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Original Research Article

Assessment of cardiovascular risk factors among transgender population at Bhubaneswar, Odisha

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ABSTRACT

Background: Cardiovascular disease (CVD) remains a leading cause of mortality worldwide, as reported by the WHO. In India, CVDs account for 28.1% of total deaths and 14.1% of all disability-adjusted life years (DALYs). However, existing evidence predominantly focuses on cisgender populations, overlooking sexual and gender minorities such as transgender women, who face unique health vulnerabilities due to social exclusion, stigma, and limited healthcare access. This study aims to assess the prevalence of cardiovascular risk factors among transgender women in Bhubaneswar, Odisha.
Methods: A cross-sectional descriptive study was conducted using simple random sampling among transgender individuals aged 18 years and above. A sample size of 196 was calculated using OpenEpi. Data were collected through structured interviews and analyzed using SPSS software.
Results: Results revealed that 50.3% of the participants abstained from alcohol, while the rest reported regular consumption. Poor dietary patterns were observed, with 45.2% reporting no fruit intake and 1.7% reporting no vegetable intake in the previous week. Physical inactivity was high, with 35.6% not engaging in moderate-intensity activity and 81.4% in vigorous activity. Over half of the participants were in the high CVD risk category, with 19.8% overweight, 29.4% classified as obesity class I, and 7.9% as obesity class II. Hypertension was present in 22.6% of the population, and notably, 40% of those aged 18-28 years were hypertensive. Other reported conditions included diabetes (6.8%), high cholesterol (2.3%), HIV/AIDS (5.6%), and neurological disorders (1.1%).
Conclusions: The mean age of participants was 28.3 years (SD=7.7), indicating early emergence of CVD risk factors in this marginalized group.

Keywords: Prevalence, Cardiovascular, Non-communicable disease, Transgenders, Gay, Minority groups

INTRODUCTION

In recent years, while India has seen a relative decline in the burden of cardiovascular disease (CVD), it remains the leading cause of death and Disability-Adjusted Life Years (DALYs) in the country.[1] In 2017, CVD accounted for 26.6% of deaths and 13.6% of DALYs, up from 15.2% and 6.9% in 1990, respectively.[1] According to WHO, the major behavioral risk factors for CVD include unhealthy diets, physical inactivity, tobacco use, and harmful alcohol use, while metabolic risks include diabetes, hypertension, high cholesterol, and obesity.[2]

Most CVD studies focus on cisgender populations, often neglecting minority groups such as transgender and gay individuals. Globally, transgender is an umbrella term for individuals whose gender identity or expression differs from the sex assigned at birth, encompassing transfeminine, transmasculine, and non-binary identities.[3] A white paper on transgender health highlights non-communicable diseases (NCDs), such as hypertension,

cardiovascular disease, and diabetes, as significant health concerns, especially among transgender persons over age 45.[3]

Men reporting male-to-male sexual contact are categorized as gay, while cisgender describes those whose gender identity aligns with their birth-assigned sex.[4,5] A white paper on transgender health highlights non-communicable diseases (NCDs), such as hypertension, cardiovascular disease, and diabetes, as significant health concerns, especially among transgender persons over age 45.[3]

In 2014, the Supreme Court of India recognized transgender individuals as a third gender, acknowledging the discrimination they face in accessing healthcare, education, and other public services.[6,7] The Protection of Rights Bill (2016) mandated support for transgender rights in education, employment, and healthcare, but significant challenges remain.[8] Transgender and gay individuals face stress due to gender dysphoria, experiences of abuse, forced livelihoods, and discrimination in healthcare settings, which exacerbates CVD risks.[9,10] Dr. Reddy has noted that hormone therapy for transgender individuals further increases their vulnerability to CVDs.[7,12]

According to the 2011 census, nearly 4.7 lakh transgender individuals were identified, a number expected to more than double by the next census, with many remaining hidden.[7,13] This growing population is at significant risk for CVD, underscoring the need for targeted research across diverse demographics to guide informed health policies.[14]

Prasanth et al conducted a cross-sectional study among 145 transgender individuals in Chennai, finding that 26.7% had type 2 diabetes, 15.1% had a history of hypertension, and 13.9% were overweight or obese. Additionally, 40% used tobacco or alcohol. Significant associations were found between obesity and factors like education, employment, and income, underscoring the need for further research to understand NCD risks among transgender individuals.[14]

Madhavan et al conducted a cross-sectional study among 200 transgender individuals registered with the Sahodaran Community Oriented Health Development Society (SCOHD) in Puducherry. They found that 90% had unhealthy dietary practices, 84% were physically inactive, 41% had high waist-to-hip ratios, 36% were obese, and 16% had high blood pressure.[16] Tobacco use was reported by 43.5%, and alcohol use by 64.5%, with possible dependence in one-fifth of alcohol users. This study highlighted the significantly higher NCD risk factors in transgender individuals compared to the general population.[16]

METHODS

Study setting and participants

The study was conducted between August and November 2023 in Bhubaneswar, Odisha, among individuals over the age of 18 from the identified transgender population associated with target intervention NGOs like Sakha.

Sampling and data collection

Participants were selected from the identified transgender community in Bhubaneswar using a simple random sampling methodology. The sample size of 196 was calculated using OpenEpi version 3.01, assuming a 15% prevalence of rare risk behaviours with a 5% absolute precision.

Study tool

A structured questionnaire will collect sociodemographic details (occupation, education, family status). Physical inactivity, diet, and consumption of fruits, vegetables, junk food, tobacco, and alcohol will be evaluated. Existing medical conditions, including diabetes and hypertension, will be recorded, along with information on hormonal therapy, illicit drug use, and HIV status (self-reported). Physical measurements such as height, weight, waist, and hip circumferences will be taken following STEPS guidelines to calculate BMI and waist-hip ratio (WHR). Blood pressure will be measured using an electronic sphygmomanometer (Omron HEM 7130), with two readings taken 10 minutes apart. The questionnaire will be translated into Odia and back into English for reliability. A pilot test will assess the feasibility of administering the questionnaire.

Ethical considerations

Ethical approval was obtained from the Indian Institute of Public Health- Bhubaneswar. Written consent was taken before taking interviews.

RESULTS

The information was entered into Microsoft Excel using Epi info and analyzed with SPSS Software. To present data in tables, descriptive statistics was used.

Baseline characteristics of the study participants

In Table 1, the baseline characteristics of the participants showed an average age of 28.32 years, with most (62.7%) between 18-28 years. Most were unmarried (75.1%) and Hindu (96.0%), with an average education of 10.44 years. Occupations varied, with 39.0% engaged in sex work and 32.2% combining it with begging. The majority (85.9%) had no secondary occupation, and 82.5% earned between ₹923 and ₹27,648, while 10.7% earned less than ₹9,226.

CVD risk factor

In Table 2 the analysis of CVD risk factors among the transgender population revealed a concerning health profile. Tobacco use was prevalent, with 20.3% smoking and 26.6% addicted to smokeless tobacco. Alcohol dependency was noted in nearly half of the population, while 50.3% reported abstaining entirely. Dietary habits showed that 45.2% did not consume any fruits, and 1.7% did not consume vegetables in the past week, highlighting a lack of essential nutrients in their diet. Physical inactivity was also high, with 35.6% not engaging in any moderate-intensity activity and 81.4% avoiding vigorous exercise altogether.

Table 1: Baseline characteristics of the study participants.

Socio-demographic features	Category	Count	%
Age (in years)	18-28	111	62.7
	29-39	39	22.0
	40-50	26	14.7
	51-61	1	0.6
Marital status	Cohabitating	35	19.8
	Currently married	8	4.5
	Divorced	1	0.6
	Never married	133	75.1
Religion	Christian	2	1.1
	Hindu	170	96.0
	Muslim	5	2.8
Education	Primary education or less	97	54.8
	Higher secondary	38	21.5
	Graduation	35	19.8
	Post graduation	7	4.0
Primary occupation	Begging	28	15.8
	Craft, artist, and related work	3	1.7
	Other elementary work	1	0.6
	Plant and machine operator and assembler	7	4.0
	Professional	1	0.6
	Refused	1	0.6
	Sex worker	57	32.2
	Sex worker and begging	69	39.0
	Social worker and activist	10	5.6
Personal average income	<9226	19	10.7
	46095-68961	9	5.1
	68967-92185	1	0.6
	9232-27648	146	82.5
	Refused	2	1.1

Table 2: Cardiovascular risk factor.

Variables	Category	Count	%
Any tobacco products usage	No	103	58.2
	Yes	74	41.8
Any smoke tobacco products	No	141	79.7
	Yes	36	20.3
Any smokeless tobacco	No	130	73.4
	Yes	47	26.6
Frequency of alcohol consumption (12 months)	No alcohol consumption	89	50.3
	Less than once a month	31	17.5
	1-3 days per month	38	21.5
	1-4 days per month	3	1.7
	1-4 days per week	4	2.3
	5-6 days per week	4	2.3
	Daily	8	4.5

Continued.

Variables	Category	Count	%
Fruit consumption per week (days)	0	80	45.2
	1-3	49	27.7
	4-5	5	2.8
	6-7	43	24.3
Vegetable consumption per week (days)	0	3	1.7
	1-3	19	10.7
	4-5	16	9.0
	6-7	139	78.5
Moderate intense activities (minutes per week)	Zero level of aerobic activities	63	35.6
	Low level of aerobic activities	14	7.9
	High level of aerobic activities	100	56.5
Vigorous intense activities (minutes per week)	Zero level of aerobic activities	144	81.4
	Low level of aerobic activities	6	3.4

Table 3: Hypertensive population.

Variables		Frequency	Percent	Valid percent	Cumulative percent
Valid	Non HTN	137	77.4	77.4	77.4
	HTN	40	22.6	22.6	100.0
	Total	177	100.0	100.0	

Table 4: The crosstabulation of age group and hypertension.

Age categorical hypertension cross tabulation			Hypertensive pop		Total
			Non HTN	HTN	
Age group (in years)	18-28	Count	95	16	111
		% within hypertensive pop	69.3	40.0	62.7
	29-39	Count	27	12	39
		% within hypertensive pop	19.7	30.0	22.0
	40-50	Count	15	11	26
		% within hypertensive pop	10.9	27.0	14.7
	51-61	Count	0	1	1
		% within hypertensive pop	0.0	2.5%	0.6
Total		Count	137	40	177
		% within hypertensive pop	100.0	100.0	100.0

In terms of weight, 19.8% of individuals were overweight, 29.4% obese (obese I), and 7.9% were in the obese II category, indicating that over half the population faces an elevated risk for cardiovascular disease (CVD) in the future. While 35.6% were within the normal weight range, 7.3% were underweight.

The hypertension was present in 22.6% of individuals (Table 3), with a notable 40% of those aged 18-28 (comprising 62.7% of the sample) being hypertensive (Table 4). Self-reported rates of diabetes were at 6.8%, while 2.3% had high cholesterol. Additionally, 5.6% had HIV/AIDS, 20.3% individuals were consuming Gender affirming hormone therapy and 1.1% reported neurological disorders. These findings suggest multiple intersecting health risks that warrant targeted intervention.

DISCUSSION

Education and socioeconomic status

In our sample, 76.3% had an education level of high school or below, similar to findings by Singh where 75% of transgender individuals in Odisha lacked matriculation certificates and only 20% studied until the intermediate level. The low educational attainment is attributed to social stigma and poverty.[17] Additionally, 100% of participants reported regular monthly wages, with 82.5% earning between ₹9,232-27,648, which is higher than Priyadarshini's study where 93% had wages, but only 57% earned in a comparable range.[17] While none of our participants cohabited with family members and instead lived with their Guru or partner, the Kerala Development Society (KDS) survey in Uttar Pradesh and Delhi found that only 2% lived with families, contrasting with 32% in

our sample.[16] These patterns suggest a mixture of economic stability and limited familial support.

CVD risk factors in the context of marginalization

The prevalence of CVD risk factors in this sample is notably higher than in the cisgender population of Bhubaneswar. Importantly, the mean age of the transgender sample was younger (28.32 years) than the cisgender reference (47.09 years), highlighting the early onset of risk factors in a context of marginalization.[18]

Substance use

Our findings indicate a tobacco use rate of 41.8%, consistent with similar rates reported in Kerala (40.8%), Puducherry (43.5%), and Chennai (40%).[14-16] Alcohol use was reported by 49.7% of our sample, significantly higher than the 5.97% found among cisgender individuals in Bhubaneswar and similar to the prevalence observed in Kerala (40%) but lower than Puducherry (64.5%).[14,16] The correlation between alcohol use and living without social support highlights the importance of social networks in reducing substance use.

Dietary habits and physical activity

A significant portion of our sample (45.2%) did not consume any fruit in the past week, and 78.5% reported daily vegetable consumption. Similar trends were observed in Kerala (97.5% with poor fruit/vegetable intake) and Puducherry (90.5%).[14,16] Physical inactivity was also prevalent, with 35.6% reporting no moderate-intensity activity and 81.4% no vigorous activity, aligning with Puducherry's findings, where 84% were inactivity.[16]

Overweight and obesity

Overweight and obesity were common in our sample, with rates of 62.7% and 49.2%, respectively. These values are significantly higher than those in Kerala (26.7% overweight, 10.8% obesity) and Chennai (29.6% overweight, 20% obesity), highlighting a concerning trend that may lead to further health complications.[14,15]

Hypertension and diabetes

Hypertension and self-reported diabetes were reported by 22.6% and 6.8% of participants, respectively, which aligns with findings from Puducherry (16% hypertension, 8% diabetes) but is lower than those in Kerala (27.5% hypertension, 18.3% diabetes).[14,16] These trends underscore the need for targeted healthcare interventions to address chronic disease risk among transgender individuals.

Limitations

Although the calculated sample size for the study was 196, the final data collection was restricted to 176 participants. This shortfall occurred primarily due to time constraints, high refusal rates, and seasonal festive engagements, during which a significant portion of the transgender community was unavailable or unwilling to participate. These factors may have introduced a degree of selection bias and may limit the generalizability of the findings to the wider transgender population.

CONCLUSION

In general, more transgender community members in our sample had modifiable risk factors than the cisgender population in Bhubaneswar. There was also an apparent early onset of metabolic risk factors such as hypertension and diabetes. A large proportion of those polled had not had diabetes or hypertension screening in the previous year. In my opinion, the situation is quite alarming, and if the focus is not shifted soon, the situation could be disastrous.

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REFERENCES

1. Kalraa A, Joseb AP, Prabhakaranc P, Kumar A, Agrawale A, Roy A, et al. The burgeoning cardiovascular disease epidemic in Indians-perspectives on contextual factors and potential solutions. Lancet. 2023;12.
2. WHO. Fact sheet: Noncommunicable diseases country profiles, 2018. Available at: https://www.who.int/publications/i/item/ncd-country-profiles-2018. Accessed on 1 November 2024.
3. NACO. Fact sheet: whitepaper on transgender persons health. Available at: https://naco.gov.in/sites/default/files/Whitepaper_on_Transgender_Persons_Health.pdf. Accessed on 1 November 2024.
4. NIH.gov. Fact sheet: HIV and all gay and bisexual men. Available at: https://hivinfo.nih.gov/understanding-hiv/fact-sheets/hiv-and-gay-and-bisexual-men. Accessed on 1 November 2024.
5. Terminology _ HIV Testing _ Transgender People _ Gender _ HIV by Group _ HIV_AIDS _ CDC".

6. Reddy DS. Cardiovascular care of the third gender: indian perspective. Ind J Clin Cardiol. 2021;2(3):182-3.
7. Sawant N. Transgender: status in India. Ann Ind Psychiatr. 2017;1(2):59.
8. "Resilience_among_transgender_p".
9. Virupaksha H, Muralidhar D. Resilience among transgender persons: Indian perspective. Indian J Soc Psychiatr. 2018;34(2):111.
10. Lakshmanan K, Victor J. A study on general wellbeing of male to female transgenders living in Chennai.
11. Balcerek MI, Nolan BJ, Brownhill A, Wong P, Locke P, Zajac JD, et al. Feminizing hormone therapy prescription patterns and cardiovascular risk factors in aging transgender individuals in Australia. Front Endocrinol (Lausanne). 2021:12:667403.
12. Sawant N. Transgender: status in India. Ann Ind Psychiatr. 2017;1(2):59.
13. Fernandez B. Risk factors of non-communicable diseases among the transgender population in Kerala: a cross-sectional study. Adv Med. 2016:632-7.
14. Prasanth B, Eashwar VA, Mahalakshmi K, Ramachandran K. Epidemiology of non-communicable diseases among transgender population residing in Chennai district, Tamil Nadu. J Family Med Prim Care. 2023;12(4):762.
15. Madhavan M, Reddy M, Chinnakali P, Kar S, Lakshminarayanan S. High levels of non-communicable diseases risk factors among transgenders in Puducherry, South India. J Family Med Prim Care. 2020;9(3)"1538.
16. Singh J. The status of transgender population in Odisha. Int J Curr Res. 2018;10(6):70781-3.

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