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Selected Non-communicable Disease Risk Factors and Mental Health of South African Durban-based Refugees: A Cross-sectional Study

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Abstract:

Background: Non-communicable diseases (NCDs) are the leading contributor to mortality and morbidity worldwide, with refugees considered more susceptible to NCDs. Refugees often encounter difficulties in accessing healthcare, resulting in delayed diagnostic assessment and treatment of mental disorders and NCDs, leading to the deterioration of the condition. The study aimed to ascertain the prevalence of risk factors for NCDs and mental health among South African Durban-based refugees.

Methods: This cross-sectional study was conducted among 121 randomly selected South African Durban-based refugees. Data on the metabolic risk factors for NCDs were collected using a modified version of the World Health Organisation (WHO) STEPwise approach to (NCDs) surveillance (STEPS) instrument. Participants' mental health disorders were determined with a Global Mental Health Assessment Tool-Primary Care Version questionnaire.

Results: A significant 38.80% of participants had normal BMI [x^2 (5, n=47) = 82.55, p<.001], 24.0% were overweight [x^2 (5, n=29) = 82.55, p<.001], 25.6% were obese class l [x^2 (5, n=31) = 82.55, p<.001]. A significant 77.1% [x^2 (2, n=64) = 76.79, p<.001] of the participants had desirable cholesterol levels, and 62.3% [x^2 (2, n=71) = 44.57, p<.001] had normal fasting glucose levels. A significant 26.1% [x^2 (4, n=31) = 64.82, p<.001] and 46.2% [x^2 (4, n=55) = 64.82, p<.001] were classified as having hypertension stage I and II, respectively. A non-significant 32.2% and 25.0% experienced depression and anxiety.

Conclusions: The prevalence of hypertension and high BMI levels combined with mental disorders underscores the importance of healthcare service delivery to this vulnerable population in SA.

Keywords: Anger, Body mass index, Cholesterol, Depression, Anxiety, Glucose.

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1. INTRODUCTION

Refugees, a socially disadvantaged and vulnerable grouping, are believed to be more predisposed to non-communicable diseases (NCDs) risk factors [1, 2]. Non-communicable diseases (NCDs) are the leading contributor to mortality and morbidity, killing 41 million people each year, equivalent to 74% of all deaths globally [3]. Non-communicable diseases are chronic diseases resulting from a combination of metabolic and behavioral risk factors [4]. The main metabolic risk factors for cardiovascular diseases (CVDs) that are very prevalent amongst refugees brought on by conditions such as poverty and displacement are a high body mass index (BMI), blood glucose, blood pressure, and cholesterol [5, 6]. Unfortunately, after migration, refugees often

experience profound changes in their lifestyle, including shifts in the natural environment, dietary patterns, educational opportunities, physical activity levels, income, and access to healthcare [7]. These lifestyle modifications are significant contributors to the susceptibility of South African Durban-based refugees to non-communicable diseases (NCDs). Factors such as a high body mass index (BMI), sedentary behavior, and limited access to healthcare services can exacerbate the risk of NCDs, including cardiovascular diseases and metabolic disorders. Recognizing and addressing these lifestyle-related challenges is crucial for developing effective healthcare interventions and promoting the well-being of this vulnerable population [8]. Regrettably, South African Durban-based refugees' metabolic NCDs risk factors are currently unreported, with previous investigations showing that migration usually worsens the chance for CVD risk factors [9]. Compounding the NCDs risk factors of South African-based refugees is that in South Africa, the public healthcare services accessed by refugees, compared to private healthcare services, can be described as mostly dysfunctional. Also, healthcare providers in public healthcare services are often unsympathetic towards refugees of African descent [9]. Establishing the metabolic NCDs risk factors of Durban-based refugees can be a first step in advocating for better healthcare for this vulnerable group of people, which would denote improved health outcomes for the refugees.

Refugees' living conditions, such as BMI, can change their health indicators [6]. Researchers showed that individuals with BMI scores below or above the ideal values had a higher risk for chronic diseases [6]. Therefore, it is crucial to monitor BMI as it can help prevent obesity and its comorbidities [6]. Researchers showed that 60.5% of Iraqi refugees were overweight [6]. In comparison, 39.5% of Syrian refugees in Jordan had normal BMI values [6]. Amongst German refugees, 58.8% were overweight and obese [10]. Researchers reported that the prevalence of hypertension was 17.2% among Syrian refugees in northern Jordan [11] and 33.7% among Bangladeshi refugees [12]. However, more than half of the Bangladesh refugees were found to have pre-hypertension according to their systolic (55.8%) and diastolic (68.3%) blood pressures [12]. A study among northern Jordan refugees showed that the prevalence of hypertension was 14.0% [13]. Since many people with diabetes remain undiagnosed, blood glucose is used as a measure of diabetes [14]. Regarding refugee blood glucose, 84.7% of Bangladesh refugees showed an average random blood glucose level (4.4–7.8 mmol/L), with 14.4% being pre-diabetic (7.8–11.1 mmol/L) [12]. Researchers indicated that 69.7% of Iran refugees had ideal fasting blood glucose levels [5]. However, South African Durban-based refugees' BMI, blood pressure, and blood glucose levels are undetermined.

Over 19 million refugees are exposed to stressful events such as war and trauma before migration [14-16]. Many refugees are exposed to various risk factors for mental health problems before and after their migration [17]. Such mental health disorders include anxiety disorders, post-traumatic stress disorder (PTSD), and depression among refugee populations in comparison to the general population [16]. Estimates of the prevalence of mental illness in refugees vary considerably, even at the level of systematic reviews [18]. Refugees residing in refugee camps in low-income countries showed a high prevalence of anxiety and depression [19]. Researchers indicated a high prevalence of anxiety and depression of 40.3% and 47.7% among Syrian refugees [20]. In this regard, research by Acarturk *et al*. [21] shows that the prevalence of depression and anxiety was 36.1% and 34.7% among Turkish refugees with mental health diseases of South African Durban-based refugees currently unreported.

Studies focusing on metabolic NCD risk factors and mental health among South African-based refugees are still scarce, with NCDs forming a fundamental part of health service delivery in South Africa. Globally, there is increased attention to addressing the needs of refugees, resulting in greater demands for services appropriate to their needs, including health and mental health services [19]. Monitoring the current status of mental health problems and these key metabolic risk factors is a crucial component of NCD control that could shed light on providing evidence of possible programs to be included in health service delivery. It is essential to generate proof to see how mental health problems and metabolic risk factors impact Durban-based refugees that can be used to inform and direct health service planning efforts for the refugee populations based in South Africa. The current study aimed to investigate the prevalence of selected risk factors of NCDs and mental health disorders amongst Durban-based refugees in South Africa. The next section will elucidate the methods employed to answer the above study's aims.

2. METHODS

2.1. Study Design and Setting

A once-off cross-sectional, quantitative design was conducted among 121 Durban-based refugees. Data was collected at the Pastoral Refugee Care Centre, Durban, Kwazulu-Natal, South Africa, as South African refugees are predominantly based in urban areas and not in refugee camps [22].

2.2. Sampling

The sample size was determined using a sample size calculator, assuming a confidence level of 95% and a confidence interval of ±5%; hence, the minimum required sample size was 121 [23]. Accordingly, 121 refugees were randomly selected using the following inclusion criteria: 1) older than 18 years, 2) versed in the English language, and 3) permanently living in Durban, South Africa. Refugees were excluded if their asylum was not secured, whose application was still in process, and who acquired citizenship through birth or marriage. A sampling strategy was employed to recruit participants by contacting all organizations that assist refugees in attaining integration

and independence. After obtaining informed consent, the data was collected over four days at the Pastoral Refugee Care Centre.

2.3. Data Collection and Measurements

2.3.1. WHO NCD STEPS Instrument

Data were collected using a modified version of the World Health Organisation (WHO) NCD STEPS instrument version 3.1 [3]. The instrument incorporates questions on various cardio-metabolic risk factors and is separated into four sections or steps. Step 1 included questions on socio-demographic characteristics, Step 2 explored the refugee's behavioral risk factors, Step 3 investigated anthropometric (body mass index) and blood pressure (BP) measurements, and Step 4 examined biochemical risk factors, fasting blood glucose (FBG) and total cholesterol (TG) or hypercholesterolemia. WHO Step 2 was excluded as it does not form part of the objectives of this article.

2.3.1.1. Socio-demographic Characteristics (WHO Step 1)

Socio-demographic characteristics, such as sex, age, the highest level of education, marital status, income, ethnicity, and contact details), were collected first.

2.3.1.2. Physical Measurements (WHO Step 3)

Height, weight, and blood pressure (BP) were measured following standard guidelines [24]. Height was measured using a wall-mounted stadiometer (Seca®, the United States of America). Weight was measured using an electronic portable calibrated Omron Karada scale (A&D Medical®, Japan) to the nearest 0.1 kilograms twice to ensure accuracy and reliability. Body mass index (BMI) was calculated as the ratio of [weight (kg)/height (m^2)] [23, 25]. This was further grouped into underweight (<18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese (>30 kg/m^2) [25, 26].

Two BP readings, each three minutes apart, were captured using an automated Omron Sphygmomanometer (Omron®, Australia) on participants" left arms after they were seated for five minutes. Participants also had to refrain from smoking cigarettes and ingesting caffeine for 3 hours or participate in physical activity for 30 minutes before blood pressure monitoring. The readings were averaged to determine the BP status. Normal blood pressure was categorized as <120/80 mmHg, elevated systolic blood pressure as 120–129 mmHg, elevated diastolic blood pressure as <80 mmHg, stage I systolic hypertension as 130–139 mmHg, and stage 1 diastolic hypertension as 80–89 mmHg, stage II systolic hypertension as ≥140 mmHg and stage 2 diastolic hypertension as ≥90 mmHg, hypertensive crisis over systolic 180/diastolic over 120 mmHg [27].

2.3.1.3. Biochemical Measurements (WHO Step 4)

For the hypercholesterolemia and blood glucose risk factors, the total serum cholesterol and blood glucose were measured following 9-hour fasting. Capillary blood was obtained *via* finger prick, and measurements were performed using the Professional Analyzer (CardioChek®, China) for glucose and the Accutrend Plus digital meter (Roche, Germany) for cholesterol measurement. All equipment was calibrated regularly before and during data collection per the manufacturer's instructions.

The fasting cut-offs for glucose were < 100 mg/dL (<5.6 mmol/L) (normal), 100–125 mg/dL (5.6 to 7.0 mmol/L) (prediabetes) and ≥126 mg/dL (≥7.0 mmol/L) (diabetes) [28, 29]. Cholesterol measurements were categorized into high (6.22 mmol/L), borderline high (5.18-6.21 mmol/L), and desirable (<5.18 mmol/L) [28].

2.4. Global Mental Health Questionnaire

The Global Mental Health Assessment Tool-Primary Care Version (GMHAT/PC), developed by [29], was used to identify refugees' mental health disorders (depressive-, anxiety and common mental disorders). The questionnaire was adapted from the "Improving mental health care of young adults in Badakshan province of Afghanistan using eHealth" (Survey questionnaire for community health workers) to include questions on refugees' mental health problems. The adapted questionnaire was piloted on 20 refugees not included in the study to meet the study's objectives. Participants selected 'Yes/No' to determine their level of agreement with the statements in the questionnaire.

2.5. Data Collection Process

After obtaining informed consent, the questionnaires were administered individually to the participants by the first author and trained research assistants who received adequate training in survey methodology. After completing the questionnaires, the research assistants measured the participant's body mass index and made physiological and biochemical measurements. Following the baseline measurements, nearby healthcare facilities were used as a referral for further interventions in cases where the blood pressure, glucose, or cholesterol values were above the extreme risk categories.

2.6. Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS, version 21.0, Chicago. IL, USA). Descriptive statistics were presented as means and standard deviations. Frequencies were represented in tables or graphs. An independent one-sample t-test was used to explore the mean differences between continuous and quantitative data. A binomial test was used to test whether a significant proportion of respondents selected one of two possible responses. The statistical significance was set at $p \leq 0.05$.

2.7. Ethics Statement

All procedures in studies involving human subjects followed the institutional and national research committee's ethical standards and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Ethical clearance was obtained from the university's Biomedical Research and Ethics Committee (BREC/00004006/2022). All participants signed informed

consent to participate in the study. Permission was obtained from the Pastoral Refugee Care Centre manager before data collection.

3. RESULTS

Several 121 refugees participated in the study, with a mean age of 40.5 (±8.6). Females contributed to most participants; 88 (73.6%) and 113 (93.3%) lived in rural areas before being displaced from their origins. Table **1** shows that 93 (76.9%) of most participants earn less than R3800.00 per month. Most participants originate from the Democratic Republic of the Congo (81, 66.9%), with 79 (65.3%) unemployed. Sixty-three (52.1%) of the participants are married.

3.1. Body Mass Index

The mean height and weight of the participants (n=121) were respectively 170.86 cm (SD=8.59) and 76.55 kg (SD=15.36). The participants' minimum and maximum BMI values (n=121) were respectively 14.8 kg/m^2 and 43.2 kg/m^2 (M=26.36, SD=5.69). Table **2** indicates that a significant 38.8% of participants were classified as having a normal BMI (p<.001), 24.0% were overweight (p<.001), and 25.6% were obese class l (p<.001).

Table 1. Socio-demographic characteristics.

Variable	n	Percentage (%)
Income level per month		
<R3 800	93	76.9
R3 800 - R5 000	12	9.9
R5 001 - R10 000	4	3.3
R10 001 - R15 000	2	1.7
>R25 000	2	1.7
Level of education		
Some/ all primary school	13	10.7
Some/ all secondary school	58	47.9
Certificate	15	12.4
Undergraduate degree/ diploma	19	15.7
Postgraduate degree/ diploma	14	11.6
Country of origin		
Burundi	22	18.2
Congo	12	9.9
Democratic Republic of the Congo	81	66.9
Liberia	1	8
Mozambique	1	8
Rwanda	1	8
Employment status		
Unemployed	79	65.3
Self-employed	31	25.6
Full-time employed	3	2.5
Part-time employed	5	4.1
Marital status		
Never married	38	31.4
Married	63	52.1
Separated/ Divorced	12	9.9
Widowed	6	5
Co-habiting	2	1.7

Table 2. Body mass index categories.

BMI Categories	Frequency and %	x^2	df
Underweight	9 (7.4)	82.55	5
Normal	47 (38.8) *	82.55	5
Overweight	29 (24.0) *	82.55	5

(Table 2) contd.....

BMI Categories	Frequency and %	x^2	df
Obese l	31 (25.6) *	82.55	5
Obese ll	3 (2.5)	82.55	5
Obese lll	2 (1.7)	82.55	5

Note: * p <.001.

Table 3. Blood pressure categories.

Blood Pressure Categories	Frequency and %	x^2	df
Normal	20 (16.8)	64.82	4
Elevated	7 (5.9)	64.82	4
Stage 1 hypertension	31 (26.1) *	64.82	4
Stage 2 hypertension	55 (46.2)*	64.82	4
Hypertension crisis	6 (5.0)	64.82	4

Note: * p <.001.

Table 4. Mental health disorders.

Mental Health Disorders	Number (%)		
	Yes	No	n
Depression	39 (32.2)	82 (67.8)	121
Anxiety	30 (25.0)	90 (75.0)	120
Drug addiction	2 (1.7)	117 (98.3)	119
Perinatal mental health	5 (4.2)	115 (95.8)	120
Disturbed sleep	39 (32.8)	80 (67.2)	119
Loss of apathy	22 (18.5)	97 (81.5)	119
Anger	54 (45.8)	64 (54.2)	118
Emotional loss	41 (34.2)	79 (65.8)	115

3.2. Cholesterol and Fasting Blood Glucose

Out of 121 participants, (n=83) had minimum and maximum total cholesterol values of 3.9 mmol/L and 6.3 mmol/L (M=4.69, SD.60), respectively. A significant 77.1% [x^2 (2, n=64) = 76.79, p<.001] of the participants had desirable cholesterol levels. The participant's minimum and maximum fasting blood glucose levels were 3.4 mmol/L and 13.8 mmol/L (M=5.59, SD=1.51). A significant 62.3% [x^2 (2, n=71) = 44.57, p<.001] of the participants had normal fasting glucose values.

3.3. Blood Pressure

The participants' minimum and maximum systolic blood pressure were 95.0 mmHg and 206.5 mmHg (M=134.06, SD=22.41), with minimum and maximum diastolic blood pressure values of 57.0 mmHg and 160.5 mmHg (M=88.98, SD=20.43) respectively. As depicted in Table **3**, a significant 26.1% (p<.001) were classified as having hypertension stage I, and 46.2% (p<.001) were classified as having hypertension stage II.

3.4. Mental Health

As portrayed in Table **4**, 39 (32.2%) participants suffered from depression, 30 (25.0%) experienced anxiety, and 54 (45.8%) experienced anger. The majority of the participants, 98.3% (n=117) and 95.8% (n=115), respectively, do not suffer from drug addiction or perinatal mental health problems.

4. DISCUSSION

This study aimed to investigate the prevalence of selected risk factors of NCDs and mental health disorders amongst Durban-based refugees in South Africa and found a high prevalence of overweightness, obesity, and hypertension. The first step in preventing obesity and its comorbidities is monitoring BMI. In this regard, 53.8% of our cohort was overweight and obese compared to 60.5% of Syrian and Iraqi refugees [6] and 58.8% of German refugees [10]. By implication, it means that 61.2% of the Durban-based refugees are at risk for suffering from chronic diseases, as researchers indicate [10] that populations with BMI values that fall below or above the normal BMI values of 18.5 and 24.9 kg/m^2 for adults, had a higher risk for chronic diseases. The high prevalence of overweightness and obesity among Durban-based refugees in South Africa can be attributed to limited access to healthcare services, and a lack of awareness about healthy lifestyle choices may impede the refugees from effectively managing their weight.

Our results indicate that 26.1% and 46.2% of the participants were classified as having hypertension stage I and II, which is higher compared to the findings of [11-13] showing that 17.2% of Syrians, 14% of northern Jordan, and 33.7% Bangladeshi refugees are hypertensive. The much higher hypertension prevalence in our cohort shows a possible lack of awareness of the consequences of hypertension, highlighting the importance of screening for hypertension among refugees for early detection and treatment. Although researchers revealed that refugees were at a high risk of diabetes [30], 62.3% of our participants have normal fasting blood glucose levels slightly lower than 69.7% of Iranian refugees [5]. The elevated proportion of individuals within the present cohort displaying normal fasting blood glucose levels may be linked to the lack of pre-existing metabolic conditions. Our cohort presented with lower desirable cholesterol levels than a Cambodian refugee community (81.7% vs. 77.1%) [31]. The difference is attributed to the Cambodian study using a higher cut-off value to categorize desirable cholesterol, 6.21 mmol/L, compared to our study's 5.18 mmol/L [31].

Contrary to the findings of other researchers showing a significant presence of mental disorders, our cohort did not present with any significant mental disorders [11, 21]. A lower 25.0% of our participants experience anxiety compared to 40.3% of Syrian refugees [20] and 36.1% of Turkish refugees [21]. Concerning depression, 32.2% of our participants experience depression compared to the findings of Lima *et al*. [20] and Acarturk *et al*. [21], showing that 47.7% of Syrian and 36.1% of Turkish refugees indicated experiencing depression. One plausible reason for the comparatively lower occurrence of mental disorders within our study group could be attributed to the predominant settlement of South African-based refugees in urban locales rather than residing in refugee camps [22]. In this regard, Li *et al*. [32] indicate that refugees' mental health is highly influenced by the conditions that they live in post-migration.

The study's findings have to be interpreted against several limitations worth mentioning. Two-thirds of respondents were female, and men's health may differ from that of females. Although not part of the study's objectives, the lack of lifestyle information is a limitation. Due to the cross-sectional study design, unmeasured confounders might affect some results, such as NCDs determinants or factors associated with care-seeking behavior. In addition, a single episode of blood pressure measurement may increase the chance of overestimation.

CONCLUSION

The study's findings indicate a high prevalence of hypertension, overweightness, and obesity among South African Durban-based refugees, revealing that these refugees are at risk for developing non-communicable diseases. As evidenced by the results, the authors provide important evidence that this vulnerable group needs access to healthcare services like the rest of the South African population. Appropriate healthcare programs for the refugees' health needs must be offered, including health and mental health services.

Subsequent investigations should prioritize the formulation of tailored management and preventive strategies for healthcare practitioners designed to assist refugees uniquely. These initiatives should underscore the promotion of healthy lifestyles as a critical strategy for mitigating the risk factors associated with NCDs.

LIST OF ABBREVIATIONS

NCDs	=	Non-communicable Diseases
CVDs	=	Cardiovascular Diseases
BMI	=	Body Mass Index
PTSD	=	Post-traumatic Stress Disorder
BP	=	Blood Pressure
WHO	=	World Health Organization
FBG	=	Fasting Blood Glucose
TG	=	Total Cholesterol
GMHAT/PC	=	Global Mental Health Assessment Tool-Primary Care Version

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical clearance was obtained from the University's Biomedical Research and Ethics Committee (BREC/00004006/2022).

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All procedures in studies involving human subjects followed the institutional and national research committee's ethical standards and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

CONSENT FOR PUBLICATION

All participants signed informed consent to participate in the study.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The dataset supporting the conclusions of this article is available upon e-mail request.

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None.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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