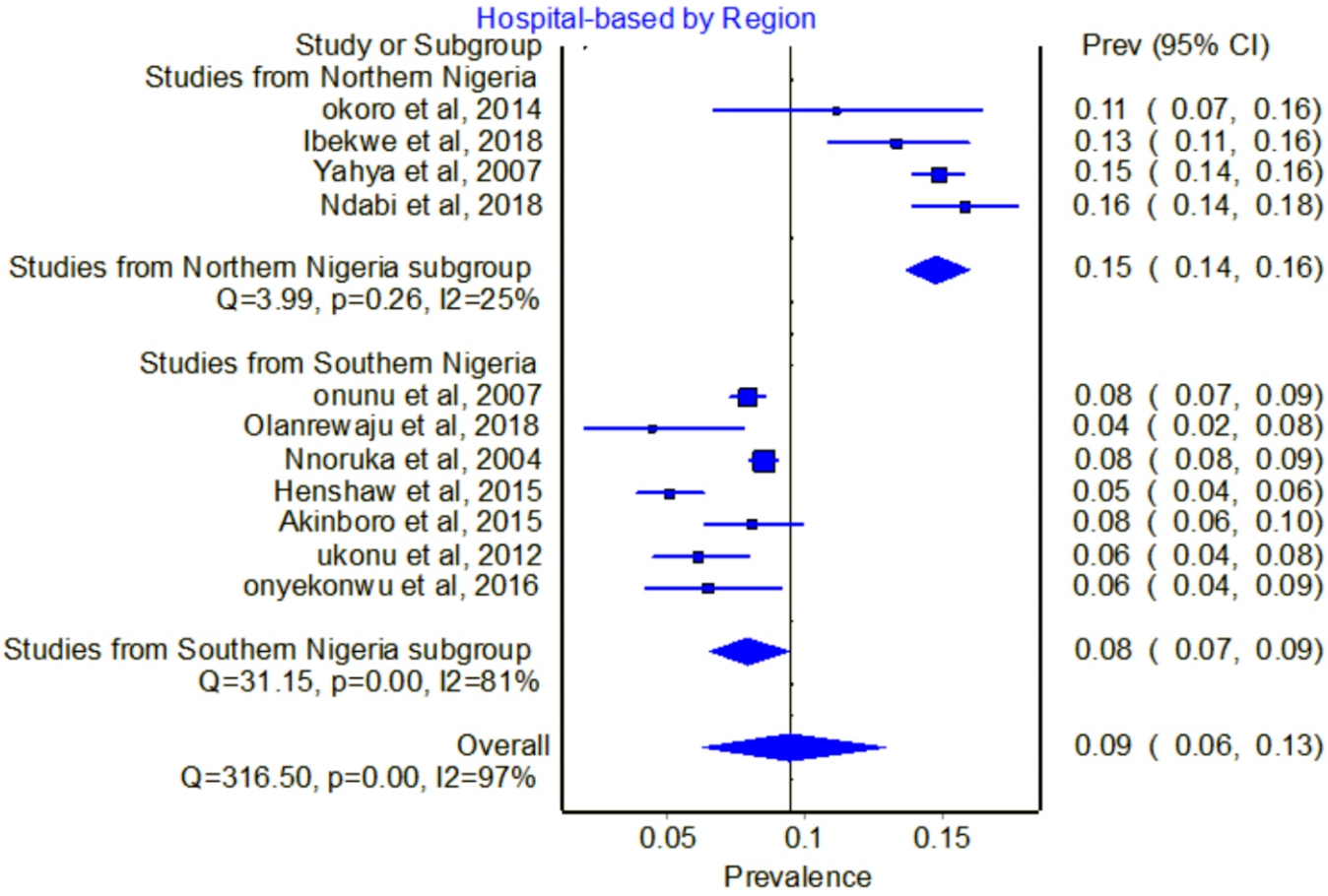
For studies conducted in the community which were essentially school-based, the modified random effect meta-analysis yielded a pooled prevalence of 0.03 (95%CI=0.00-0.09, I^2=99%, p<0.001). Due to the very high heterogeneity of this analysis, studies in children less than 10years old and the use of diagnostic instruments were excluded[25,27,] and further analysis was done with school-based studies among children aged 10 to 20 years which were essentially studies in which AD was diagnosed by the dermatologist. The analysis revealed a pooled prevalence of 0.01 (95%CI=0.00-0.01, I^2=67%, p=0.05). Figure 2



CI: Confidence interval, Q and I2 (I^2): Heterogeneity statistics

Figure 2: Forest plot showing the analysis of prevalence rates from school-based studies among children 10-20years old

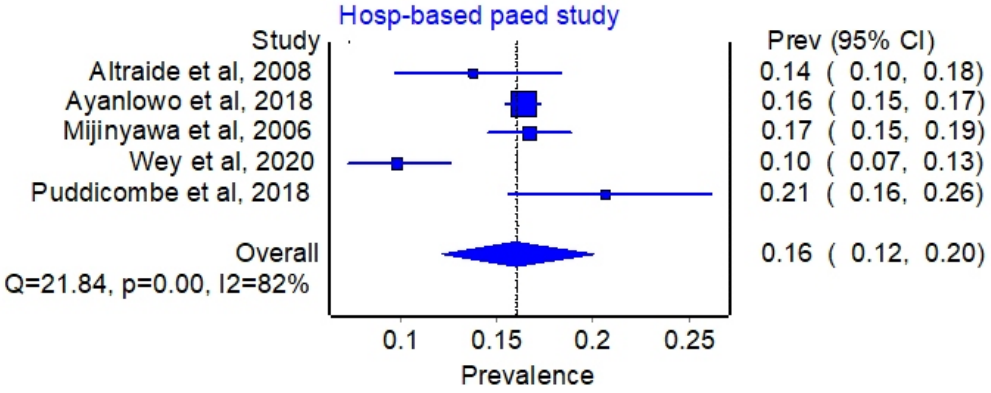
Analysis of the hospital-based studies showed a pooled prevalence of 0.1 (95%CI=0.07-0.14, I^2=98%, p<0.001). A further sub-group analysis of this group of studies to test for subgroup differences based on the region of the country where the studies were conducted was done. The result for northern Nigeria showed a pooled prevalence of 0.13 (95%CI=0.07-0.21, I^2=97%, Q=237.7) and for southern Nigeria revealed a pooled prevalence of 0.1 (95%CI=0.06-0.14, I^2=98%, Q=382.6) Due to the very high heterogeneity obtained during this analysis, studies that had pediatric age group as the study participants[11,13,16,23,28] were excluded from the analysis. This resulted in a higher prevalence for studies in the north (0.15, 95%CI=0.14-0.16, I^2=25%, Q=3.99) and a lower prevalence for studies in the south (0.8, 95%CI=0.07-0.09, I^2=81%, Q=31.15) Figure 3 and 4. The test suggests that there is a statistically significant subgroup effect (p<0.001), meaning that AD is more prevalent in the Northern than the southern part of Nigeria. Although the heterogeneity index for studies from southern Nigeria (I^2=81%) was still high, this suggests the need for further exploration to explain the heterogeneity within the studies. There was no asymmetry observed on the Doi plot and the LFK index was -0.42 (Figure 4).



CI: Confidence interval, Q and I2 (I2): Heterogeneity statistics

Figure 3: Forest plot showing the subgroup analysis of prevalence rates of AD studies conducted in northern and southern parts of the country; in studies that included children and adults as study participants

Meanwhile, the overall prevalence of studies reported in children by hospital-based studies was 0.16 (95%CI=0.12-0.20, I2=82%, Cochran's Q = 21.84), Figure 3. There was no asymmetry of the Doi plot, thus no publication bias (LFK = -0.92). Figure 4



CI: Confidence interval, Q and I2 (I2): Heterogeneity statistics

Figure 4: Forest plot showing the overall prevalence of AD in paediatric populations from hospital-based studies

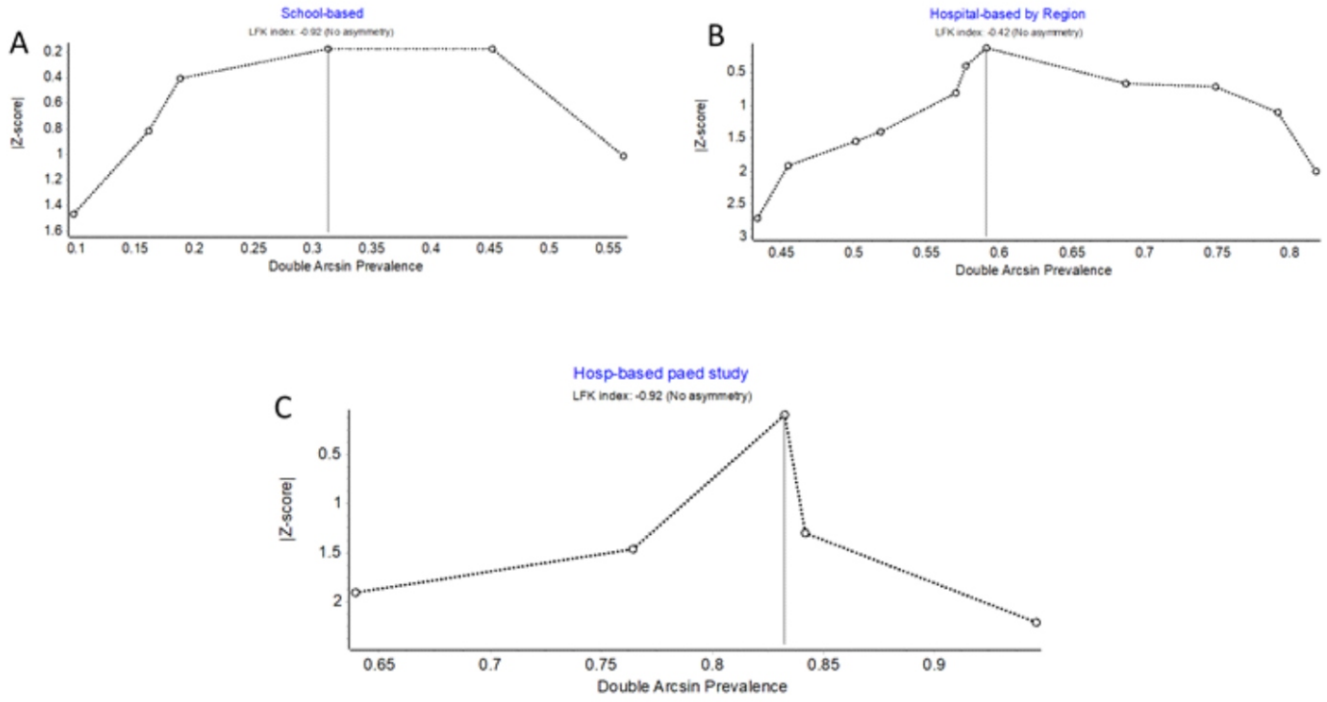


Figure 5: Doi plots for publication bias for included studies in the meta-analysis

Discussion

This study is a systematic review of 24 cross-sectional studies of AD in Nigerians from across different states of the country. These were made up of studies conducted in hospitals or schools and studies where AD diagnosis was made by the dermatologists or with a validated AD diagnostic instrument. The findings indicate a different prevalence rate for each scenario. For community/school-based studies, the prevalence rate (3%) is far lower than was estimated for Africa, by the ISAAC Phase 3 study.[32] Our analysis of the prevalence rate of AD diagnosed by a dermatologist in schoolchildren aged 10 to 20years old produced an even lower rate of 1% after the study using the ISAAC instrument to diagnose AD in a similar age group was excluded from the analysis. This could be as a result of the known limitation of the ISAAC instrument in tropical countries as reviewed by Sanchez et al.[6] Though the doctor-diagnosis of AD is much more preferred, it is difficult to assume that similar features were employed across the board. The prevalence of AD in the community reported in this study (which were essentially school-based studies on children aged 6 to 20years) is higher than was previously reported for Nigeria by Bylund et al.[33] Bylund et al[33] had reported zero prevalence of AD and analyzed only one study in Nigeria.

Dermatologist-diagnosed AD was employed in most of the hospital-based studies. This resulted in a higher prevalence (10%) than the school-based studies. This could be because the prevalence was based on all cases seen in the dermatology clinic; as against the studies conducted in schools which is based on all possible diseases/disorders that can occur within the school children population. This indicates some form of selection bias. Further analysis of these hospital-based studies showed a higher prevalence of AD in the northern part of Nigeria (15%) as against that in the South (8%). This has been observed in a systematic review of common dermatoses in Nigeria by Henshaw et al.[34] Reason was attributed to arid weather of the northern region such as in Kaduna state with mean high temperature/low relative humidity of 34°C/41% compared to those of Port Harcourt in the South with mean high temperature/relative humidity of 31°C/80%. Ibekwe et al.[1] described how AD patients had significantly higher odds of presenting with symptoms during periods/seasons with higher temperature and lower precipitation, humidity settings. More studies will be required to investigate the reasons for this difference.

The highest prevalence rate of AD that is reported by this study was that of children studied within the hospital/dermatology clinic setting (16%). This lies within the global estimate of AD in children.[5] Although most studies have observed a higher frequency of AD in infants than older children[1,10,15,34], this study is the first to report a meta-analysis of these prevalence studies among Nigerian children. Studies of AD among Nigerian adults were not found, although half of the studies included in this analysis involved both children and adults. However, we could not confirm the prevalence of AD in adults or the number of adults who were diagnosed with AD since childhood. The prevalence rate of hospital-based studies estimated in this study (10%) was higher than reported by Henshaw et al.[34] who reported 8.2%. Since their report was from hospital-based studies published from the year 2000 to 2016 and our study is from 2000 to 2020, this rise may confirm previous assumptions that the prevalence of AD is rising in Africa.[35]

Limitations

This study included all possible studies on AD including hospital-based, doctor-diagnosed, and studies where AD is a secondary outcome. Although, the trend in using doctor-diagnosed AD is still acceptable, it is difficult to ascertain if similar clinical features of AD were used to diagnose AD across studies. We could only report point prevalence of AD, most studies did not have information on risk factors, socio-economic position, and disease patterns. There were no studies on AD in adults only.

Conclusion

AD is a common disorder across the different states in Nigeria. It is more prevalent in the northern parts of Nigeria and hospital-based studies. Further epidemiological studies on childhood and research on adulthood AD are needed in Nigeria. There is also a need to assess the features of doctor-diagnosed AD and how it compares with established diagnostic criteria.

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Conflict of Interest: None

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