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Substance use and lifestyle risk factors for somatic disorders among psychiatric patients in Greenland

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ABSTRACT

Patients with psychotic disorders exhibit elevated mortality and morbidity rates compared to the general population primarily due to comorbid somatic diseases. This study aims to describe the prevalence of selected risk factors and somatic disorders among psychiatric patients with a diagnosis of psychotic disorder. Material and methods: Data were retrieved from Greenland's nationwide electronic medical record. The study population consists of 104 patients diagnosed with a psychotic disorder, encompassing schizophrenia or schizotypal and delusional disorders, residing in Nuuk. The study population comprised 104 patients (68 males and 36 females) with a mean age of 40 years. More than 80% were daily smokers, and 68% had harmful use of cannabis. More than half had dyslipidemia (any imbalance in lipids), while over a quarter were classified as obese with body mass index of 30 kg/m2 or higher. Eighteen percent had hypertension, and six percent suffered from diabetes. This study revealed a notable prevalence of risk factors for somatic diseases, particularly smoking and cannabis use among patients with schizophrenia in Nuuk, indicating that a high prevalence of somatic diseases might be expected as the population gets older and the risk of developing somatic diseases becomes greater. Increased focus on monitoring and preventing those as part of the health care is recommended.

Introduction

Mental health problems affect more than 1 billion individuals worldwide, contributing to a decrease in years of good health and a decreased life expectancy compared to the general population [1,2].

For patients with schizophrenia, life expectancy is notably reduced by 15–20 years compared to the general population [3]. Suicide plays a substantial role in this mortality gap. However, lifestyle-related conditions like cardiovascular diseases and other chronic somatic disorders also contribute to reduced life expectancy due to their tendency to be underdiagnosed and inadequately managed [1,3–5].

A high prevalence of comorbid somatic disorders in patients with mental health disorders has been well-described across various nations [6,7], with heightened vulnerability to lifestyle-related somatic diseases such as smoking and obesity among people diagnosed with schizophrenia [3]. Within the last three to four decades, lifestyle-related diseases and conditions have been more common, concomitant with the societal transformations in Greenland towards a modernised society with wage-earning and sedentary lifestyles. [8]. As living, - and health-care conditions have advanced, a concurrent rise in life expectancy has transpired, concomitant with increasing incidence of lifestyle disorders, e.g. diabetes and cardiovascular disease [8–10].

Despite a comparable prevalence rate of schizophrenia, approximately 1% in Greenland in relation to global statistics [11,12]; somatic disorders in psychiatric patients are still scarcely described [11]. Notably, a study in 2021 by Jakobsen et al. underlined scarcities in the attention directed towards somatic well-being in patients diagnosed with schizophrenia [11], prompting more focus on somatic disease and risk factors, including routine annual checks for lifestyle risk factors and diagnosing somatic conditions. Yet, the empirical prevalence rates of risk factors and lifestyle-related diseases like diabetes and hypertension within the demographic of patients with schizophrenia in Nuuk remain uncharted [11].

Therefore, the aim of this study is to ascertain the prevalence rates of selected risk factors and somatic morbidities prevalent among patients living in Nuuk diagnosed with schizophrenia.

Materials and methods

This is an observational, retrospective, cross-sectional register study utilising data extracted from the electronic medical record (EMR) system employed in Greenland [13].

Setting

Greenland is the world's largest island and holds a population of approximately 57.000 people. The demographic composition is predominantly comprised of Inuit individuals, accounting for about 90% of the population, with the residual 10% encompassing individuals of Danish and Asian descent [14]. The infrastructure depends on air and sea transportation, as there are no land connections between settlements and cities.

Healthcare services in Greenland are organised into five distinct regions, each with a regional hospital. The pivotal healthcare institution in Greenland is the Queen Ingrid Hospital, situated in Nuuk, the capital. It functions as the primary provider of specialised secondary healthcare services, including psychiatric care. Satellite healthcare facilities in smaller towns provide primary healthcare, while health stations in remote settlements are staffed by either a nurse or a healthcare assistant. Notably, all healthcare provisions in Greenland are free [15].

The organisation of the psychiatric department at Queen Ingrid Hospital in Greenland comprises an acute ward housing 12 general psychiatric beds, an outpatient clinic, and a day treatment centre in Nuuk [16]. The acute ward in Nuuk serves as a point of referral point for psychiatric patients throughout the entire country. Patients residing in rural areas regularly consult the local nursing staff, with psychiatrists offering remote consultations via online platforms where necessary. Periodically, consultation psychiatrists visit smaller towns to address clinical needs [17].

Greenland is part of the Danish kingdom and a former colony of Denmark. However, Greenland has gradually taken over different areas of social responsibilities, and in 1992, the healthcare system became detached from the Danish healthcare system [18]. However, collaborative arrangements still exist between Greenland and Danish psychiatric entities, specifically in areas concerning child- and adolescent mental health as well as forensic psychiatry. Child- and adolescent psychiatrists and psychologists from Denmark have yearly visits to cities and settlements in Greenland, where they perform clinical assessments, initiate treatments, and follow up. Forensic psychiatric patients sentenced to treatment in a forensic psychiatric hospital setting are sent to a specialised facility in Denmark for short or long periods. The Greenlandig healthcare system finances this agreement [19].

All psychiatric patients in Greenland undergo a diagnostic assessment by a psychiatrist with diagnoses recorded in the EMR utilising the World Health Organization's International Classification of Diseases, Tenth Revision (ICD-10) [20].

Over several years, Greenland has aimed to reduce substance abuse, and several initiatives, such as treatment centres, have been introduced [21].

Substance abuse and misuse treatment for alcohol, cannabis, and gambling addictions is supplied by the local treatment centres, Allorfik, available in every large city since 2016. Like health care, these have equal access and are free of charge [22].

Study population

The study includes patients aged 18 years and older diagnosed with an ICD-10, chapter F2 diagnosis (Schizophrenia, schizotypal, and delusional disorders) and residing in Nuuk. The study population was sampled from the Electronic Medical Record (EMR) including inpatients and outpatients [20].

Data and variables

Data retrieval from the Electronic Medical Record (EMR) was conducted from June to September 2021. The EMR has been described elsewhere [13].

Information about age, gender, and the most recent registration and measurement of smoking, weight, height, blood pressure metrics, plasma lipid profiles inclusive of total cholesterol (TC), triglycerides (TG), low-density lipoprotein-cholesterol (LDL) and high-density lipoprotein-cholesterol (HDL)), glycosylated haemoglobin (Hba1c), daily smoking, and selected diagnosis including International Classification of Primary Care version 2 (ICPC 2) and International Classification of diseases version 10 (ICD 10) were extracted from the EMR September 2021.

Smoking status was affirmed for patients with documented daily smoking habits, and the diagnosis of chronic obstructive pulmonary disease (COPD) (J449) was extracted from the EMR. Use of cannabis was deduced if the patient was diagnosed with the ICD-10 Chapter F10 diagnoses: harmful usage of cannabis (F12.1) or cannabis dependency (F12.1).

Patients were stratified as obese if the most recent Body Mass Index (BMI) was 30 kg/m^2 or higher [23]. Elevated blood pressure status was assigned to those whose most recent blood pressure recording indicated a systolic pressure equal to or exceeding 140 mmHg or diastolic pressure equal to or greater than 90 mmHg [24]. Moreover, patients diagnosed with ICPC-2 code K86-K87 or ICD 10 code I10 were considered to have elevated blood pressure.

Dyslipidemia categorisation was established for patients with any of the following measurements in mmol/l: Total cholesterol above 5.0, HDL Cholesterol below 1.2 (male) or below 1.0 (females), LDL cholesterol above 3.0, or TG above 4.0 mmol/l [25].

Diabetes mellitus type 2 was defined as having glycosylated haemoglobin (HbA1c) of 47 mmol/mol or higher or a formal diagnosis documented under the ICPC-2 T90 or T89 or ICD-10 E10-E14 [26].

All blood samples were analysed at the central laboratory in Queen Ingrid's Hospital, Nuuk (QIH). Methods for analysis of paraclinical data have been described elsewhere [27].

Analysis

The prevalence of risk factors was determined by the sample size ($N = 104$).

Descriptive statistics such as means with standard deviation (SD) were computed as per relevance of the data. Frequencies and variances between genders were assessed. Parametric data underwent T-tests for normally distributed datasets, whereas independent data were subjected to the Mann-Whitney U test. Categorical data underwent analysis utilising either Fisher's exact test or Chi-squared analysis. All statistical computations were executed utilising STATA version 17.0 [28].

P-values below 0.05 were considered statistically significant.

Results

Characteristics of the study sample

The study encompassed a total of 104 patients diagnosed with and ICD-10 F2 diagnosis, whereby 65% ($n = 68$) were male. The mean age of the study population was 40 years (SD 13).

A predominant proportion (63%) were diagnosed with paranoid schizophrenia (F20.0), with the remainder diagnosed with schizoaffective disorder (F25), Hebephrenic schizophrenia (F20.1), Catatonic schizophrenia (F20.2), Undifferentiated schizophrenia (F20.3), Simple schizophrenia (F20.6), acute polymorphic psychotic disorder with symptoms of schizophrenia (F23.1), and Unspecified psychosis (F29). Basic characters are presented in Table 1.

Full data acquisition was successful for over 80% of the patient cohort (Table 1).

Daily tobacco usage was prevalent among 84% of the patients. Less than five people were diagnosed with COPD; thus, data is not further elaborated.

For cannabis abuse, there were gender discrepancies, with a higher prevalence among men relative to women (78% versus 50%, $p = 0.005$). Additionally, approximately a quarter of the study population exhibited obesity, with a mean BMI of 37 kg/m^2.

Eighteen percent had elevated blood pressure with elevated systolic or diastolic pressure exceeding 140/90 mmHg. Moreover, eight percent of the patients were diagnosed with the clinical diagnosis of hypertension (ICPC-2 code K86-K87 or ICD 10 code I10).

Six percent had an HbA1c plasma level at or above 48 mmol/mol or were formally diagnosed with diabetes (Table 2). For dyslipidemia, one-third had elevated LDL cholesterol levels (34%), and more than half had reduced HDL cholesterol levels (56%). Overall 68% of the patients had dyslipidemia (Table 2).

Table 1. Prevalence of life-style risk factors among 104 patients diagnosed with an ICD-10 F20-29 diagnosis, Nuuk Greenland 2021.

	Data available %	Total N = 104	Men N = 68	Women N = 36	P-value
Age, year mean (SD)	100	40 (13)	40 (11)	39 (15)	0.763[c]
Daily Smoker n (%)	89	87 (84)	56 (82)	31 (86)	0.640[b]
Harmful use of cannabis n (%)	96	71 (68)	53 (78)	18 (50)	**0.005**[b]
Height, m mean (SD)	93	1.71 (0.10)	1.76 (0.10)	1.62 (0.11)	**> 0.001**[a]
Weight, kg mean (SD)	94	81 (20)	81 (21)	82 (19)	0.836[c]
BMI, kg/m^2 mean (SD)	93	28 (7)	26(6)	31(7)	**> 0.001**[c]
Systolic blood pressure, mmHg mean (SD)	94	126.6 (13.0)	127.0 (12.6)	126.0 (14.0)	0.663[a]
Diastolic blood pressure, mmHg mean (SD)	94	78.1 (9.2)	78.2 (9.4)	78.0 (9.1)	0.823[a]
HbA1c, mmol/mol mean (SD)	96	40 (3.7)	39 (3.5)	41 (4.0)	0.063[a]
Total cholesterol, mmol/L mean (SD)	95	4.3 (1.0)	4.2 (1.0)	4.6 (0.8)	0.067[a]
LDL cholesterol, mmol/L mean (SD)	95	2.6 (0.7)	2.5 (0.8)	2.8 (0.7)	0.085[c]
HDL cholesterol, mmol/L mean (SD)	95	1.2 (1.1)	1.4 (0.4)	0.9 (0.4)	0.426[c]
Triglycerides, mmol/L ean (SD)	95	1.8 (1.2)	1.7 (1.2)	2.2 (1.3)	**0.004** [c]

The p-value relates to tests for differences between men and women.
[a]: T-test (normal distribution, mean) [b]: Chi^2-test [c] Mann-Whitney U-test (independent samples).

Table 2. Prevalence of selected somatic risk factors among 104 patients diagnosed with schizophrenia Nuuk Greenland 2021.

		Total N = 104
		n (%)
[1]Obesity	BMI >30 kg/m^2	29 (28)
[2]Elevated blood pressure	Systolic or diastolic blood pressure > 140/90 mmHg	19 (18)
[3]Diabetes mellitus	HbA1c >47 mmol/mol	6 (6)
[4]Dyslipidemia	Any imbalance in lipids	71 (68)

[1]BMI >30: obese; [2]Hypertension: sys/dia: 140/90; [3]Diabetes mellitus: HbA1c > 47; [4]Normal range total cholesterol: < 5.0 mmol/L, Normal range LDL cholesterol <3.0 mmol/L, Normal range HDL cholesterol >1.0 mmol/L, Normal range of triglycerides <4 mmol/L [25].

While analysing lipids, we divided the participants into two groups by age: over and under 40. We found that with increasing age, LDL cholesterol and triglycerides slightly increased, and HDL cholesterol had a slight decrease. For triglycerides, the increase was significant (mean (SD) 2.1 (1.4) mmol/L versus 1.5 (1.0) mmol/L $p = 0.002$). However, the measured triglycerides in both age groups were within the normal range. Furthermore, a gender-stratified analysis revealed that women exhibited a higher BMI than men, with a mean (SD) of 38 (5) versus 36 (4) in the obesity groups.

No other gender or age differences were observed within the dataset.

Discussion

Since the majority of Greenland's population is Inuit, we will investigate below whether we can find similarities or differences between the psychiatric patients and general Inuit populations.

Major findings

This investigation revealed a notable prevalence of risk factors associated with somatic diseases among adult patients diagnosed with schizophrenia. Noteworthy findings included a high proportion of daily smoking, 84%; harmful use of cannabis, 68%; dyslipidemia, 68%; obesity, 28%; and elevated blood pressure, 18%. Moreover, six percent were diagnosed with diabetes or observed with elevated levels of glycosylated haemoglobin.

Interestingly, we found that somatic health data was available for more than 80% of the study population, suggesting an effective implementation of somatic health considerations propounded by Jakobsen et al. [11].

Lifestyle factors

Smoking

Within the study population, 84% of the patients had daily tobacco usage ranking among the highest globally [29], surpassing the general population prevalence in Greenland of 55% and that of other Inuit populations [21,29,30]. This heightened prevalence of tobacco use among patients with schizophrenia aligns with observations in various international settings [31]. It has been suggested that tobacco smoking reduces negative symptoms in schizophrenia, and thus, patients might use it for therapeutic purposes [32]. Recent investigations have also raised the prospect of smoking as a contributing factor to the onset of schizophrenia [32,33], contrasting the observation that the prevalence of schizophrenia in Greenland does not surpass that of other nations [11].

Of clinical significance, tobacco use has been linked to reduced plasma levels of antipsychotic medications [34], necessitating higher to manage psychotic symptoms effectively. Studies indicate that the dosages of antipsychotics administered in Greenland exceed those prescribed in Denmark [35], likely influenced by the pronounced disparity in smoking prevalence between patients with schizophrenia in Denmark (64% vs. 84%) [36].

Consistent with other studies, our findings underscore that patients with psychiatric conditions exhibit heightened tobacco consumption relative to the general population, substantiated by global estimates attribution of daily tobacco use to 53–70% of patients with schizophrenia [21,29,32,37,38].

Even though nearly all the patients in this sample were daily smokers, less than 4% were diagnosed with COPD. The prevalence of COPD in Greenland is estimated to be 2.2%, with 99% of the patients being between 40–79 years [39]. However, 7.5% of the Greenlandic population uses medication targeting COPD, suggesting that the registered diagnoses might be underestimated [10,21]. The high number of psychiatric patients smoking and the low prevalence of COPD may indicate that psychiatric patients and people in the general population are underdiagnosed and have unmet treatment needs. This concern will only be greater with advancing age as the prevalence increases [39].

In line with other studies, we have documented that psychiatric patients have higher tobacco use than the general population, and internationally, it is estimated

that 53–70% of patients with schizophrenia have daily tobacco use [21,29,32,37,38].

Cannabis use

The prevalence of cannabis use within this study population was 68%, markedly exceeding the corresponding figure in the general population of Greenland, where 6.4% engage in weekly use of cannabis [21].

Risk factors associated with cannabis use

Cannabis consumption predominantly manifests among young men with compromised mental- and somatic health, lower educational attainment, and residents in low socioeconomic areas [40]. While our study did not incorporate data relating to education and income, prior research indicates that individuals with low socioeconomic status and educational achievements are inherently predisposed to heightened vulnerabilities concerning mental health challenges and substance abuse [41,42].

Furthermore, intergenerational trauma among Arctic Indigenous communities resulting from historical colonisation, abrupt socioeconomic transitions without regard for individual autonomy, and, thus, loss of cultural identity have been described as contributory factors fostering cannabis usage in North American Arctic areas [43–45].

The recent evaluation report from Allorfik, the national Greenlandic Treatment Centre, highlights that an increasing number of citizens have completed their treatment programme, and for patients with mental disorders, data showed that those who had completed the Allorfik treatment programme had reduced symptoms of anxiety, concentration, and aggression but unchanged depressive and psychotic symptoms [46]. To enhance the treatment programme, they have introduced a future goal to increase collaboration with the healthcare system to improve the prognosis for people with substance abuse and psychiatric disease [46].

Cannabis and psychiatric morbidity

Cannabis use has been linked to the onset and exacerbation of psychiatric symptoms such as psychosis and depression [47]. Moreover, the heightened mortality rates among psychiatric patient cohorts are intricately linked to maladaptive patterns of substance abuse [48].

Within North American Indigenous communities, a correlation has been delineated that people who commit suicide are more likely to use cannabis compared to the non-Indigenous population with no substance abuse [49]. This is concerning, as patients report using cannabis to alleviate an array of distressing symptoms such as anxiety, depressive symptoms, sleep disorders, and social discomfort, akin to indicators commonly observed in patients diagnosed with a psychosis disorder under the ICD-10 classifications (codes F20–29) [50]. This observed reliance on cannabis within Indigenous cultural frameworks, characterised by shared risk factors and historical intergenerational trauma, underscores the need for contextualised interventions tailored to the unique challenges within these communities.

Our findings are in line with previous research that having a psychiatric diagnosis increases the propensities towards cannabis use, underscoring the imperative for fortified collaboration between substance abuse centres and the healthcare system to address this pressing public health concern [35,51–53].

Lifestyle risk factors

Smoking, obesity, dyslipidemia, hypertension, and diabetes are all risk factors for developing more serious somatic diseases that can affect morbidity and mortality [1,2]. Various lifestyle risk factors were present in this study population; BMI and diabetes are higher than in the general Greenlandic population.

Noteworthy among them are elevated BMI and heightened prevalence of diabetes, surpassing the general Greenlandic population.

Obesity and dyslipidemia

Within the general Greenlandic population, approximately 32% of women and 24% of men exhibit obesity (BMI > 30 kg/m^2). Our study population demonstrated a parallel obesity rate, as 25% had a BMI >30 kg/m^2, with gender disparity favouring higher BMIs among women. These findings resonate with prevailing trends in other Inuit cultures, positioning Inuit men and women in the top half of nearly 80 countries regarding obesity, with women ranking over men [21,54,55].

Dyslipidemia is common in the general Greenlandic population, with a prevalence of approximately 80%, and focus has recently been increased on this health issue, as there has been observed incongruence between paraclinical lipid profiles and subsequent prescription practices with cholesterol-lowering agents [56]. Further, the Greenlandic population survey results show that LDL cholesterol increases with age [21].

In concordance with these trends, our study population also had a high prevalence of dyslipidemia and an increase in triglycerides with increasing age in line with the general population, thus advocating for an extension of cholesterol management strategies to

encompass psychiatric patients, as health data on treatment strategies are scarce [57].

Hypertension

Notably, 18% of the patients in this population presented with elevated blood pressure readings, yet merely eight percent had received a formal hypertension diagnosis. This corresponds with the discrepancy between diagnoses and drug usage in the general population in Greenland, with a diagnostic prevalence of hypertension of 7.9%, while antihypertensive drug utilisation is notably higher at 17.5% [58].

Diabetes

Parallel to the global trajectory, diabetes incidence in Greenland has exhibited an upward trajectory over recent decades, with the 2019 prevalence standing at 2.2% with a notable upward trend correlating increasing age with heightened diabetes incidence [9,21,59]. In contrast, within our study population, 6% displayed elevated HbA1c levels surpassing 47 mmol/mol, indicative of a diabetes prevalence twice as high as the general population [9].

Strengths and limitations

This study delineates the prevalence of selected somatic diseases and lifestyle risk factors among psychiatric patients in Greenland, thus focusing on distinctive challenges encountered by this frequently underserved group of patients.

All data was obtained from the EMR records, reducing the potential for recall bias risk.

Restricting our analysis solely to patients with F20–29 diagnoses necessitates a prudent approach when generalising our conclusions to encompass other groups of psychiatric patients.

Given the study's cross-sectional design, the causal relationships between psychiatric conditions and the emergence of somatic comorbidities such as obesity, hypertension, and diabetes remain undetermined. Plausible explanations encompass the influence of psychopharmacological medications, specific lifestyle practices influenced by socioeconomic status, unwholesome dietary items, elevated tobacco usage, and substance abuse.

It is plausible to assume that unexamined patients within this population exhibit comparable somatic comorbidities, with anticipation of heightened risk factors potentially stemming from limited adherence to routine health monitoring.

Clinical implications

We have tried to highlight similarities in Inuit cultures living in similar geographical areas [19]. However, research materials are very limited and even more limited when focusing on somatic health in these minority groups. We hope to inspire further research into mental and somatic health in this overlooked patient group as this present study unfolds several critical clinical considerations warranting contemplation. Notably, the pronounced prevalence of cannabis use prompts an exploration of potential interventional strategies that can be introduced to address this concerning trend. Moreover, the elevated incidence of lifestyle risk factors engenders inquiries concerning the nature of treatments and follow-up schemes for these patients. The availability of health data indicates amplified attention directed towards this patient demographic; nevertheless, the applicability of this insight in shaping disease prevention strategies remains an area requiring further examination.

Conclusion

The identification of a heightened prevalence of somatic disease risk factors, smoking, and use of cannabis among patients diagnosed with schizophrenia in Nuuk portends a future trajectory marked by an augmented burden of somatic diseases as the population advances in age, as the risk of developing somatic diseases increases.

The recommendation stemming from these findings is encouraging a heightened emphasis on preventative measurements, tailored treatments, and monitoring protocols within the healthcare system.

Acknowledgments

Disclosure statement

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Ethics

The study was approved by the Ethics Committee for Medical Research in Greenland, The Agency for Health and Prevention in Greenland, and the management of Queen Ingrid Health Care Center. (Nanoq – ID nr: 18088306)

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