

Cancer Risk Based on Sexual Orientation in the United States: A Comparative Analysis between Lesbian, Bisexual, Gay, and Heterosexual Individuals

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Abstract

Purpose

Our study aimed to compare the prevalence and likelihood of cancer diagnosis between lesbian, gay, and bisexual (LGB) groups and the heterosexual population in the United States between 2017 and 2021.

Methods

This study analyzed data from the National Health Interview Survey (NHIS) 2017–2021, which included 134,372 heterosexual and 4,576 LGB individuals aged 18 and above. The prevalence of any cancer and some selected cancers were calculated for the LGB and compared with heterosexual adults. Sexual orientation was used to predict cancer diagnosis for each sex using multiple logistic regression, adjusting for other sociodemographic determinants.

Results

The unadjusted prevalence of any cancer among the LGB population was 9.0%. Lesbian and Bisexual women had higher prevalence of cancer of the cervix, uterus, ovary, thyroid, bone, skin melanoma, leukemia, and other blood cancers than Heterosexual women. Gay and Bisexual men had a higher prevalence of cancer of the bladder, kidney, skin (non-melanoma, and other kinds), bone, lymphoma, and leukemia than Heterosexual men. After adjusting for other socio-demographic factors, gay men were 1.73 (CI: 1.14–2.63, $p = 0.01$) times more likely than heterosexual men to be diagnosed with cancer, while lesbian women were 2.26 (CI: 1.24–4.16, $p = 0.009$) times more likely to be diagnosed with cancer than heterosexual women.

Conclusion

Some sexual minority subgroups are more likely to be diagnosed with cancer than their heterosexual counterparts. As a result, more research and SM-specific intervention efforts should focus on cancer risk assessment, screening, prevention, treatment, and survivorship in SM populations.

Introduction

In 2020, sexual minority (SM) groups made up about 5.2% of the US population, with a recent increase to 7.1% in 2022 [1]. SM people are disproportionately affected by cancers such as cervical, prostate, anal, colorectal, breast, lung, etc [2]. Higher rates of chronic infections (e.g., HIV and HPV), higher rates of tobacco and alcohol consumption, and long-term consumption of high-fat diets are all cancer risk factors or behaviors among the SM population [3].

Some members of the lesbian, gay, and bisexual (LGB) communities are hesitant to seek care because they believe primary care providers will not make appropriate and timely cancer screening recommendations based on prejudice or assumptions about their sexual orientation, gender, and anatomical and physiological makeup [4]. They face discrimination that makes it difficult for them to seek cancer-related medical care and prevention services [5, 6]. These healthcare disparities continue to grow due to a lack of culturally relevant cancer screening guidelines, limited access to affordable healthcare, and a lack of trust in healthcare professionals to provide appropriate care tailored to their needs and health concerns [3].

As a result of health disparities and stigma, LGB adults are less likely to seek medical care and services in a timely manner than their heterosexual counterparts, resulting in poor health outcomes [7]. Furthermore, these populations have difficulty obtaining health insurance for domestic partners, mental health services, hormone therapies, gender affirmation surgeries, and annual checkups or screening procedures [7].

Our literature search revealed a dearth of reports on the prevalence of specific cancers in the LGB community. Few studies have compared the prevalence of cancer among different sexual orientations in the past [8–11]. According to a California study by Mansh et al., gay and bisexual men have a higher risk of skin cancer than heterosexual men, while lesbian and bisexual women have a lower risk than heterosexual men [10]. Another California study conducted on cancer survivorship and sexual orientation between 2001 and 2005 by Boehmer et al. reported that gay men had a higher risk of cancer than heterosexual men, with no significant difference in cancer prevalence between lesbian, bisexual, and heterosexual women [9]. Similar findings were reported in another study that used the 2014–2015 Behavioral Risk Factor Surveillance System (BRFSS).[11]

The study by Gonzales et al. used the National Health Interview Survey (NHIS) to compare the prevalence of cancer diagnosis by gender and sexual orientation between 2013 and 2016 and found gay men and bisexual women to be more likely to be diagnosed with cancer compared with their heterosexual counterparts [8]. Our study built on this report and aimed to compare the prevalence and likelihood of cancer diagnosis between the LGB and heterosexual populations in the United States using information from the NHIS survey between 2017 and 2021. We further provided the prevalence of specific cancer among the LGB populations.

This study would provide current knowledge of cancer epidemiology by sex and sexual orientation, as well as the prevalence of specific cancers among LGB groups, which would go a long way toward improving cancer prevention, screening, care, and control among sexual minority groups in the United States.

Methods

Source of data

The data came from the 2017–2021 National Health Interview Survey (NHIS) conducted annually by the Centers for Disease Control and Prevention (CDC) among civilian noninstitutionalized populations residing within the 50 states and the District of Columbia [12]. The NHIS is a cross-sectional survey that monitors the health of the United States population [13].

The NHIS used geographically clustered sampling techniques to select a sample of dwelling units.[12] Sampling and interviewing were continuous throughout each year [12]. Family (discontinued in 2019), one sample adult (18 years and older), and one sample child (aged 17 and younger) surveys were collected at each selected dwelling unit [12]. Only the sampled adult survey was used in our study. NHIS surveys were approved by the Research Ethics Review Board of the National Center for Health Statistics and the U.S. Office of Management and Budget [14]. All NHIS respondents provided oral consent prior to participation [14]. Computer-assisted personal interviewing was used to complete each survey [12]. Face-to-face interviews were conducted in respondents' houses, and telephone follow-up interviews were conducted [12].

Due to the COVID-19 pandemic, data collection procedures in 2020 were disrupted [15]. In 2018 and 2019, the response rates for the sample adult component were 53.1% and 59.1%, respectively, while it was 48.9% in 2020 [15].

Study Sample

For this analysis, the NHIS datasets from 2017 to 2021 were pooled. The adults in the sample were asked to identify their sexual orientation and the possible available options as (i) gay or lesbian, (ii) bisexual, or (iii) heterosexual [16]. Adults who chose "something else," "don't know," or "not ascertained" as their sexual orientation, as well as those who refused to answer the question, were excluded from the sample. Additionally, those who did not know or refused to respond to the questions about their sex and cancer diagnosis were excluded. The NHIS survey ascertained sex by asking, "Are you a male or female" and cancer diagnosis by asking, "Have you EVER been told by a doctor or other health professional that you had cancer or a malignancy of any kind?" [16]. Because the NHIS asks only about male/female sex and no question about gender identity, our analyses could not consider transgender individuals.

After implementing our eligibility criteria, a total of 138,948 adult participants were selected, including 134,372 heterosexual people and 4,576 LGB individuals (1,054 lesbian women, 1,500 gay men, and 2,022 bisexual men and women).

Measures

Cancer diagnosis was the dependent variable, while the main independent variable was sexual orientation, which we further stratified into heterosexual men, heterosexual women, gay men, lesbian women, bisexual men, and bisexual women. Other covariates include age, marital status, race/ethnicity, body mass index (BMI), work status, annual family income, smoking status, and alcohol use.

Statistical analysis

Survey weights were considered to account for the complex survey design and disparate sample size in the sexual orientation strata.

After stratifying the participants by sex and sexual orientation, descriptive statistics were used to characterize them. One-way ANOVA and Pearson Chi-Square tests were used to compare the different socio-demographic characteristics across the sexual orientations within each sex group. The descriptive analysis results were presented as mean, standard deviation, and proportion.

The prevalence of any cancer and some selected cancers were calculated for LGB individuals and compared with the heterosexual population. The results were presented in proportions.

Sexual orientation was used to predict cancer diagnosis for each sex using multiple binomial logistic regression, adjusting for sociodemographic determinants such as age, marital status, race/ethnicity, BMI, work status, smoking status, and alcohol use. The result from the multiple logistic regression was presented in adjusted odds ratio and 95% confidence intervals (CI). Data analysis was done with STATA 17.0/SE.

Results

Socio-demographic characteristics

The socio-demographic characteristics of the study sample were summarized in Table 1, stratified by sexual orientation and sex. According to the NHIS data sample, 3.3% of the US population identified as lesbian, gay, or bisexual between 2017–2021. Among the men, 2.4% were gay, while about 1.0% were bisexual. Among the women, 1.4% were lesbian, while 2.0% were bisexual.

Bisexual men were younger than heterosexual and gay men. Lesbian and heterosexual women were also younger than bisexual women. Approximately 46% of the total sample identified as male, while the remaining 54% identified as female. LGB people were less likely to be married or live with significant others than heterosexual people. Gay men were less likely than heterosexual and bisexual men to be obese. Lesbian and bisexual women were more likely to be obese than heterosexual women. Compared to heterosexual individuals, LGB people appeared more likely to work full-time or part-time.

Gay and bisexual men were more likely to be current smokers, while heterosexual men were more likely to be former smokers. Bisexual women were more likely than heterosexual women to be current smokers, while lesbian women were more likely to be former smokers. Heterosexual individuals were more likely than LGB people to be binge drinkers.

Table 1
The socio-demographic characteristics by sex and sexual orientation (2017–2021)

	All	Men			Women				
	(Weighted %)	Gay (Weighted %)	Bisexual (Weighted %)	Heterosexual (Weighted %)	P-value	Lesbian (Weighted %)	Bisexual (Weighted %)	Heterosexual (Weighted %)	P-value
Participants (unweighted)	138,948	1,500 (2.4%)	527 (0.8%)	61,550 (96.8%)		1,054 (1.4%)	1,495 (2.0%)	72,822 (96.6%)	
Age (Years) Mean (SD)	52.3 (± 18.40)	47.4 (± 16.34)	39.8 (± 17.65)	51.5 (± 18.14)	< 0.001 ^a	45.5 (± 16.30)	34.4 (± 13.91)	53.6 (± 18.46)	< 0.001 ^a
Sex									
Male	45.8%								
Female	54.2%								
Marital Status^c					< 0.001 ^b				< 0.001 ^b
Married or living with significant others	53.2%	33.9%	29.7%	57.5%		44.5%	40.4%	50.5%	
Not married, separated, divorced, widowed	46.8%	66.1%	70.34%	42.5%		55.5%	59.6%	49.5%	
Race/Ethnicity^c					< 0.001 ^b				< 0.001 ^b
Hispanic/Latino	13.0%	14.6%	13.3%	12.8%		12.0%	14.3%	13.2%	
Non-Hispanic white	69.3%	71.7%	70.2%	70.4%		68.7%	67.6%	68.3%	
Non-Hispanic Black	10.7%	7.60%	7.8%	9.6%		13.7	9.6%	11.6%	
Non-Hispanic Asian	3.9%	3.0%	2.3%	4.0%		2.2%	2.5%	3.9%	
Non-Hispanic American Indian and Alaska Native	0.8%	0.7%	2.1%	0.76%		1.2%	0.7%	0.8%	
Non-Hispanic Native Hawaiian/Pacific Islander	0.9%	0.4%	1.1%	1.0%		1.0%	1.5%	0.8%	
Multiple races	1.49%	1.9%	3.2%	1.5%		1.3%	3.6%	1.4%	
Body Mass Index^c					< 0.001 ^b				< 0.001 ^b
Underweight (< 18.5kg/m ²)	1.6%	1.1%	1.33%	0.9%		1.9%	1.6%	2.2%	

^a P-Value from ANOVA test

^b P-Value from Pearson Chi-Square test

^c There were missing data

SD = Standard Deviation

	All	Men			Women				
	(Weighted %)	Gay (Weighted %)	Bisexual (Weighted %)	Heterosexual (Weighted %)	P-value	Lesbian (Weighted %)	Bisexual (Weighted %)	Heterosexual (Weighted %)	P-value
Normal (18.5–24.9 kg/m ²)	32.1%	35.7%	33.5%	26.7%		30.9%	37.7%	36.7%	
Overweight (25.0–29.9 kg/m ²)	34.5%	38.6%	35.1%	40.8%		28.1%	24.0%	29.3%	
Obese (> 30 kg/m ²)	31.2%	24.7%	30.1%	31.7%		39.1%	36.7%	31.8%	
Work status^c					< 0.001 ^b				< 0.001 ^b
Currently working full-time or part-time	53.1%	66.2%	67.8%	58.1%		65.2%	71.1%	48.3%	
Not working	46.9%	33.4%	32.2%	41.9%		34.8%	28.9%	51.7%	
Annual Family Income^c					< 0.001 ^b				< 0.001 ^b
<\$35,00	27.3%	21.1%	39.3%	23.4%		27.6%	38.4%	30.5%	
\$35,000 - \$49,999	12.8%	14.1%	13.3%	12.1%		16.0%	13.8%	13.4%	
\$50,000 - \$74,999	18.2%	20.6%	17.4%	18.4%		16.2%	19.1%	17.9%	
\$75,000 - \$99,999	12.7%	12.8%	12.2%	13.7%		12.6%	11.1%	12.0%	
\$100,000 or greater	29.0%	31.3%	17.9%	32.37%		27.6%	17.7%	26.3%	
Smoking Status^c					< 0.001 ^b				< 0.001 ^b
Current Smoker	13.3%	16.7%	16.5%	15.0%		17.0%	22.4%	11.6%	
Former Smoker	25.6%	26.9%	26.8%	29.8%		25.8%	21.7%	22.1%	
Never Smoker	61.1%	56.4%	56.7%	55.2%		57.2%	56.0%	66.3%	
Alcohol (Binge Drinking)^c					0.001 ^b				< 0.001 ^b
Yes	37.4%	22.9%	31.2%	34.0%		25.9%	26.6%	40.3%	
No	62.6%	77.1%	68.8%	66.0%		74.1%	73.4%	59.7%	
^a P-Value from ANOVA test									
^b P-Value from Pearson Chi-Square test									
^c There were missing data									
SD = Standard Deviation									

Prevalence of cancer among LGB

The unadjusted prevalence of any cancer among the LGB population was 9.0%.

Lesbian and Bisexual women had higher prevalence of cancer of the cervix (16.3%), uterus (7.2%), ovary (7.7%), thyroid (3.2%), bone (1.4%), skin melanoma (11.0%), leukemia (1.8%), and other blood cancers (0.9%) than the Heterosexual women.

Gay and Bisexual men had a higher prevalence of cancer of the bladder (6.0%), kidney (4.5%), skin [non-melanoma (29.0%), and other kinds (10.0%)], bone (1.1%), lymphoma (6.3%) and leukemia (2.7%) than Heterosexual men. More details are in Table 2.

Cancer diagnosis by sex and sexual orientation

After controlling for other socio-demographic factors, gay men were 1.73 (CI: 1.14–2.63, $p = 0.01$) times more likely than heterosexual men to be diagnosed with cancer (Table 3). Lesbian women were 2.26 (CI: 1.24–4.16, $p = 0.009$) times more likely to be diagnosed with cancer than heterosexual women after adjusting for the other socio-demographic variables (Table 3).

Although not statistically significant, bisexual women were 1.42 times more likely than heterosexual women to be diagnosed with cancer, while the odds of cancer diagnosis in bisexual men were 0.86 times that in heterosexual men (Table 3).

Table 2
Prevalence of different cancers among the LGB and Heterosexual individuals stratified by sex (2017–2021)

Cancer type	Total sample (%)	Lesbian, Gay, and Bisexual (LGB) people			Heterosexual people		
		All (%)	Men (%)	Women (%)	All (%)	Men (%)	Women (%)
Any cancer	12.2	9.0	9.4	8.7	12.4	11.2	13.3
Colorectal	5.5	2.3	2.4	2.1	5.6	6.2	5.2
Cervix	8.3	16.3	-	16.3	8.2	-	8.3
Uterus	6.0	7.2	-	7.2	5.9	-	5.9
Ovary	3.6	7.7	-	7.7	3.5	-	3.5
Breast	19.3	11.5	0.5	20.8	19.5	0.4	33.0
Thyroid	2.9	3.2	1.1	5.0	2.9	1.5	3.8
Prostate	29.4	22.2	22.2	-	30.0	29.4	-
Lymphoma	3.2	4.2	6.3	2.3	3.2	3.8	2.7
Leukemia	1.5	2.2	2.7	1.8	1.4	1.9	1.1
Other blood	0.6	0.7	0.5	0.9	0.6	0.6	0.5
Bone	0.8	1.2	1.1	1.4	0.7	0.8	0.6
Melanoma	6.3	5.6	6.3	5.0	6.3	7.5	5.4
Skin (Melanoma)	9.1	9.4	7.3	11.0	9.1	10.5	8.0
Skin (Non- Melanoma)	22.4	24.2	29.0	19.9	22.3	24.3	20.8
Skin (Type unknown)	7.6	7.7	10.0	5.4	7.0	8.6	5.7
Bladder	2.7	2.8	6.0	0.0	2.7	4.6	1.4
Kidney	2.2	2.8	4.5	1.3	2.2	2.6	1.9

LGB = Lesbian, gay, and bisexual

Table 3
showing the multiple logistic regression analysis by sex (2017–2021)

	Men		Women	
	Adjusted Odds Ratio (95% CI)	p-value	Adjusted Odds Ratio (95% CI)	p-value
Sexual Orientation				
Heterosexual ^a (Ref)				
Gay-Lesbian ^b	1.73 (1.14–2.63)	0.01	2.26 (1.23–4.16)	0.009
Bisexual ^c	0.86 (0.30–2.52)		1.42 (0.68–3.00)	0.354
Age (Years)	1.07 (1.06–1.08)	< 0.001	1.04 (1.03–1.05)	< 0.001
Marital Status				
Married or living with significant others	1.39 (1.22–1.59)	< 0.001	0.98 (0.86–1.11)	0.738
Not married, separated, divorced, widowed (Ref)				
Race/Ethnicity				
Hispanic/Latino (Ref)				
Non-Hispanic white	2.86 (2.15–3.80)	< 0.001	2.42 (1.88–3.130)	< 0.001
Non-Hispanic Black	1.72 (1.20–2.45)	0.003	1.08 (0.78–1.50)	0.656
Non-Hispanic Asian	0.52 (0.23–1.20)	0.128	1.20 (0.67–2.14)	0.540
Non-Hispanic American Indian and Alaska Native	0.97 (0.37–2.57)	0.950	1.35 (0.58–3.14)	0.483
Non-Hispanic Native Hawaiian/Pacific Islander	1.20 (0.56–2.54)	0.642	1.65 (0.83–3.28)	0.157
Multiple races	0.87 (0.41–1.82)	0.705	1.46 (0.85–2.48)	
Body Mass Index				
Underweight	0.99 (0.52–1.89)	0.973	0.93 (0.64–1.35)	0.693
Normal (Ref)				
Overweight	0.86 (0.73–1.00)	0.062	0.97 (0.84–1.13)	0.724
Obese	0.88 (0.74–1.04)	0.135	1.11 (0.85–2.48)	0.167
Work status				
Currently working full-time or part-time (Ref)				
Not working	1.51 (1.09–1.76)	0.045	1.35 (1.11–1.66)	0.003
Smoking Status				
Current Smoker	1.01 (0.72–1.12)	0.335	1.14 (0.91–1.42)	0.246
Former Smoker	1.10 (0.96–1.26)	0.188	1.31 (1.15–1.50)	< 0.001
Never Smoker (Ref)				
Alcohol (Binge Drinking)				
Yes	1.09 (0.81–1.22)	0.282	0.95 (0.84–1.07)	0.365
No (Ref)				
Model = Cancer diagnosis vs. No Cancer diagnosis				

This multivariable model adjusted the following variables: sexual orientation, age, marital status, race/ethnicity, BMI, work status, living with a child, smoking status, and alcohol use.

Ref = Reference Group

CI = confidence interval

^a Heterosexual men for the men group and heterosexual women for the women group

^b Gay men for the men group and Lesbian women for the women group

^c Bisexual men for the men group and Bisexual women for the women group

Discussion

Our study aimed to compare the prevalence and risks of cancer diagnosis by sexual orientation using NHIS survey data from 2017 to 2021 among 134,372 heterosexual and 4,576 LGB individuals aged 18 and above.

The proportion of LGB in the US population was higher in the current study than in a similar study conducted between 2013 and 2016 [8]. This might be due to the LGB community's continued growth in recent years. However, because the CDC did not include other sexual and gender minority groups, such as transgender people, asexual, pansexual, and queer populations, among others, in its NHIS surveys, this proportion was lower than that reported for the whole sexual and minority groups (SGM) in 2022 [1].

Previous research has shown that the prevalence and likelihood of cancer diagnosis in some sexual and gender minority groups may be higher than in the heterosexual population [7–11, 17–19]. However, limited data collection on gender identity and sexual orientation has hampered research into cancer diagnosis, risk, care, and survivorship among SM people. We found a lower unadjusted prevalence of cancer diagnosis in the LGB compared to heterosexual individuals. This finding can be attributed to the lower average age of LGB individuals, LGB people's relatively smaller sample size (1:30), a lack of adequate cancer screening among the LGB people and underreporting by the LGB individuals. Furthermore, despite the fact that incidence rates for various types of cancer are decreasing nationally [20], the prevalence of cancer among LGB and heterosexual populations found in this study is higher than the rate seen by Gonzales et al. in the 2013–2016 NHIS study.

We found that the prevalence of certain cancers was higher in the LGB population than in the heterosexual group. Our findings were consistent with previous studies that SM individuals were at increased risk of cancer of the cervix, uterus, ovary, thyroid, and skin [19]. This finding necessitates more deliberate SM-targeted action in the screening, treatment, and control of these cancers.

In line with the similar study conducted with NHIS data between 2013 and 2016, we found that gay men were more likely than heterosexual men to be diagnosed with cancer [8]. However, in contrast to other previous studies, which found bisexual women to be more likely to be diagnosed with cancer, we found lesbian women to be twice as likely as their heterosexual counterparts to be diagnosed with cancer [8–11]. The nonsignificant result we found in bisexual women could be attributed to an increase in the sample size of bisexual women from 780 in study conducted between 2013–2016 [8] to 1,495 in our study between 2017–2021. Similar to the previous NHIS study, we found that bisexual men had no higher risk of a cancer diagnosis than heterosexual men [8].

We believe that as more data becomes available, researchers should continue to investigate whether LGB people are more likely to develop cancer than heterosexual people. Our study provided baseline information on the prevalence of some specific cancer types among the LGB population; however, more research into each cancer type among the SM population is needed to understand the cancer type risk among this population fully. Researchers should also keep looking into cancer-specific screening, treatment, care, and survivorship disparities among the SM population.

Limitations and strengths

There were some limitations to the NHIS survey. They are as follows: (1) Because the NHIS survey was a cross-sectional study, determining the causality between cancer diagnosis and sexual orientation was limited; (2) Because the NHIS survey was self-reported, there was a risk of underreporting, recall, or response bias. For example, we relied on participants' self-reported cancer diagnosis status (3), a relative sample size of LGB sample compared to the heterosexual sample (1:30); (4) underreporting of sexual orientation as a lesbian, gay, or bisexual because some participants may not disclose their sexual orientation during face-to-face interviews. As a result, the cancer burden among LGB people may be higher than what we found in this study. (5) The NHIS survey did not ask participants about their current gender identity or transgender status. As a result, information from other SGM groups, such as transgender people, pansexual, asexual, queer people, and others, was missing from the NHIS survey.

The classification of these individuals among the heterosexual population might have resulted in an underreporting of cancer burden among the SM population. In future NHIS surveys, the CDC should include questions on sex at birth, current gender identity, transgender status and expand the options for sexual orientation questions to include other SM groups such as pansexual, queer, and so on.

Despite these limitations, our study was one of the few studies to compare cancer risk based on sexual orientation from 2017 to 2021. Furthermore, this study provided some novel information on the prevalence of certain cancers in the LGB population.

Conclusion

Sexual minority populations are disproportionately affected by cancer. Our study showed that gay men and lesbian women had a higher risk of being diagnosed with cancer than their corresponding heterosexual counterparts. It also provided baseline information on the prevalence of some specific cancers among the LGB population. Due to the established disparities, a multilevel SM-specific approach and intervention would be required to address cancer prevention, screening, treatment, survivorship, and control among SM individuals.

Declarations

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Competing Interests

The authors have no relevant financial or non-financial interests to disclose.

Author contributions

All authors contributed to the study's conception and design. Data analysis was performed by Samuel Tundealao. The first draft of the manuscript was written by Samuel Tundealao and Anusha Sajja, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data Availability

The primary datasets analyzed during the current study are publicly available on CDC's NHIS website at <https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm>.

Ethics Approval

Although this was a secondary analysis, NHIS surveys were approved by the Research Ethics Review Board of the National Center for Health Statistics and the U.S. Office of Management and Budget

Consent to Participate

Informed consent was obtained from all individual participants included in the study

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