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Colorectal Cancer Screening Awareness and Literacy among Korean American Women: Importance of Health Care Accessibility

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Abstract

Background: Although early screening for colorectal cancer provides positive impacts, Korean Americans are found to underutilize colorectal cancer screening. The purpose of this study was to examine factors associated with awareness of colorectal cancer screening modalities and literacy on CRC screening guideline and risk factors among Korean American women.

Method: A quota sampling strategy was used to recruit 243 Korean American women aged 19 to 85 in Atlanta, Georgia. Data were collected through self-administered survey or face-to-face interview in 2016.

Results: Findings showed approximately 57%, 70% and 92% of participants, respectively, heard of fecal occult blood test, sigmoidoscopy, and colonoscopy. Having a primary care physician was consistently associated with awareness of colorectal cancer screening modalities, while getting an annual check-up was significantly associated with colorectal cancer literacy on guideline and risk factors.

Conclusion: Korean American women had relatively high level of awareness and literacy of colorectal cancer modalities and screening guideline. However, particular attention should be given to those who lack health accessibility. Community-based interventions and health-care providers' continuous encouragement are important to improve colorectal cancer screening awareness and literacy.

Key words: Colorectal cancer; Screening; Immigrant; Health Literacy

Abbreviations: US: United States; AAPIs: Asian Americans and Pacific Islanders; CRC: Colorectal Cancer; USPSTF: U.S. Preventive Services Task Force; FOBT: Fecal Occult Blood Test; FIT: Fecal Immunochemical Test; KAs: Korean Americans; IRB: Institutional Review Board;

Introduction

In the United States (U.S.), cancer remains the leading cause of death among Asian Americans and Pacific Islanders (AAPIs) [1]. From 2013-2017, cancer incidence rate for AAPIs was 302.1 per 100,000 and mortality rate was 98.9 per 100,000 [2]. Of those cancer cases and deaths, colorectal cancer (CRC) was one of the most commonly diagnosed and deadly cancers [2-6].

The U.S. Preventive Services Task Force (USPSTF) recommends several screening modalities for individuals aged 50 to 75 for the early detection of CRC. For the fecal occult blood test (FOBT) or the fecal immunochemical test (FIT), the USPSTF recommends an annual screening. For Sigmoidoscopy, individuals are recommended a decennial (every 10 year) screening with the addition of an annual FIT screening. For Colonoscopy, the USPSTF recommends a screening every ten years [7]. According to the American Cancer Society Colorectal Cancer Facts & Figures 2020-2022 report, in 2018 the national average CRC screening rate in accordance with the USPSTF guidelines was 66% [8].

Despite the positive impacts and health rewards of early screening for CRC, many AAPI subgroups still underutilize CRC screening [9, 10]. Korean Americans (KAs), in particular, consistently reported lower rates of CRC screening [11-14]. A variety of barriers, such as demographic information, English fluency, cultural beliefs, and health access have been identified among Kas [11, 13, 15-18]. Jo and colleagues [15] found that

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lack of health insurance, language barriers, lack of physician's recommendations, and concern about being a burden to one's family were potential barriers to CRC screening among Korean Americans in Los Angeles. Another study conducted in New York City reported that cultural health beliefs also contributed to the CRC screening behavior [12]. Specifically, culture-embedded health beliefs such as fatalism-lack of control over severe diseases - hindered KAs from conducting CRC screenings. Numbers of studies suggested that health literacy might be a contributing factor to cancer screening among different ethnic groups [19-22]. Han and colleagues [23] confirmed the efficacy of a health literacy intervention on breast and cervical screening receipts among Korean American women. However, research on CRC screening among Korean Americans is dearth. Sy et al. [10] and Maxwell et al. [24] indicated that Asian Americans, including KAs, had low risk perception or were less aware of cancers. Therefore, more research is needed to identify the levels of awareness and literacy relevant to the Korean American population.

This study, therefore, aims to examine the (1) levels of CRC screening awareness and literacy and (2) relevant factors associated with CRC screening awareness and literacy in KA women residing in Atlanta, Georgia. To our best knowledge, this is the first study to investigate CRC screening awareness and literacy within KA women in the state of Georgia, and the findings will provide geography-specific intervention strategies to improve CRC screening rates in this region.

Methods

Research Design

This study was part of a larger research project, which aims to investigate cancer prevention behaviors, including cervical, breast, and colorectal cancer, of Korean American women. The study was approved by the authors' university Institutional Review Board (IRB). Using a cross-sectional survey research design, we recruited Korean American women, aged 19 to 85, in the Metro-Atlanta area in 2016. A quota sampling strategy was used to ensure inclusion of approximately 25 to 35 women in each of the six age categories: (1) 19 to 29, (2) 30 to 39, (3) 40 to 49, (4) 50 to 59, (5) 60 to 69, and (6) 70 to 85. Multiple sampling sites where many Korean American women socialize (specifically, local Korean churches, ethnic senior centers, and Korean community events) were used to recruit study participants. To recruit participants, fliers were posted in public areas of these sites, including lunchrooms and recreational rooms. The researchers made several public presentations about the research at these sites; in these, the purpose of the study, eligibility criteria, and voluntary nature of participation were explained.

Data Collection

This study utilized two data collection methods: (1) self-administered questionnaires with those under 60 years old, and (2) face-to-face interviews with the women aged ≥ 60. Face-to-face interviews were conducted with the women in the older age bracket to prevent any potential misunderstanding of cancer and cancer screening terminologies. The interviews were conducted at Korean senior centers and Korean ethnic churches in the area. After obtaining informed consent, individuals who chose to participate met with one of three bilingual (Korean and English) interviewers who were trained by the researchers in interviewing older Korean American. All interviews were conducted in Korean. The interview lasted approximately 45 minutes to one hour. Self-administered surveys were used with the women in the younger group and conducted at Korean churches, Korean community events, and Korean parents' meetings at local public schools where many KA women attend. The survey was available in both Korean and English, and the respondents chose which version to use. Self-administered surveys took approximately 20-25 minutes to complete. All respondents were given $10 for their participation in the study.

Instruments

Dependent variables

The primary outcomes of this study are awareness of colorectal cancer screening and colorectal cancer literacy. Awareness of colorectal cancer screening was measured by questions of whether respondents have ever heard of FOBT, Sigmoidoscopy, and Colonoscopy. Colorectal cancer literacy was measured by a 7-item questionnaire adopted from the American Cancer Society colorectal cancer screening guidelines and colorectal cancer risk factors [26, 27]. The answer to each item was dichotomized (0=False, 1=True), and the sum of each score was converted into a measure for colorectal cancer literacy level.

Independent variables

Respondents provided information on nine independent (i.e., sociodemographic) variables, which included age, marital status, years in the U.S., education, annual checkup, having a primary physician, having health insurance, family cancer history, and self-rated health status. Age, years in the U.S. (ranging from 0 to 50), and education were entered as continuous variables. Marital status was dichotomized (1=married or partnered, 0=other). Yes/no questions (1=yes, 0=no) was employed to measure whether the participants had a bachelor's degree, whether they received an annual checkup, whether they have a primary physician, whether they have health insurance, and whether they have a family history of cancer. Self-rated health status was measured by a 5-point Likert scale and dichotomized (0=very poor/poor, 1=fair/good/excellent).

Data Analysis

Sociodemographic characteristics of the sample, awareness of colorectal cancer screening, and literacy of colorectal cancer screening were conducted using univariate analyses. Bivariate analysis by means of chi-square was conducted to examine the relationship between sociodemographic characteristics and awareness of colorectal cancer screening; t-test and F-tests were performed for the relationship between sociodemographic

characteristics and colorectal cancer literacy. Awareness of CRC screening modalities (FOBT, Sigmoidoscopy, and Colonoscopy) and CRC literacy were regressed on all sociodemographic characteristics using logistic regression and multiple linear regressions, respectively. All analyses of this study were conducted using SPSS version 24.0.

Results

Sociodemographic Characteristics of the Sample

Approximately 19.6% of the sample was aged 19 to 29, 21.7% was aged 30-39, 24.3% was aged 40 to 49, 10.6% was 50 to 59, and 23.8% was 60 and over years of age. About 68% of the participants were married or partnered, while 32% were never married, divorced, or widowed. About 68% reported earning less than $6,000 per month, while 32% reported their monthly income at $6,000 or over. Regarding years in the US, about 38.7% of the respondents reported having been in the US for less than 10 years, 27.7% indicated between 11 and 20 years, 19.7% reported between 21 to 30 years, 9.2% reported between 31 to 40 years, and only about 4.6% reported they had been in the US for more than 31 years. Approximately 68.8% of the sample had received a bachelor's degree. Less than a half (46.5%) of the participants reported having an annual checkup, and about 64% of the respondents indicated having a primary physician. The majority of the respondents (80.2%) had health insurance, and more than a half (58.4%) had a family cancer history. The majority of the participants (92%) reported their health status as fair, good, or excellent, while only 8% indicated poor or very poor health status.

As presented in Table 1, awareness of colorectal cancer screenings differed depending on the sample's sociodemographic characteristics: FOBT awareness was significantly different by years in the U.S. ($\chi2=11.837$, $p<.05$), annual checkup ($\chi2=7.196$, $p<.01$), having a primary physician ($\chi2=8.965$, $p<.01$), and health status ($\chi2=5.260$, $p<.05$); Sigmoidoscopy awareness was significantly different by age ($\chi2=33.659$, $p<.001$), marital status ($\chi2=5.589$, $p<.05$), years in the U.S. ($\chi2=15.650$, $p<.01$), and having a primary physician ($\chi2=5.591$, $p<.05$); Colonoscopy awareness was significantly different by having a primary physician ($\chi2=7.835$, $p<.01$). Colorectal cancer literacy significantly differed between groups of years in the U.S. ($F=2.753$, $p<.05$); post hoc analyses using the Scheffé criterion indicated that colorectal cancer literacy was significantly lower in the group who had been in the U.S. for 31-40 years than in the group living in the U.S. more than 41 years ($p<05$). Participants' getting an annual checkup showed significantly higher colorectal cancer literacy than those not getting an annual checkup ($t=2.286$, $p<.05$).

Table 1: Sociodemographic Characteristics of the Sample (N=243)

Characteristic			FOBT awareness			Sigmoidoscopy awareness			Colonoscopy awareness			Colorectal cancer literacy		
	N[a]	(%)	N	(%)[b]	χ^2	N	(%)[c]	χ^2	N	(%)[d]	χ^2	M	SD	t/F
Age														
19-29	46	(19.6)	17	(37.0)	.865	18	(39.1)	**33.659*****	40	(87.0)	4.473	5.04	1.56	.961
30-39	51	(21.7)	21	(41.2)		36	(70.6)		49	(96.1)		4.72	1.41	
40-49	57	(24.3)	34	(61.8)		47	(82.5)		53	(93.0)		4.77	1.34	
50-59	25	(10.6)	19	(76.0)		19	(79.2)		23	(92.0)		5.20	1.38	
≥60	56	(23.8)	42	(82.4)		45	(86.5)		54	(96.4)		4.64	1.59	
Marital status														
Married or partnered	164	(68.0)	98	(59.8)	.717	121	(77.1)	**5.589***	153	(94.4)	1.044	4.91	1.41	.843
Other	77	(32.0)	41	(53.3)		48	(62.3)		70	(90.9)		4.74	1.50	
Years in the US														
0-10 (a)	92	(38.7)	53	(58.2)	**11.837***	72	(80.0)	**15.650****	86	(93.5)	8.898	4.89	1.36	**2.753***
11-20 (b)	66	(27.7)	33	(50.0)		41	(62.1)		57	(86.4)		4.89	1.35	
21-30 (c)	47	(19.7)	25	(56.8)		27	(58.7)		45	(97.8)		4.89	1.66	
31-40 (d)	22	(9.2)	16	(76.2)		17	(85.0)		22	(100.0)		4.18	1.59	
≥41 (e)	11	(4.6)	10	(100.0)		10	(100.0)		11	(100.0)		5.91	.83	
Education														
Bachelor's degree	75	(31.3)	44	(58.67)	.903	52	(72.5)	.040	64	(87.7)	**5.277***	4.64	1.59	2.849
Bachelor's degree	165	(68.8)	93	(56.36)		116	(71.2)		158	(95.8)		4.93	1.40	
Annual checkup														
Yes	112	(46.5)	74	(68.5)	**7.196****	83	(76.1)	1.908	108	(96.4)	3.291	5.06	1.38	**2.286***
No	129	(53.5)	64	(51.2)		85	(68.0)		115	(90.6)		4.63	1.51	
Having a primary physician														

Yes	155	(64.0)	99	(66.4)	**8.965****	115	(77.2)	**5.591***	148	(96.7)	**7.835****	4.88	1.41	.501
No	87	(36.0)	40	(42.1)		54	(62.8)		76	(87.4)		4.78	1.54	
Having health insurance														
Yes	195	(80.2)	109	(58.0)	.533	133	(70.4)	1.304	180	(93.3)	.015	4.88	1.44	1.002
No	48	(19.8)	30	(63.8)		37	(78.7)		45	(93.8)		4.64	1.58	
Family cancer history														
Yes	142	(58.4)	76	(54.7)	2.817	102	(73.4)	.305	132	(93.6)	.036	4.71	1.45	-1.526
No	101	(41.6)	63	(65.6)		68	(70.1)		93	(93.0)		5.00	1.48	
Health status														
Fair/good/ excellent	219	(92.0)	130	(61.0)	**5.260***	152	(71.7)	.458	203	(93.5)	.459	4.85	1.47	.169
Very poor/poor	19	(8.0)	6	(33.3)		15	(78.9)		17	(89.5)		4.79	1.32	

[a] The total sample size is different depending on each characteristics due to missing values.
[bcd] These are the percentages of respondents aware of each screening among respondents who offered information of each screening awareness.

Awareness and Literacy of Colorectal Cancer Screening

As shown in Table 2, only 57.2% of the participants had heard of FOBT, while 70% and 92.6% of those had heard of Sigmoidoscopy and Colonoscopy, respectively. The majority of participants answered correctly regarding items "Obesity raises the risk of colon cancer in both men and women" and "Both men and women at the age of 50 should begin colorectal cancer screening" at 84.4% and 80.2% respectively. Significant portion of the participants still gave correct answers to questions "Long-term smokers are more likely than non-smokers to develop and die from colorectal cancer", "To screen colorectal cancer or find polyps, one should take flexible Sigmoidoscopy every 5 years", "Colorectal cancer has been linked to the heavy use of alcohol", and "To detect cancer, one should take fecal occult blood test (FOBT) every year", with 77.0%, 72.8%, 70.0%, and 61.7% answering correctly, respectively. On the other hand, only 35% of the sample endorsed a correct answer for the statement "To screen colorectal cancer or find polyps, one should take flexible Colonoscopy every 10 years".

Factors Predicting Colorectal Cancer Awareness

As shown in Table 3, in the model predicting FOBT awareness, only having a primary physician (OR=2.133, p<.05, CI 1.034-4.403) was significantly associated with FOBT awareness. Those who reported having a primary physician had 113% increased odds of being aware of FOBT compared to those who did not have a primary physician.

In the model predicting Sigmoidoscopy awareness, marital status (OR=2.215, p<.05, CI 1.137-4.316) and having a primary physician (OR=2.668, p<.05, CI 1.191-5.978) had significant associations with Sigmoidoscopy awareness. Those who reported being married or partnered had 122% increased odds of being aware of Sigmoidoscopy compared to those who were not married or partnered. Additionally, those who reported having a primary physician had 167% increased odds of being aware of Sigmoidoscopy compared to those who did not have a primary physician.

In regards to the Colonoscopy awareness model, education (OR=3.790, p<.05, CI 1.195-12.019) and having a primary physician (OR=5.315, p<.05, CI 1.252-22.568) were the only factors significantly associated with Colonoscopy awareness. Those who had a bachelor's degree or higher had 279% increased odds of being aware of Colonoscopy compared to

Table 2: Descriptive Analysis on Awareness and Literacy of Colorectal Cancer (N=243)

Awareness of colorectal cancer screening	**Participants answered "Yes" n (%)**	
I have ever heard of FOBT.	139	(57.2)
I have ever heard of Sigmoidoscopy.	170	(70.0)
I have ever heard of Colonoscopy.	225	(92.6)
Literacy of colorectal cancer	**Participants answered correctly n (%)**	
1. Both men and women at age of 50 should begin colorectal cancer screening.	195	(80.2)
2. To screen colorectal cancer or find polyps, one should take flexible Sigmoidoscopy every 5 years.	177	(72.8)
3. To screen colorectal cancer or find polyps, one should take flexible Colonoscopy every 10 years.	85	(35.0)
4. To detect cancer, one should take fecal occult blood test (FOBT) every year.	150	(61.7)
5. Obesity raises the risk of colon cancer in both men and women.	205	(84.4)
6. Long-term smokers are more likely than non-smokers to develop and die from colorectal cancer.	187	(77.0)
7. Colorectal cancer has been linked to the heavy use of alcohol.	170	(70.0)
Note. Colorectal cancer literacy total (*M* =4.83, *SD* =1.47; range 0-7)		

Table 3: Logistic Regression of Colorectal Cancer Screening Awareness by Sociodemographic Variables

Variables	FOBT				Sigmoidoscopy				Colonoscopy			
	SE	OR	95% CI		SE	OR	95% CI		SE	OR	95% CI	
Age (19~82)	.005	1.005	[.995	1.014]	.005	1.010	[1.000	1.021]	.011	1.002	[.982	1.023]
Marital status (Ref = not married or partnered)	.326	1.031	[.544	1.953]	**.340**	**2.215***	**[1.137**	**4.316]**	.603	.979	[.300	3.192]
Years in the US (0~50)	.011	1.006	[.985	1.028]	.015	.977	[.949	1.006]	.021	1.002	[.960	1.045]
Education level (Ref < bachelor's degree)	.328	.784	[.412	1.489]	.354	1.148	[.573	2.298]	**.589**	**3.790***	**[1.195**	**12.019]**
Annual checkup (Ref=no)	.353	1.427	[.714	2.853]	.411	1.337	[.597	2.994]	.771	1.255	[.277	5.690]
Having a primary physician (Ref=no)	**.370**	**2.133***	**[1.034**	**4.403]**	**.412**	**2.668***	**[1.191**	**5.978]**	**.738**	**5.315***	**[1.252**	**22.568]**
Having health insurance (Ref=no)	.404	.532	[.241	1.174]	.456	.447	[.183	1.094]	.746	.360	[.083	1.557]
Family cancer history (Ref=no)	.295	.673	[.377	1.199]	.323	1.569	[.834	2.954]	.569	1.244	[.408	3.793]
Health status (Ref=very poor/poor)	.538	2.862	[.997	8.220]	.635	.504	[.145	1.749]	.867	1.462	[.267	7.998]
Constant	.699	.535			.769	1.966			1.119	3.262		
Hosmer-Lemeshow goodness-of-fit $\chi 2(8)$			10.369 (p=.240)				10.055 (p=.261)				4.423 (p=.817)	

those who did not have a bachelor's degree. Furthermore, those who had a primary physician had 432% increased odds of being aware of Colonoscopy compared to those who did not have a primary physician.

Factors Predicting Colorectal Cancer Literacy

To assess factors predicting colorectal cancer literacy, a multiple linear regression analysis was conducted by regressing colorectal cancer literacy with the nine sociodemographic variables (Table 4). The model fitted the data well ($F(10, 224) = 2.023$, $p<.05$) and the results showed that the combination of the nine predictors accounted for 8.3% of colorectal cancer literacy variance. Only annual checkup ($\beta=.171$, $SE=.229$, $p<.05$) was found to be a significant predictor of colorectal cancer literacy in this model. Those who reported having an annual check-up had a 0.171 mean score increase in colorectal cancer literacy.

Discussion

This study examined levels of CRC screening awareness and literacy among Korean American women and investigated relevant predictors on levels of CRC screening awareness and literacy. Findings in this study expands existing literature on the research of CRC screening awareness and literacy by providing more baseline information and suggestions for future research and health practice within the Korean American women population.

Table 4: Multiple Linear Regression of Colorectal Cancer Literacy by Sociodemographic Variables (N = 243)

Variables	SE	β
Age (19~82)	.003	-.034
Marital status (Ref = not married or partnered)	.211	-.026
Years in the US (0~50)	.006	.090
Education level (Ref < bachelor's degree)	.208	.087
Annual checkup (Ref = no)	**.229**	**.171***
Having a primary physician (Ref=no)	.240	-.071
Having health insurance (Ref=no)	.259	-.011
Family cancer history (Ref= no)	.187	-.099
Health status (Ref = very poor/poor)	.338	.001
Constant	.445	
R^2	.083	
F(10, 224)	2.023*	

*p < .05

Overall, in our study, Korean American women had relatively high colorectal cancer awareness. Among all participants, 57.2% had heard of FOBT, 70% had heard of Sigmoidoscopy and 92.6% had heard of Colonoscopy. Our findings were much higher than a number of previous studies about Korean Americans' CRC screening awareness [18, 24, 27]. Oh and colleagues [18] found that in their study only 43% Korean Americans had heard of FOBT, 50% or so had heard of Sigmoidoscopy and Colonoscopy. But a study done by Le et al. [28] also demonstrated that Korean Americans had higher awareness of CRC screening modalities (63%) than other Asian subgroups (compared to Chinese and Vietnamese at 61% and 47%, respectively). However, these percentages are still lower than those of national samples in 2003, where awareness of FOBT, Sigmoidoscopy, and Colonoscopy were at 73.7% and 84.3%, respectively [29]. With respect to CRC literacy, the Korean American women in our sample generally reported higher scores than in the existing literature [18, 27], except for one question regarding the frequency of conducting a flexible Colonoscopy.

Having a primary physician was consistently associated with awareness of all three types of CRC screening, which was in line with previous studies that receiving recommendations from physicians was one of the most strongly relevant factors to get CRC screening for Korean Americans and their other Asian American counterparts [9, 15-17, 27]. Also being married or partnered is highly associated with being aware of Sigmoidoscopy than those not married or partnered, and having a bachelor's degree or higher is strongly associated with being aware of Colonoscopy than those who did not have a bachelor's degree or higher. These findings were consistent with a previous study conducted by Juon and colleagues [11].

Annual checkup was the only significant predictor of CRC literacy. In our study, marital status, years in the US, education level, health insurance and health status were not statistically significant predictors of colorectal cancer literacy. This finding contradicted with a previous study that found education, English proficiency, marital status, health insurance, and physical health ratings as being significantly related with CRC knowledge among Asian Americans [11]. A possible explanation is that Asian Americans are a heterogeneous group [28] and Korean Americans may be different from this aggregated population group.

Limitations

While this study provides important insight into the modifiable factors of CRC screening awareness and literacy among an underserved population, several limitations were inherent in this cross-sectional study. First and most importantly, the issue of discerning temporality (i.e., reverse causality) persists – it is not clear whether having a primary physician led to awareness of CRC screening or if the awareness of CRC screening led to having a primary physician. Secondly, the research sample was recruited from Georgia, Atlanta, so the use of a targeted sample did not allow for generalizations to be applied to the greater Korean American population. Thirdly, the research sample size is relatively small. The 95% CI was wide in Table 2 due to the small sample size. Results from this research, therefore, need to be replicated with a larger sample size in the future. Additionally, the explanatory power of predictive factors of CRC literacy is relatively low. The combination of the nine variables can only explain 8.3% of the dependent variable. Other important factors may exist to better explain the variance of CRC literacy. Other limitations that may have also played a role in the study findings include participation bias and recall bias/social desirability bias, especially among older women who were interviewed. Due to these biases, modifiable factors of CRC screening and literacy may have been underreported in this population.

Implications for Practice

Previous studies showed that improving CRC screening awareness and literacy may increase the likelihood of getting CRC screening [30, 31]. Despite the limitations, this study can still offer important implications for the development of CRC screening interventions targeted towards Korean American women to increase their CRC screening rate. As aforementioned, having a primary physician was the only significant predictor of awareness for all three CRC screening modalities. Therefore, particular attention should be given to those who lack health care accessibility. Development of community-based intervention to reach those who do not routinely use health care systems or have access to a primary physician is important to improve colorectal cancer screening rates in this underserved group. Concomitantly, health care providers must continuously engage in educational efforts with their Korean American women patients to facilitate more CRC awareness and literacy.

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Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee.

Informed Consent

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

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