Psoriasis and Down Syndrome: Do Clinicians Need to Screen for High Blood Pressure?

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BACKGROUND

Psoriasis is common in individuals with Down syndrome (DS), yet the association of psoriasis with cardiometabolic diseases in DS is unknown (**Figure 1**).[1] In the neurotypical population, psoriasis is associated with increased risk of hypertension.[2] In contrast, individuals with DS exhibit a distinct cardiometabolic phenotype characterized by lower baseline blood pressure.[3] Whether psoriasis alters the unique cardiometabolic profile of DS remains unclear.

OBJECTIVE

Assess systolic and diastolic blood pressure values in individuals with DS and psoriasis compared to matched controls without psoriasis

METHODS

A retrospective cohort study using the United States Epic Cosmos dataset was performed from January 1, 2017, to December 31, 2024. Inclusion criteria included ≥1 encounter with an ICD-10 diagnosis code for DS, ≥2 encounters for cutaneous psoriasis, and at least 3 systolic/diastolic values within physiologically plausible ranges taken during an annual well-visit **(Table 1, Figure 2)**. Patients with DS and psoriasis were matched 1:4 to individuals with DS by age and sex. Subgroup analyses were performed by sex and age.

FIGURE 1. Psoriasis in individuals with Down syndrome

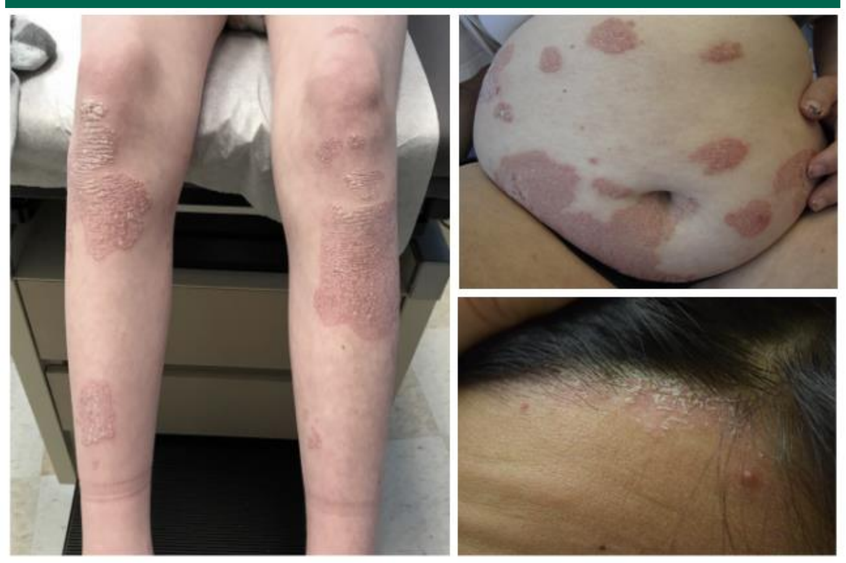
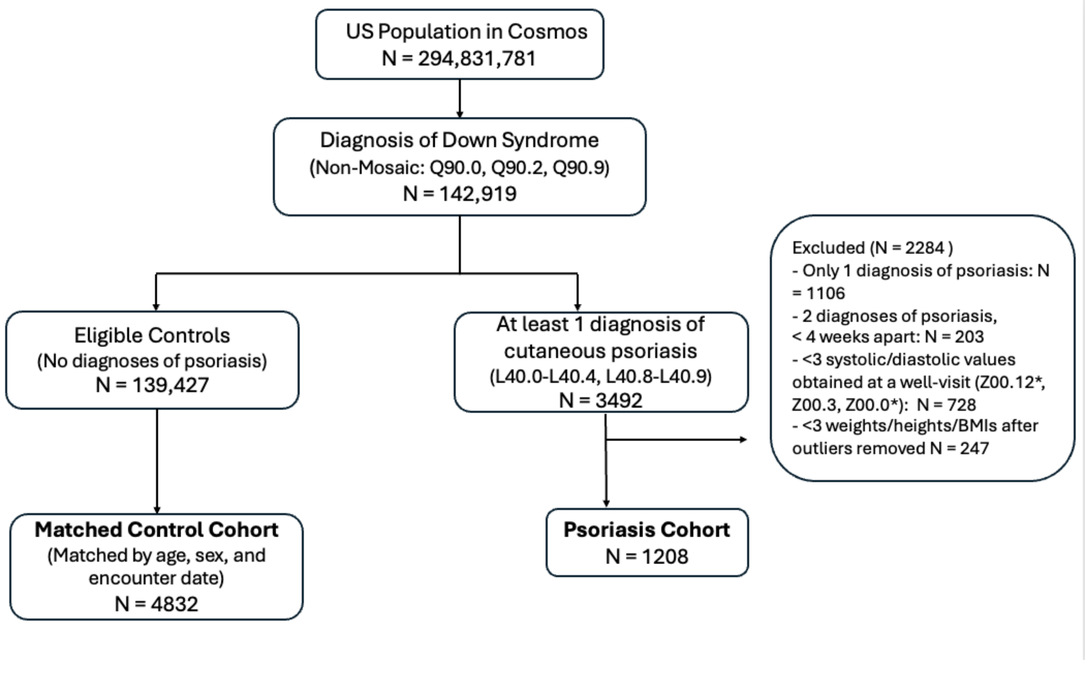


TABLE 1. Systolic and Diastolic Ranges for Inclusion Criteria

Age range (years)	Systolic Range (mmHg)	Diastolic Range (mmHg)
0-5	60-130	30-100
6-12	60-150	30-110
13-17	70-150	40-110
18+	80-160	40-110

FIGURE 2. Study Flowchart



RESULTS

A total of 1,208 patients met inclusion criteria (**Table 2**). There were no significant differences in systolic or diastolic blood pressure between individuals with Down syndrome and psoriasis and individuals with Down syndrome alone: **mean systolic blood pressure was similar between groups (113.0 vs 113.2 mmHg, p=0.57), as was diastolic blood pressure (69.52 vs 69.57 mmHg, p=0.83).** These findings remained consistent across subgroup analyses by sex (female and male) and age (pediatric and adult), with no statistically significant differences observed in any subgroup (all p>0.05) (**Table 3**)

TABLE 2. Demographics Characteristics

Group		Psoriasis cases	Control population
Overall population		1,208	4,832
Sex			
	Female	553 (45.8%)	2,212 (45.8%)
	Male	655 (54.2%)	2,620 (54.2%)
Age at first psoriasis diagnosis (years), Mean (SD)		32.01 (14.24)	-
Age range, years			
	0 – 12	21 (1.7%)	84 (1.7%)
	13 – 17	69 (5.7%)	276 (5.7%)
	18 – 29	365 (30.1%)	1,456 (30.1%)
	30 – 39	276 (22.9%)	1,104 (22.9%)
	40 – 49	238 (19.7%)	952 (19.7%)
	50 - 59	156 (12.9%)	1624 (12.9%)
	60+	84 (7.0%)	336 (7.0%)
Race and Ethnicity			
	Hispanic	162 (13.5%)	591 (12.3%)
	Non-Hispanic Asian	50 (4.2%)	114 (2.4%)
	Non-Hispanic Black or African American	48 (4.0%)	473 (9.8%)
	Non-Hispanic Other (including multiracial)	23 (1.9%)	69 (1.4%)
	Non-Hispanic White	749 (62.2%)	2,838 (58.9%)
	Unknown	172 (14.3%)	732 (15.2%)
United States Census Region			
	Midwest	373 (30.9%)	1,534 (31.7%)
	Northeast	281 (23.3%)	1,068 (22.1%)
	South	381 (31.5%)	1,605 (33.2%)
	West	165 (13.6%)	604 (12.5%)
	US Territories	< 11 (< 0.9%)	< 20 (< 0.4%)
	Unknown	< 11 (< 0.9%)	< 20 (< 0.4%)
Insurance at first psoriasis diagnosis			
	Medicaid	255 (21.1%)	
	Medicare	400 (33.1%)	
	Commercial (Miscellaneous other)	494 (40.9%)	
	Uninsured (self-pay)	< 11 (< 0.9%)	
	Unknown	54 (4.5%)	
	Not Applicable	< 11 (< 0.9%)	

TABLE 3. Subgroup analyses of systolic and diastolic values

Outcome	Subgroup	Control	Psoriasis	Diff (SE)	P-value
Systolic	Female	112.3 (0.22)	112.2 (0.43)	0.09 (0.48)	0.8527
	Male	114.0 (0.20)	113.7 (0.40)	0.26 (0.44)	0.5551
	Adult	113.6 (0.15)	113.5 (0.30)	0.15 (0.34)	0.6681
	Pediatric	107.3 (0.57)	107.8 (1.03)	-0.50 (1.17)	0.6700
Diastolic	Female	69.10 (0.16)	68.80 (0.31)	0.31 (0.35)	0.3809
	Male	69.96 (0.14)	70.13 (0.29)	-0.17 (0.32)	0.5990
	Adult	69.87 (0.11)	69.85 (0.22)	0.02 (0.24)	0.9446
	Pediatric	65.38 (0.41)	65.83 (0.74)	-0.45 (0.85)	0.5929

WHY THIS RESEARCH MATTERS

Despite strong evidence linking psoriasis to hypertension in the general population, this association was not observed in individuals with Down syndrome. Prior studies have consistently shown that individuals with Down syndrome have lower blood pressure and a reduced prevalence of hypertension, even in the setting of obesity and other metabolic comorbidities. Proposed mechanisms include altered autonomic regulation, reduced sympathetic vascular tone, and overexpression of chromosome 21 genes involved in vascular protection and oxidative stress responses, including RCAN1, DYRK1A, and CBR1. Together, these findings suggest a potential decoupling of systemic inflammation from blood pressure regulation in Down syndrome, highlighting a distinct and potentially modifying cardiometabolic phenotype that warrants further investigation.

BOTTOM LINE: Clinicians do not need to be concerned about hypertension in patients with Down syndrome and psoriasis

FUNDING

National Institutes of Health INvestigation of Co-occurring conditions across the Lifespan to Understand Down syndrome (INCLUDE) Project R03 - RFA-OD-22-008

AFFILATIONS

REFERENCES