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a call for increased awareness of chronic skin disease in Greenland

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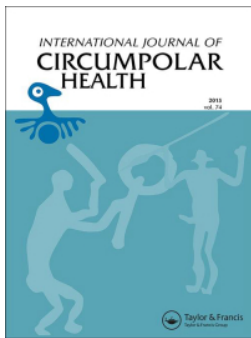
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Low prevalence of patients diagnosed with psoriasis in Nuuk: a call for increased awareness of chronic skin disease in Greenland

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ABSTRACT

The objective of this study was to estimate the age- and gender-specific prevalence of psoriasis in Nuuk. Furthermore, we aimed to explore the common risk factors and comorbidities for patients with psoriasis compared to an age- and gender-matched control group. The study was designed as a cross-sectional case-control study based on national high-quality data from medical and population registers in Nuuk. A total of 175 patients (0.9%) were diagnosed with psoriasis in Nuuk by January 1 January 2022, of which 79 were females and 96 were males. The prevalence of patients diagnosed with psoriasis in the adult population aged 20 years old or more in Nuuk was 1.1%. No overall gender-specific difference in prevalence was observed. Chronic diseases including diabetes, hypertension, and obstructive lung disease were observed more frequently among patients with diagnosed psoriasis (28.6%) in Nuuk compared to controls (20.9%) ($p < 0.05$). We found a low prevalence of patients with psoriasis in Nuuk. We speculate that the prevalence found in this study is underestimated and thus, call for increased awareness of chronic skin disease in Nuuk, Greenland. Chronic co-morbidity to psoriasis was common.

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Introduction

Greenland is the largest Island in the world, with 85% of its 2.2 million square metre surface covered by ice. Approximately 56,500 people live along the ice-free coastline in Greenland, of which 19,261 live in the capital Nuuk. The majority (90%) of the population is of Greenlandic origin, and 10% are immigrants (mostly from Denmark) of which 2.4% come from the Philippines, Thailand and Iceland [1].

Psoriasis is a multifactorial polygenic chronic, immune-mediated inflammatory skin disease characterised by the formation of sharply demarcated, scaly erythematous plaques [2].

Psoriasis is estimated to affect 125 million people worldwide. In Europe, it is estimated that approximately 5 million people suffer from psoriasis, while 7 million people in the US have psoriasis. In western countries, the prevalence of psoriasis is believed to be around 2–4% [3–5], while the highest prevalence of psoriasis is found in the Scandinavian population. In Denmark, approximately 2.2–2.8% of the population suffers from psoriasis [6,7]. The self-reported lifetime prevalence of psoriasis in northern Norway

increased from 4.8% in 1979–1980 to 11.4% in 2007–2008, indicating an increased awareness of the disease over the last 40 years [8]. Due to difficulties in accurately identifying and documenting the disease, psoriasis is believed to be underdiagnosed and undertreated in many countries across the world [5].

Very few studies describe the prevalence and incidence of psoriasis among Inuit populations [9–11]. Higher prevalence rates have been reported at higher latitudes, and in Caucasians compared with other ethnic groups [12]. In Greenland, the earliest mentioning of psoriasis stems from a book from 1940 based on observations done by a doctor through 30 years [10]. Here, a girl in 1912 was described as having psoriasis. Furthermore, an epidemiological study from 1980 found a low incidence of chronic diseases, including psoriasis, in the Upernavik district in northern Greenland in the years of 1950–1974 [11]. The current prevalence of psoriasis in Greenland is unknown.

The disease can debut at any age. Several studies indicate that 75% of cases of psoriasis occur before

46 years of age, with an average age of onset at 33 years. Other studies suggest the average age of onset for psoriasis to be bimodal with two peaks: the first peak at 16–22 years of age and the second peak at 57–60 years of age [13].

There is no significant gender difference, other than a dominance of males suffering from severe psoriasis [13]. The disease typically fluctuates in severity over time. At present time, there are treatment options available for patients with psoriasis [13].

Psoriasis is a phenotypically diverse disease associated with co-morbidities such as arthritis, cardiovascular diseases, depression, inflammatory bowel diseases, metabolic syndrome and ocular inflammation like iritis, uveitis, and episcleritis [14].

The aim of this study was to estimate the prevalence of diagnosed psoriasis in Nuuk, Greenland, and further to describe and compare basic characteristics of the patients to an age- and gender-matched control group.

Material and methods

Study design

The study was designed as a cross-sectional case-control study based on data extracted from the electronic medical record (EMR) used in Greenland.

Setting

Health care services in Greenland are free of charge including prescribed medicine. In Nuuk, primary health care including treatment of psoriasis is delivered by Queen Ingrid's Primary Health Care Center (PHC). In advanced cases, patients with severe dermatological diseases such as psoriasis can be referred to a specialist in general medicine, located at the PHC in Nuuk. This specialist is responsible for the national coordination and treatment of dermatological diseases in Greenland. All specialised dermatological examinations at the PHC in Nuuk are performed in close collaboration with the Department of Dermatology and Venerology at Bispebjerg Hospital in Copenhagen, Denmark.

Since 1st of January 2021, it became mandatory for medical doctors in primary care in Nuuk to register all contacts in PHC with an ICPC-2 (International Classification of Primary Care version 2) code in the national EMR. However, already since the 1st of March 2015, all physicians working at the PHC in Nuuk have been encouraged to use diagnosis coding regularly.

Study population

All patients with permanent address in Nuuk who had been given a diagnosis code of psoriasis S91 (ICPC-2) or DL40 (International Classification of Disease version 10) were included. Data on the patients were extracted January 1st, 2022.

The background population was obtained from Statistics Greenland [1] and included all people living in Nuuk by January 1st, 2022 (N = 19,261). Furthermore, an age- and gender- matched control group without psoriasis was identified.

Statistical analyses

Covariates

Information on age, gender, smoking, and body mass index (BMI) was extracted from the lifestyle table and the lab card in the EMR. Prevalence of comorbidities including diabetes, hypertension, chronic obstructive lung disease, and asthma was evaluated based on presence of one or more of the following diagnosis codes; T89, T90, K85, K86, K87, R95, and R96 (ICPC-2) or E10, E11, I10, J44, J45 (ICD-10). If available in the EMR, blood pressure measured at home was preferred.

Otherwise, blood pressure measured at the health care centre was used. Glycated haemoglobin (HbA1c) levels were measured from venous blood samples and analysed using a Tosoh G8 HPLC analyser.

Only the most recent measurements performed within two years prior to the date of the data extraction (January 1st, 2022) were included in the analysis.

Statistics

Prevalence estimates were calculated using the background population as denominator. We calculated prevalence ratios (PR) to compare prevalence estimates and used Chi-square tests to compare frequencies between groups. Covariates were described with means and standard deviation (SD). All estimates were calculated with 95% confidence intervals (CI) and p-values below 0.05 were considered significant. All statistical analyses were performed in IMB SPSS Statistics 27.

Ethics

The study was approved by the Ethics Committee for Scientific Research in Greenland (KVUG 2020–24) and the agency of Health and Prevention in Greenland.

Table 1. Age- and gender-specific prevalence of psoriasis in Nuuk.

Prevalence (%) in age groups	Females % (95% CI) (n/N)	Males % (95% CI) (n/N)	<i>p</i>	Total % (95% CI) (n/N)
0–19 years	0.1 (–0.0–0.3) (3/2,321)	0.2 (0.1–0.4) (6/2,478)	0.366	0.2 (0.1–0.3) (9/4,799)
20–29 years	0.5 (0.2–0.9) (8/1,519)	0.5 (0.2–0.9) (8/1,543)	0.975	0.5 (0.3–0.8) (16/3,062)
30–39 years	1.3 (0.8–1.9) (23/1,729)	1.2 (0.7–1.7) (21/1,811)	0.647	1.2 (0.9–1.6) (44/3,540)
40–49 years	1.1 (0.5–1.7) (12/1,093)	1.2 (0.6–1.7) (16/1,389)	0.899	1.1 (0.7–1.5) (28/2,482)
50–59 years	1.6 (0.9–2.3) (21/1,326)	1.3 (0.7–1.9) (20/1,526)	0.541	1.4 (1.0–1.9) (41/2,852)
60–69 years	0.8 (0.2–1.4) (7/844)	1.8 (1.0–2.6) (19/1,054)	0.070	1.4 (0.9–1.9) (26/1,898)
70–79 years	2.1 (0.3–3.9) (5/241)	1.9 (0.3–3.5) (5/269)	0.861	2.0 (0.8–3.2) (10/510)
80+ years	0.0 (0.0–0.0) (0/58)	1.7 (–1.6–4.9) (1/60)	0.323	0.9 (–0.8–2.5) (1/118)
20+ years	1.1 (0.87–1.37) (76/6,810)	1.2% (0.93–1.42) (90/7,652)	0.735	1.1% (0.97–1.32) (166/14,462)
Total	0.9 (0.7–1.1) (79/9,131)	1.0 (0.8–1.1) (96/10,130)	0.547	0.9 (0.8–1.0) (175/19,261)

n/N number of patients/population.

Results

Study population

A total of 19,261 people lived in Nuuk by January 1st, 2022. Of those, 175 (79 females and 96 males) (0.9%) were diagnosed with psoriasis.

Prevalence estimates

Table 1 shows the age- and gender-specific prevalence of patients with psoriasis in Nuuk as of January 1st, 2022. The prevalence of patients diagnosed with psoriasis in the adult population aged 20 years or above in Nuuk was 1.1%. No difference in prevalence related to gender was observed. The prevalence in the youngest age group, 0–19 years old was 0.2% and significantly lower than among adults aged 20 or above ($p < 0.001$).

Characteristics of females and males with psoriasis in Nuuk

The characteristics of patients with psoriasis in Nuuk are shown in Table 2. Males were significantly higher than

females were ($p < 0.001$), and had significantly higher blood pressure, both systolic and diastolic, compared to females ($p < 0.01$).

Table 2 shows that females and males with psoriasis were equally affected by chronic diseases, as 30.4% and 27.1% of the females and males with psoriasis were diagnosed with diabetes, hypertension, and/or obstructive lung diseases. Significantly more females (13.9%) than males (5.2%) with psoriasis in Nuuk were diagnosed with COPD ($p < 0.05$). Significantly more females (12.7% = 10/79 patients) than males (1.0% = 1/96 patients) with psoriasis in Nuuk were diagnosed with asthma ($p < 0.05$). Significantly more males (9.4%) than females (8.9%) with psoriasis in Nuuk were diagnosed with diabetes ($p < 0.05$).

Chronic diseases in patients with psoriasis in Nuuk compared to control group

Table 2 shows a significant association between any chronic disease including diabetes, hypertension, and/or obstructive lung diseases and patients with psoriasis in Nuuk (28.6%) compared to the control group (20.9%)

Table 2. Characteristics of patients with psoriasis in Nuuk (females and males) and a control group matched according to age and gender.

Characteristics	Females Mean (SD)	<i>N</i>	Males Mean (SD)	<i>N</i>	<i>p</i>	Total Mean (SD)	<i>N</i>	Control group Mean (SD)	<i>N</i>	<i>p</i>
Age (years)	45 (15.5)	79	46 (17.5)	96	0.554	45 (16.6)	175	45 (16.6)	350	>0.999
BMI (kg/m ²)	31.6 (7.7)	40	29.2 (5.2)	42	0.100	30.4 (6.6)	82	29.2 (7.3)	120	0.254
Height (cm)	158 (11.9)	40	172 (15.6)	42	<0.001	165 (15.4)	82	165 (17.4)	121	0.908
Weight (kg)	80 (22.7)	41	89 (22.3)	43	0.090	84 (22.8)	84	81 (22.8)	127	0.291
Blood pressure:	126 (13.8)	30	140 (15.1)	36	<0.001	134 (16.0)	66	133 (16.1)	114	0.790
• Systolic (mmHg)	78 (8.4)	30	86 (10.4)	36	<0.005	82 (10.3)	66	83 (10.0)	114	0.905
• Diastolic (mmHg)										
HbA1c (mmol/mol)	39.9 (8.2)	66	41.9 (12.3)	55	0.299	40.8 (10.3)	121	40.0 (10.2)	203	0.480
	% (n)	<i>N</i>	% (n)	<i>N</i>	<i>p</i>	% (n)	<i>N</i>	% (n)	<i>N</i>	<i>p</i>
Daily smoking	44.3 (35)	79	37.5 (36)	96	0.362	40.6 (71)	175	32.9 (115)	350	0.081
Any chronic disease*	30.4 (24)	79	27.1 (26)	96	0.631	28.6 (50)	175	20.9 (73)	350	<0.05
- COPD diagnosis	13.9 (11)	79	5.2 (5)	96	<0.05	9.1 (16)	175	5.1 (18)	350	0.079
- Asthma diagnosis	12.7 (10)	79	1.0 (1)	96	<0.05	6.3 (11)	175	2.6 (9)	350	<0.05
- Diabetes diagnosis	8.9 (7)	79	9.4 (9)	96	<0.05	9.1 (16)	175	4.3 (15)	350	<0.05
- Hypertension diagnosis	21.5 (17)	79	22.9 (22)	84	0.825	22.3 (39)	175	18.0 (63)	350	0.242

HbA1c: glycated haemoglobin. % refers to the percentage of patients with available data. *Any chronic disease = COPD, Asthma, Diabetes and/or Hypertension.

($p < 0.05$). Significantly more patients with psoriasis in Nuuk (6.3%) compared to the control group (2.6%) were diagnosed with asthma ($p < 0.05$). For the control group, the gender distribution of those diagnosed with asthma was 55.6% females and 44.4% males. Significantly more patients with psoriasis in Nuuk (9.1%) compared to the control group (4.3%) were diagnosed with diabetes ($p < 0.05$).

Discussion

Prevalence

We found a low prevalence (1.1%) of patients diagnosed with psoriasis in the adult population in Nuuk. This is in line with previous observations suggesting a low prevalence of psoriasis in Greenland [11]. A prevalence of 1.1% is considered a low prevalence, as the overall global prevalence of psoriasis is 1.9% [15].

Thus, this study probably underestimated the actual incidence of psoriasis in Nuuk. Possibly, patients with well-treated psoriasis have not been in contact with PHC since it became mandatory for medical doctors to register all contacts with an ICP-2 code in the EMR and will therefore not have been included in our study period of 12 months. Furthermore, the prevalence of psoriasis has been found to vary in terms of geography and ethnicity and is found to be higher among people living far from the equator [15]. Hence, the results from this study are lower than expected.

We found almost the exact same prevalence among adult females (0.9%) and males (1.0%) in Nuuk. This was expected, as there is no significant gender difference in psoriasis, other than a dominance of males with severe psoriasis [13]. In this study, it was not possible to differentiate the severity of the disease among the 175 diagnosed patients with psoriasis in Nuuk.

Characteristics and comorbidities

There were significantly more females (13.9%) than males (5.2%) with psoriasis were diagnosed with COPD ($p < 0.05$). Furthermore, significantly more females (12.7%) than males (1.0%) with psoriasis were diagnosed with asthma ($p < 0.05$). In contrast, significantly more males (9.4%) than females (8.9%) with psoriasis were diagnosed with diabetes ($p < 0.05$).

Chronic diseases including diabetes, hypertension, and/or obstructive lung diseases were observed more frequently among patients with diagnosed psoriasis (28.6%) compared to controls (20.9%) ($p < 0.05$). This confirms that psoriasis is a phenotypically diverse chronic disease associated with lifestyle-related diseases such as cardiovascular diseases and metabolic

syndrome. In accordance, a systematic review and meta-analysis from 2015 found that psoriasis patients were at a greater risk of developing chronic obstructive pulmonary disease than the general population [16]. Also, an association between psoriasis and asthma is in line with a recent meta-analysis from 2018, where patients with psoriasis were found to have a higher risk of asthma susceptibility, especially among the older patients with psoriasis [17]. Further, a systematic review and meta-analysis from 2019 found a significant association between psoriasis and diabetes [18].

Strengths and limitations

A major strength of this study was the use of high-quality data from the national EMR-system. Since the 1st of January 2021, it has been mandatory for medical doctors in primary care in Nuuk to register all contacts in PHC with an ICP-2 code. The low prevalence of psoriasis in Nuuk might indicate a deficient registration in the EMR-system. Furthermore, we do not expect all the patients with well-treated psoriasis or other chronic diseases in Nuuk to have visited the PHC within the relatively short period from the 1st of January 2021 to the 1st of January 2022.

The low number of patients per age group have a major impact on the statistical calculations, resulting in weak statistical strength and few statistically significant associations and/or differences. Thus, we speculate that the low prevalence found in this study is lower than the actual prevalence of patients with psoriasis in Nuuk.

Conclusion

A total of 175 patients (0.9%) were diagnosed with psoriasis in Nuuk on the 1st of January 2022. Of the 175 patients with psoriasis, 79 were females and 96 were males. This was lower than expected. In the adult population aged 20 years or above, the estimated prevalence was 1.1%.

Chronic diseases including diabetes, hypertension, and/or obstructive lung diseases were observed more frequently among patients with diagnosed psoriasis compared to controls, (28.6%) in Nuuk compared to controls (20.9%) ($p < 0.05$). This association was expected, as psoriasis is a multifactorial polygenic chronic, immune-mediated inflammatory skin disease associated with lifestyle-related diseases.

Due to the low prevalence estimated in this study, psoriasis is believed to be both underdiagnosed and undertreated in Greenland. We suggest that the prevalence found in this study is underestimated and lower than the actual prevalence of patients with psoriasis in

Nuuk. Thus, we call for increased awareness of chronic skin disease in Nuuk, Greenland.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Research data

The data used to support the findings of this study are included within the article.

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