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Stroke and Ischemic Heart Disease among LGBT Sexual and Gender Minorities in Japan

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ABSTRACT

Leading causes of death in Japan include stroke and ischemic heart disease (IHD). It has been unclear regarding the risk for these diseases among sexual and gender minorities (SGMs) in Japan. Using cross-sectional data from JACSIS (Japan COVID-19 and Society Internet Survey) 2022, participants were categorized as cisgender/heterosexual, lesbian, gay, bisexual, and transgender based on sex at birth, gender identity, and sexual orientation. Outcomes were measured by history of stroke or IHD. Multivariable logistic regression was constructed adjusting for risk factors. 24,298 participants were eligible for analysis. Overweight/obesity was prevalent among gay and bisexual participants, while lesbians and transgenders were implausible compared to cisgender/heterosexuals. After adjusting for potential covariates, all SGM groups experienced an increased prevalence of stroke (transgender odds ratio [OR], 2.97; 95% CI, 1.74-5.06, gay OR, 2.69; 95%CI, 2.00-3.64, lesbian OR, 2.44; 95%CI, 1.0-3.40, bisexual OR, 1.86; 95% CI, 1.01-3.40) and IHD (transgender OR, 2.92; 95%CI, 1.75-4.86, gay OR, 2.18; 95%CI, 1.64-2.91, lesbian OR, 1.96; 95%CI, 1.32-2.93, bisexual OR, 1.23; 95% CI, 0.65-2.31) compared to cisgender/heterosexuals. SGMs in Japan have different prevalence of cardiovascular risk factors compared to Western countries. SGMs face a higher prevalence of stroke or IHD, and transgenders are the most vulnerable. There is a great need for support for the health of SGMs in Japan.

Keywords
Cardiovascular Disease
Japan
LGBT
Obesity
Overweight

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Introduction

A. Stroke and ischemic heart disease in Japan

Stroke and ischemic heart disease (IHD) are two of the top causes of mortality in Japan [1]. The top five causes of total deaths in 2021 were Alzheimer's disease and other dementias (12.02%), stroke (10.21%), IHD (8.57%), lung cancer (6.41%), and lower respiratory infections (5.54%)[2]. Sexual/gender minorities (SGM) are known to face a higher risk of cardiovascular diseases (CVD) including stroke and IHD compared to cisgender/heterosexual peers in the US [3]-[6]. Multilayer individual, interpersonal, and structural stressors have been considered as mechanisms related to CVD risk among SGMs and these stressors can be categorized into psychosocial, clinical, and behavioral factors [7],[8]. Psychosocial factors, such as harassment and discrimination lead to marginalization that cultivates stressful environments [7]. Recent research revealed that chronic loneliness increased stroke risk [9] supporting that SGMs may be at higher risk of CVD through marginalization.

B. Risk factors surrounding sexual and gender minorities

Clinical factors include low healthcare seeking among SGMs [6],[10],[11]. In Western countries, SGMs are likely to face a lack of adequate insurance coverage [10],[12], mistreatment by health providers [7],[12],[13] and health providers' inexperience [12], and financial insufficiency that becomes a barrier to seek medical care [11]. Another clinical risk factor for CVD may be the usage of gender-affirming hormonal therapy among transgender individuals [7],[14],[15].

Behavioral factors include higher tobacco usage, an unpleasant diet, and inadequate physical activity [3]-[5],[16]. Physical activity differs among SGM groups, where gay men were more likely to exercise compared to heterosexual peers [16],[17] while vice versa among women [16]. These factors may be also related to the various obesity risks among SGMs that have yet to achieve consensus [18]. Among SGMs in Japan, there has yet been research on lifestyle habits including smoking and obesity.

Literature Review

Although sexual/gender minorities are more likely to face stroke and IHD risk overall, differences among SGMs have also been suggested among CVD risk [19],[20]. Bisexual men were more likely to experience CVD compared to gay men [20]. Sexual minority women were

less likely to face heart attacks, diabetes, and hypertension compared to heterosexual women [19].

However, circumstances around SGMs may differ in Japan compared to Western countries, because of cultural and historical backgrounds [21]. In Japan, homosexuality was common in the pre-modern era especially among Japanese Buddhism, *samurai* (warriors), and *onnagata* (men who play female parts in kabuki theatre) [22],[23]. Same-sex marriage was never prohibited in Japan's history except for between 1872 and 1882 [21]. Thus, there are aspects of Japan that are tolerant of homosexuality, and, in the 1950s, Japan was reported to be more permissive than many other Western countries [22]. However, the acceptance of homosexuality and other sexual minorities among civilians in daily lives both in cities and suburbs appears to have been less inclusive. Although sexual/gender minorities have increased attention in Japan since the 2010s, there remains much exclusiveness including insufficient legislation such as disapproval of homosexual marriage, adoption, and restriction on gender transition [24]. Although there has been more focus on health disparities among SGMs, there lacks much consideration among clinicians and healthcare structures as has also been pointed out in Western countries [12],[13],[25],[26].

To our knowledge, stroke and IHD risk among SGMs have yet to be disclosed in the Japanese population, as well as the diversity among SGMs. As discussed above, SGMs in Japan face different circumstances compared to SGMs in Western countries. Consequently, stroke and IHD risk may differ in the Japanese settings. The hypothesis in this study is that SGMs in Japan are likely to experience higher stroke and IHD prevalence overall compared to cisgender/heterosexual individuals. The tendency among each sexual/gender identity is investigated as well. Thus, this study aims to reveal stroke and IHD prevalence among SGMs in Japan, as well as the differences among sexual/gender identities. If the risk is identified, we have to offer individualized social support to those in need.

Material and Methods

A. Participants

This study was conducted using data from JACSIS (Japan COVID-19 Society Internet Survey) 2022, a survey of living conditions in Japan during the COVID-19 infection outbreak [27]. An Internet survey was conducted by an Internet research firm (Rakuten Insight, Inc.) from September 15 to October 22, 2022. Respondents were paid a gratuity of 100 JPY. There were 32,000 valid responses from participants aged sixteen to eighty-two nationwide. Respondents who reported sex at birth, gender identity as bisexual, undecided, or others, and sexual orientation as undecided or others were excluded from the analysis (n=1,653) due to the

complexity of the classification. Participants who had missing information on household income (n=5,797, 19.1%) and education attainment (n=178, 0.6%), who had outliers in BMI defined as over 3SD or under 3SD or missing information (n=185, 0.6%) were excluded, resulting in 24,298 individuals for analysis (Fig. 1). Informed consent was secured from all participants.

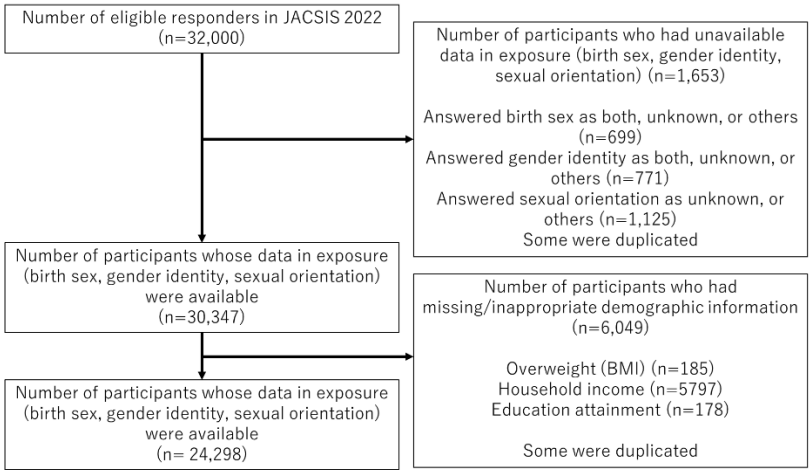


Fig. 1. Enrollment of participants

B. Measurements

Birth sex, gender identity, and sexual orientation were investigated with the following questions. “Please choose one that applies to you from the following five options”: male, female, both male and female, undecided/unwilling, and other.

Gender was categorized as cisgender/heterosexual, gay, lesbian bisexual, and transgender. Cisgender/heterosexual was defined as “birth sex=male, gender identity=male, sexual orientation=female” or “birth sex=female, gender identity=female, sexual orientation=male”. Gay was defined as “birth sex=male, gender identity=male, sexual orientation=male” and lesbian was defined as “birth sex=female, gender identity=female, sexual orientation=female”. Transgender was defined as “birth sex=male, gender identity=female, sexual orientation=male/female/both” and “birth sex=female, gender identity=male, sexual orientation=male/female/both”, prioritizing gender identity over sexual orientation. History of IHD and stroke (cerebrovascular disease) were attained by self-report. Covariates were included according to determinants of CVDs [16],[27],[28](16, 27, 28). Household income was retrieved categorically and defined as <3 Million JPY, 3 or more less than 6 million JPY, 6 or more less than 10 million JPY, and 10 or more JPY. Education attainment was categorized as completion of junior high school, high school, vocational school or junior college, college, or more. Smoking included tobacco, e-cigarettes, pipes, and cigars, categorized as never, past smoker, and current smoker. Alcohol consumption was categorized as never, past, or current.

Current use included occasional consumption. A history of hypertension, diabetes, and dyslipidemia was attained alongside a cardiovascular disease history.

C. Statistical analyses

Analysis was conducted by STATA SE statistical package, version 16 (StataCorp LP, College Station, ZTX, USA). Logistic regression was used to estimate the association of gender identity, sexual orientation, and stroke or IHD prevalence adjusting for covariates. For sensitivity analysis, we stratified SGMs by sex at birth according to previous literature, and we compared them with same-sex cisgender/heterosexual participants [5],[11]. Transgender participants were stratified into male-to-female (MTF) and female-to-male (FTM), and compared with both cisgender/heterosexual males and females according to previous studies in consideration of the plausible impact of birth sex and hormone therapy [19],[20].

D. Data availability and ethical approval

The data used in this study are not available in a public repository because they contain personally identifiable or potentially sensitive patient information. Based on the regulations for ethical guidelines in Japan, the Research Ethics Committee of Osaka International Cancer Institute has imposed restrictions on the dissemination of the data collected in this study. All data inquiries should be addressed to the person responsible for data management, Dr. Takahiro Tabuchi at the following e-mail address: tabuchitak@gmail.com.

Results and Discussion

A. Characteristics of participants

Among 24,298 participants from the JACSIS 2022, cisgender/heterosexuals, gays, lesbians, bisexuals, and transgenders resulted in several 22,731 (93.6%), 658 (2.7%), 469 (1.9%), 265 (1.1%), and 175 (0.7 %), respectively (Table 1).

There were 32,000 valid responses from participants in JACSIS (Japan COVID-19 Society Internet Survey). Respondents who reported sex at birth, gender identity as bisexual, undecided, or others, and sexual orientation as undecided or others were excluded from the analysis (n=1,653) due to the complexity of the classification. Number of participants who had missing/inappropriate demographic information on overweight, household income and education attainment were excluded from the analysis (n=6,049). A total of 24,298 individuals were eligible for analysis.

Overweight/obesity was more prevalent among gays (21.58%, p=0.015), while lesbians (7.46%, p<0.001) and transgenders (12.00%, p=0.042) had a lower prevalence compared to cisgender/heterosexuals (17.90%). Financial circumstances measured by household income were more skewed towards low income among gays (p=0.005) and lesbians (p<0.001)

compared to cisgender/heterosexuals. Current smoking was more common among gays (29.79%, p<0.001) and transgenders (30.29%, p<0.001), while lesbians (12.15%, p<0.001) had a lower prevalence compared to cisgender/heterosexuals (18.60%). Current alcohol use was less likely to be seen in LGBTs (gays 51.67%, p<0.001, lesbians 41.15%, p<0.001, bisexuals 46.04%, p=0.047, transgenders 43.43%, p=0.026) compared to cisgender/heterosexuals (52.42%).

Table 1. Characteristics of participants (N=24,298)

		Total		Cisgender/Heterosexual (N=22,731)		Gay (N=658)		Lesbian (N=469)		Bisexual (N=265)		Transgender (N=175)	
		N or mean	% or SD	N or mean	% or SD	N or mean	% or SD	N or mean	% or SD	N or mean	% or SD	N or mean	% or SD
Ischemic heart disease		1033	4.25	880	3.87	76	11.55	36	7.68	12	4.53	29	16.57
Stroke		767	3.16	620	2.73	72	10.94	34	7.25	14	5.28	27	15.43
Age	15-19	128	0.53	110	0.48	5	0.76	8	1.71	5	1.89	0	0
	20-29	3662	15.07	3215	14.14	151	22.95	150	31.98	88	33.21	58	33.14
	30-39	5764	23.72	5414	23.82	149	22.64	86	18.34	58	21.89	57	32.57
	40-49	4057	16.7	3845	16.92	83	12.61	63	13.43	46	17.36	20	11.43
	50-59	3453	14.21	3243	14.27	108	16.41	48	10.23	31	11.7	23	13.14
	60-69	3589	14.77	3416	15.03	83	12.61	56	11.94	23	8.68	11	6.29
	70-79	3344	13.76	3207	14.11	67	10.18	51	10.87	13	4.91	6	3.43
	80-89	301	1.24	281	1.24	12	1.82	7	1.49	1	0.38	0	0
Overweight/Obesity	BMI<25	19981	82.23	18662	82.1	516	78.42	434	92.54	215	81.13	154	88
	BMI 25 or over	4317	17.77	4069	17.9	142	21.58	35	7.46	50	18.87	21	12
Household income (million JPY)	<3.0	4839	19.92	4436	19.52	150	22.8	146	31.13	68	25.66	39	22.29
	3.0≦, <6.0	9311	38.32	8722	38.37	275	41.79	157	33.48	97	36.6	60	34.39
	6.0≦, <10.0	7031	28.94	6643	29.22	155	23.56	110	23.45	68	25.66	55	31.43
	10.0≦	3117	12.83	2930	12.89	78	11.85	56	11.94	32	12.08	21	12
Education attainment	Junior high school	406	1.67	372	1.64	14	2.13	9	1.92	7	2.64	4	2.29
	High school	6045	24.88	5639	24.81	166	25.23	127	27.08	70	26.42	43	24.57
	Vocational school, junior college	5030	20.7	4753	20.91	84	12.77	121	25.8	45	16.98	37	15.43
	College, University, Graduate school	12817	52.75	11967	52.65	394	59.88	212	45.2	143	53.96	101	57.71
Hypertension		6581	27.08	6133	26.98	233	35.41	105	22.39	55	20.75	55	31.43
Diabetes		2053	8.45	1832	8.06	115	17.48	46	9.81	22	8.3	38	21.71
Dyslipidemia		4850	19.96	4534	19.95	145	22.04	85	18.12	40	15.09	46	26.29
Smoking	Never	12560	51.69	11760	51.74	265	40.27	324	69.08	142	53.58	69	39.43
	Past	7160	29.47	6743	29.66	197	29.94	88	18.76	79	29.81	53	30.29
	Current	4578	18.84	4228	18.6	196	29.79	57	12.15	44	16.6	53	30.29
Alcohol use	Never	2492	10.26	2233	9.82	105	15.96	98	20.9	33	12.45	23	13.14
	Past	8933	36.76	8356	36.76	213	32.37	178	37.95	110	41.51	76	43.43
	Current	12873	52.98	12142	53.42	340	51.67	193	41.15	122	46.04	76	43.43

Remark:
Bolded results indicate p<0.05 by Chi-square analysis referring to cisgender/heterosexual participants.
SD: standard deviation
BMI: body mass index
JPY: Japanese yen

B. LGBTs and prevalence of stroke or IHD

LGBTs had a higher prevalence of stroke or IHD after adjusting for confounding factors (Table 2 Model 1, Table 3 Model 1). Stroke prevalence was highest among transgenders (OR 2.97; 95% CI 1.74, 5.06), followed by gays (OR 2.69; 95% CI 2.00, 3.64), lesbians (OR 2.44; 95% CI 1.61, 3.70), and bisexuals (OR 1.86; 95% CI 1.01, 3.40) (Table 2 Model 1). IHD prevalence was highest among transgenders (OR 2.92; 95% CI 1.75, 4.86), followed by gays (OR 2.18; 95%CI 1.64, 2.91), lesbians (OR1.96; 95%CI 1.32, 2.93), and bisexuals (OR 1.23; 95%CI 0.65, 2.31), in the same order as stroke (Table3 Model1). Past medical history of hypertension,

diabetes, dyslipidemia, and past or current smoking significantly contributed to a higher prevalence of both stroke and IHD, while overweight/obesity did not (Table 2 Model1, Table 3 Model1).

Table 2. Sexual and gender identity and the association with stroke (N=24,298)

		Crude		Model1	
		OR	95%CI	OR	95%CI
Cisgender/Heterosexual		Ref		Ref	
Gay		4.38	(3.39,5.67)	2.69	(2.00,3.64)
Lesbian		2.79	(1.95,3.99)	2.44	(1.61,3.70)
Bisexual		1.99	(1.15,3.43)	1.86	(1.01,3.40)
Transgender		6.51	(4.28,9.88)	2.97	(1.74,5.06)
Age	15-19			Ref	
	20-29			1.7	(0.52,5.52)
	30-39			0.95	(0.29,3.09)
	40-49			0.82	(0.25,2.70)
	50-59			0.52	(0.16,1.73)
	60-69			0.67	(0.20,2.18)
	70-79			0.63	(0.19,2.06)
	80-89			0.49	(0.31,1.81)
Overweight	BMI<25			Ref	
	BMI 25 or over			0.75	(0.62,0.91)
Household income (million JPY)	<3.0			Ref	
	3.0≦, <6.0			0.9	(0.74,1.10)
	6.0≦, <10.0			0.87	(0.70,1.10)
	10.0≦			0.92	(0.69,1.22)
Education attainment	Junior high school			Ref	
	High school			1.53	(0.86,2.73)
	Vocational school, junior college			1.11	(0.61,2.02)
	College, University, Graduate school			1.28	(0.72,2.28)
Hypertension				5.45	(4.48,6.64)
Diabetes				3.02	(2.51,3.63)
Dyslipidemia				2	(1.68,2.38)
Smoking	Never			Ref	
	Past			1.65	(1.36,1.99)
	Current			1.79	(1.46,2.21)
Alcohol use	Never			Ref	
	Past			1.14	(0.85,1.52)
	Current			0.82	(0.61,1.09)

Model 1 adjusted for age, BMI, household income, education attainment, smoking, alcohol use, and history of hypertension, diabetes, and dyslipidemia.
OR: odds ratio
CI: confidence interval
BMI: body mass index
JPY: Japanese yen

Table 3. Sexual and gender identity and the association with ischemic heart disease (N=24,298)

		Crude		Model1	
		OR	95%CI	OR	95%CI
Cisgender/Heterosexual		Ref		Ref	
Gay		3.4	(2.53,4.16)	2.18	(1.64,2.91)
Lesbian		2.06	(1.46,2.92)	1.96	(1.32,2.93)
Bisexual		1.18	(0.66,2.11)	1.23	(0.65,2.31)
Transgender		4.93	(3.29,7.39)	2.92	(1.75,4.86)
Age	15-19			Ref	

		Crude		Model1	
		OR	95%CI	OR	95%CI
	20-29			0.82	(0.34,2.02)
	30-39			0.5	(0.20,1.24)
	40-49			0.44	(0.18,1.08)
	50-59			0.36	(0.15,0.89)
	60-69			0.49	(0.20,1.21)
	70-79			0.75	(0.30,1.82)
	80-89			0.96	(0.37,2.52)
Overweight	BMI<25			Ref	
	BMI 25 or over			1.01	(0.86,1.19)
Household income (million JPY)	<3.0			Ref	
	3.0≦, <6.0			0.89	(0.75,1.05)
	6.0≦, <10.0			0.79	(0.65,0.96)
	10.0≦			0.81	(0.63,1.05)
Education attainment	Junior high school			Ref	
	High school			1.46	(0.89,2.40)
	Vocational school, junior college			1.29	(0.77,2.15)
	College, University, Graduate school			1.44	(0.88,2.35)
Hypertension				3.31	(2.81,3.90)
Diabetes				3.29	(2.81,3.84)
Dyslipidemia				2.35	(2.03,2.73)
Smoking	Never			Ref	
	Past			1.66	(1.41,1.96)
	Current			2.16	(1.80,2.59)
Alcohol use	Never			Ref	
	Past			0.82	(0.65,1.03)
	Current			0.6	(0.48,0.76)

Remark: Model 1 adjusted for age, BMI, household income, education attainment, smoking, alcohol use, and history of hypertension, diabetes, and dyslipidemia.
OR: odds ratio
CI: confidence interval
BMI: body mass index
JPY: Japanese yen

C. Sensitivity analysis among LGBs according to sex at birth

Gays had significantly higher prevalence of both stroke (OR 2.61; 95% CI 1.92, 3.53) and IHD (OR 2.03; 95% CI 1.52, 2.71), while bisexual males had a trend of higher stroke prevalence (OR 2.22; 95% CI 0.93, 5.30), and a surprisingly preventive trend of IHD (OR 0.70; 95% CI 0.21, 2.27) compared to cisgender/heterosexual males (Table 4). Lesbians had a significantly higher prevalence of both stroke (OR 2.59; 95% CI 1.65, 4.08) and IHD (OR 2.12; 95% CI 1.38, 3.25). Bisexual females also had an increased prevalence of stroke (OR 1.42; 95% CI 0.59, 3.43) and IHD (OR 1.67; 95% CI 0.75, 3.70), though not statistically significant after adjusting for considerable confounders (Table 4).

D. Sensitivity analysis among transgenders

Among transgenders (N=223), there were 101 (45.3%) transgender females and 122 (54.7%) transgender males. Both transgender females and transgender males had significantly higher prevalence of stroke and IHD compared to both cisgender/heterosexual males and cisgender/heterosexual females (Table 5).

Table 4. Sexual and gender identity and the association with cardiovascular disease stratified by birth sex (N=24,298)

		Cerebrovascular disease				**Ischemic heart disease**			
		Crude		**Model 1**		**Crude**		**Model 1**	
	N	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Male									
Cisgender/heterosexual	11691	Ref		Ref		Ref		Ref	
Gay	658	**3.32**	**(2.55,4.32)**	**2.61**	**(1.92,3.53)**	**2.32**	**(1.81,2.99)**	**2.03**	**(1.52,2.71)**
Bisexual	94	1.84	(0.80,4.24)	2.22	(0.93,5.30)	0.59	(0.19,1.86)	0.70	(0.21,2.27)
Female									
Cisgender/heterosexual	11040	Ref		Ref		Ref		Ref	
Lesbian	469	**4.17**	**(2.87,6.07)**	**2.59**	**(1.65,4.08)**	**3.47**	**(2.42,4.99)**	**2.12**	**(1.38,3.25)**
Bisexual	171	**2.62**	**(1.27,5.40)**	1.42	(0.59,3.43)	**2.32**	**(1.17,4.59)**	1.67	(0.75,3.70)

Model 1 adjusted for age, BMI, household income, education attainment, smoking, alcohol use, and history of hypertension, diabetes, and dyslipidemia.

Table 5. Sexual and gender identity and the association with stroke or ischemic heart disease between transgender subgroups (N=175)

	N	Cerebrovascular disease				Ischemic heart disease			
		Crude		Model1		Crude		Model1	
		OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Cisgender/heterosexual male	13830	Ref		Ref		Ref		Ref	
Transgender female	101	6.53	(3.61,11.79)	3.55	(1.69,7.46)	4.68	(2.64,8.32)	3.43	(1.68,7.02)
Transgender male	122	3.9	(2.17,7.04)	2.71	(1.31,5.59)	2.8	(1.58,4.95)	2.42	(1.21,4.81)
Cisgender/heterosexual female	14410	Ref		Ref		Ref		Ref	
Transgender female	101	12.89	(7.07,23.48)	3.16	(1.40,7.13)	11	(6.14,19.68)	4.05	(1.86,8.86)
Transgender male	122	7.71	(4.24,14.02)	2.46	(1.12,5.39)	6.57	(3.69,11.70)	2.68	(1.29,5.60)

Remark: Model 1 adjusted for age, BMI, household income, education attainment, smoking, alcohol use, and history of hypertension, diabetes, and dyslipidemia.
OR: odds ratio
CI: confidence interval

Discussion

This study aimed to reveal stroke and IHD burden among SGMs in Japan, including the discrepancies among SGM groups in Japan. All SGM groups faced higher stroke and IHD prevalence compared to cisgender/heterosexual individuals, as in line with previous research conducted in Western countries [3]-[6](3-6). Of note, transgenders were most vulnerable to both stroke and IHD.

There remains a plausible pathway through the minority stress model that consists of psychosocial, clinical, and behavioral factors [7],[8]. Psychosocial factors include harassment and discrimination related to marginalization that occurs at individual, interpersonal, and structural levels [7]. According to a report from the US, 53% of SGMs experienced verbal harassment and 9% experienced physical violence during school [29]. Discrimination continues in adulthood and is experienced in current societies, 42-71% of SGMs experienced

discrimination during the past year [29]. However, responses to current daily concerns among SGMs in Japan were less likely to include discrimination, 7.9% among LGBs and 12.5% among transgenders [30], compared to the high prevalence of discrimination towards SGMs in the US [29]. Discrimination towards SGMs in Japan may have different features from that in Western countries.

Clinical factors include low healthcare seeking among SGMs [6],[10],[11]. SGMs are known to experience financial insecurity compared to cisgender/heterosexual counterparts [31] which is a barrier to healthcare-seeking [11]. In this study, finance showed an association with IHD. However, finance among transgenders did not show a significant difference between cisgender/heterosexuals. Regarding transgender CVD risk, it is also noteworthy to point out that in line with previous literature, both MTF and FTM transgenders experienced higher CVD risk compared to cisgender/heterosexual females [32], and also exceeded the risk of cisgender/heterosexual males. Previous literature points out that there is a sex difference among CVD risk, and men are generally at higher risk [33]. It can be interpreted that both MTFs and FTMs transgenders experience tremendous CVD risk compared to cisgender/heterosexuals in Japan. Literature suggests the use of hormone therapy as a risk factor for CVD, resulting in a higher CVD risk, especially among MTFs [34]. In this study, MTFs had an additional risk which is in line. However, there remains much discussion regarding the association between hormone therapy and CVD risk [32],[35]. The percentage of hormone therapy usage was not asked and the explanation between MTFs and FTMs remains questioned.

Behavioral factors include lifestyle habits such as smoking, physical activity [3]-[5],[16] and past medical history of CVD risk factors [36]. Although diabetes and dyslipidemia were significantly more common among transgenders, they did not fully explain the association between sexual identity and stroke/IHD risk in this study. Results in this study add to previous literature on the prevalence of behavioral CVD risk factors among SGMs in Japan, such as smoking [4],[5],[16], alcohol consumption, and overweight/obesity [5]. Gays were more likely to experience overweight/obesity, which was contradictory to reports from Western countries [4],[5],[11]. There may be differences between gays in Japan and those in Western countries, through pile-ups of expectation towards gay men to be “cute” which has been emphasized through media [37]. Also, lesbians had a surprisingly low overweight/obesity rate compared to Western countries [4]. Japan is one of the few countries where underweight among women has become a major health issue [38],[39]. Lesbians as well may also experience underweight and consequences, thus further research is needed. Smoking was prevalent among gays which was in line with reports from Western countries [5]. Lesbian smoking was significantly low in contrast to Western countries, which is in line with the low female smoking rate in Japan [40].

Alcohol consumption was surprisingly low among all SGM groups however, this study did not focus on binge drinking which may have different results that require future research [4],[5].

There are implications and impacts from our study. First, all SGM groups in Japan face higher rates of stroke and IHD compared to their cisgender/heterosexual counterparts, mirroring trends seen in Western countries [3]-[6]. Transgender individuals are particularly vulnerable. Second, psychosocial stress, discrimination, and harassment may contribute significantly to the health disparities observed among SGMs [7],[8]. Despite lower reported discrimination rates in Japan compared to the US [29],[30], SGMs still face substantial stressors affecting their health. Third, SGMs may often experience barriers to healthcare access due to financial insecurity and discrimination in medical settings [11],[31]. This leads to lower healthcare-seeking behaviors, exacerbating their health risks [11]. Fourth, for transgender individuals, hormone therapy may be a potential risk factor for CVD [34], which needs further study. Transgender individuals exhibit higher CVD risk compared to cisgender individuals both males and females, emphasizing the need for careful medical monitoring. Fifth, lifestyle habits such as smoking, physical activity, and weight management may play a significant role in the health outcomes of SGMs [3]-[5],[16]. Smoking is prevalent among gay individuals, while overweight/obesity is less common among lesbians compared to Western countries [4],[5],[11], potentially due to cultural differences. Sixth, the findings underscore the necessity for targeted support and healthcare interventions for SGMs in Japan. Tailored healthcare services and policies addressing the unique needs of SGMs can help mitigate higher stroke and IHD risks. Thus, this study contributes valuable insights into the health challenges faced by SGMs in Japan, highlighting the importance of inclusive healthcare practices and the need for further research to address these disparities effectively.

Conclusion

This literature adds to previous research, on stroke and IHD risk among LGBT individuals in Japan as well as the demographic factors of SGM groups. The results highlight that SGMs in Japan are at high risk of stroke and IHD and, thus in need of careful support. SGMs in Japan face significant stroke and IHD risk. Among SGM groups, transgenders faced the highest stroke and IHD prevalence, followed by gays, lesbians and bisexuals. SGMs in Japan have different demographic characteristics compared to those in Western countries. This study contributes to emphasizing the necessity of support for SGM health.

Limitation and Suggestions

The limitations of this research are, firstly, the population may be biased due to online surveys. There is the possibility that the main target population frequently collects and

disseminates information via the Internet [41]. Nonetheless, the number of SGMs defined in this study was 6.4%, similar to a previous report from the Japanese population [42]. Secondly, the survey was conducted cross-sectionally. This research aimed to become a pioneer in revealing the situation surrounding SGMs in Japan and their CVD risk. Future longitudinal studies will expand the findings for further explanation. Thirdly, categories of SGMs were limited to LGBT. SGMs who were not included in this study are also at risk of minority stress and may be as well facing health disparities [7]. Future research including such individuals is required to provide evidence for further support. Fourth, the number of bisexuals among each birth sex was limited. It has been pointed out that the number of bisexuals is limited compared to that of gays and lesbians [43]. Thus, bisexuals may be more prone to minor stress and CVD risk as well. Future studies with a larger population may contribute to a holistic finding.

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Conflict of Interest

The authors declare that there is no conflict of interest.

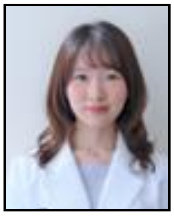
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