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Factors associated with failure to undergo health check-ups in Nagasaki Prefecture, Japan

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Abstract

Objective: Municipal National Health Insurance (NHI) in Nagasaki Prefecture in Japan struggles with poor attendance of health check-ups, which was only 39.6% in 2018. This study aimed to evaluate factors that encourage healthy behaviors, including opting for health check-ups, and the characteristics of middle-aged and older individuals who did not undergo health check-ups.
Materials and Methods: This cross-sectional study, using a self-administered questionnaire, was conducted in August 2020 in three municipalities of Nagasaki Prefecture. In addition to questions regarding sociodemographic information, such as sex, age, educational status, self-rated economic status, and family structure, the questionnaire included questions on daily lifestyle habits such as alcohol intake and exercise, current medical treatment, self-rated health, and information related to health check-ups. Of the 18,710 questionnaires distributed in the three municipalities, 8,756 (46.8%) were collected by the end of December 2020, of which 7,840 were valid for analysis. The compliance rate for health check-ups was obtained from the Public Health and Welfare Bureau of Nagasaki Prefecture. Statistical analyses were performed according to two age groups: 40−59 and 60−74 years.
Results: Among the respondents who did not undergo health check-ups in the year prior to this study, "lack of time" and being "too bothersome" were the most popular reasons for not attending health check-ups. "Living alone" and "low self-rated economic status" were negative factors for receiving health check-ups regardless of age group.
Conclusions: Vulnerable middle-aged and older persons, such as those living alone and with low economic status, were less likely to undergo health check-ups. Emphasis on home visits by public health nurses may also be needed to increase awareness of individual health conditions, especially for people living alone and those who are socioeconomically disadvantaged.

Key words: health check-ups, nonattendees, healthy behaviors

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Introduction

The Ministry of Health, Labour and Welfare (MHLW) introduced a nationwide screening program named "specific health check-ups (SHCs) and specific health guidance (SHG)" in Japan in 2008, which aims to address the prevention of metabolic syndrome—such as obesity and cardiovascular risks—which is a precondition that can lead to noncommunicable diseases such as lifestyle-related diseases. All insurers, including the National Health Insurance (NHI), are mandated by law to conduct SHCs and SHG for insured individuals aged 40−74 years. Based on the SHC results, attendants identified with risk factors for lifestyle-related diseases are offered SHG. The fees for both SHCs and SHG are covered by insurers; therefore, individuals do not need to pay from their pocket or pay only a nominal fee, depending on insurers[1, 2].

According to the All-Japan Federation of National Health Insurance Organizations, 38.0% of those insured by municipal NHI underwent SHCs in 2019[3], a figure far from the participation rate that the MHLW aims to achieve, which is 70% or more. In addition, the rate of receiving SHCs among those insured by municipal NHI is relatively low compared to other types of insurance, such as the National Federation of Health Insurance Societies (79.0%) and the Japan Health

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Insurance Association (53.7%), in 2019[4]. People insured by NHI are self-employed, including farmers, fishermen, small businesses, retirees, unemployed individuals, and others who are not covered by other health insurances, such as company-based health insurance associations and public servant mutual aid insurance.

Several efforts have been made by municipal NHI to increase SHC coverage and identify the reasons for the lack of participation in SHCs. According to Ohashi *et al*., 55.6% of middle-aged individuals insured by NHI who did not undergo SHCs for three consecutive years demonstrated an intention of undergoing future SHCs and were more likely to do so because their spouse understood the need for SHCs to maintain a healthy life and suggested that they undergo their check-ups. However, individuals who did not intend to undergo health check-ups were more likely to be male, unmarried, or living alone[5]. Among middle-aged NHI-insured individuals who did not undergo SHCs, 40.3% did not have regular clinical visits or consultations, indicating that they could not easily seek medical health advice. Middle-aged men who did not undergo SHCs were less likely to be married and had few social interactions[6]. After health risks were identified in their primary health check-ups that required further examination, unmarried males often did not undergo secondary examinations[7]. In contrast, older individuals with multiple diseases and those who periodically visited hospitals/clinics were more likely to undergo health check-ups[8]. Awareness of health check-up locations and regular participation in health check-ups were also associated with SHC participation[9].

Municipal NHIs in Nagasaki Prefecture also struggled with low coverage of SHCs, which was 39.6% in 2018[10]. This study aimed to evaluate the characteristics of middle-aged and older individuals with municipal NHI to assess their reasons for not receiving SHCs and identify factors that may promote healthy behaviors, including SHC participation. This study combined selected municipal NHI information, which includes data from individuals who did and did not undergo SHCs, and a questionnaire survey for analysis. The findings from this study aim to provide an understanding of the characteristics of individuals who opt not to undergo their SHCs, and to make needs-oriented recommendations for meaningful strategies to improve SHC participation in Nagasaki Prefecture among individuals with municipal NHIs.

Materials and Methods

Study area and participants

This cross-sectional study was conducted using a self-administered questionnaire in August 2020 in three municipalities of Nagasaki Prefecture. The Nagasaki Prefectural Bureau of Welfare and Public Health invited all municipalities in the prefecture that constituted 21 cities or towns to participate in this study. Matsuura City, Hasami Town, and Minamishimabara City, which are relatively distant from the prefecture's capital, expressed interest in and agreed to participate in the research, and a mutual agreement among the municipalities, Nagasaki National Health Insurance Organizations, and Nagasaki Prefecture was made. Nagasaki Prefecture and Nagasaki University achieved a mutual agreement in conducting this research.

Table 1 shows the population, proportion of population by age group, NHI coverage rate, and SHC participation rate in 2019 for the three municipalities. The participating municipalities scheduled SHCs for individuals at medical facilities/clinics on a convenient date, time, and location.

Questionnaires with sealed return envelopes were mailed to all individuals aged 40–74 years who were registered with the NHI (as of July 2020) by the Public Health and Welfare Bureau of Nagasaki Prefecture. Of the 18,710 distributed questionnaires, 8,755 (46.8%) were collected by the end of December 2020. The response rate was highest for Hasami (58.8%) and lowest for Minamishimabara (43.8%). After removing responses with missing information, such as sociodemographic information and SHCs, 7,840 responses were used for analysis.

Study variables

In addition to questions regarding sociodemographic information, such as sex, age, educational status, self-rated economic status, and family structure, the questionnaire included queries on lifestyle, including drinking habits and exercise, current medical treatment, self-rated health,

Table 1 Municipal population, National Health Insurance coverage rate and health check-ups participation rate

	Matsuura city	Hasami twon	Minamishimabara city
Population (2020)	21,416	14,335	42,195
Proportion of population by age group (2020)			
0–14 years old (%)	12.3	13.8	11.2
15–64 years old (%)	50.0	53.8	47.9
65 years old or over (%)	37.7	32.2	40.8
National Health Insurance coverage rate (%) (2016)	26.4	22.2	36.4
Health check-ups participation rate (%) (2019)	36.7	54.3	43.1

and information related to health check-ups, including the reasons and conditions motivating individuals to undergo health check-ups and reasons for not undergoing health check-ups. For statistical analysis, participants were divided into two age groups: 40–59 and 60–74 years, because those who are covered by their employer's social insurance system until retirement will also be covered by the NHI after the age of 60 years, which is the common retirement age of employees in Japan.

Information regarding participation in SHCs provided by the municipal NHI in 2019, the year prior to this study, was obtained from the Public Health and Welfare Bureau of the Nagasaki Prefecture. The current medical treatment status related to chronic diseases, including lifestyle-related diseases, cancers, musculoskeletal diseases, and mental disorders, was also obtained from the same data source. Information from the Nagasaki Prefecture Bureau was obtained by allocating a specific identification (ID) number for each individual. The same ID number was sealed in the questionnaires when they were mailed, and no personal information, such as name or living address, was included in the questionnaires. The researchers then used ID numbers to match the data collected from the questionnaire with the information from the Nagasaki Prefecture Bureau.

Statistical analysis

After simple tabulation of the sociodemographic information of the study participants, conditions that may motivate individuals to undergo health check-ups and reasons for not receiving health check-ups were analyzed using a chi-square test by age group and SHC status in the year prior to this study or by current medical treatment status. Logistic regression analysis with a forced entry method was performed to determine factors associated with receiving health check-ups for each age group and sex.

All analyses were performed using IBM SPSS Statistics 27, with a significance level of $P<0.05$.

Ethical consideration and consent to participate in the study

The study was approved by the Ethics Committee of Nagasaki University Graduate School of Biomedical Sciences (approval number: 21062501). The study was conducted in accordance with the Declaration of Helsinki and the Ethical Guidelines for Medical and Health Research Involving Human Subjects by the Ministry of Health, Labour and Welfare. A written information sheet regarding study participation and publication was enclosed within the questionnaires when mailed to the target population. Informed consent to participate in the study was obtained by mail upon returning the completed questionnaire to the researchers.

Results

A total of 4,089 (46.7%) male and 4,666 (53.3%) female respondents returned the completed questionnaires. The municipal response rate of the questionnaire survey by sex, age group, and SHC attendance in 2019 is presented in Table 2. Females, individuals between 60 and 74 years of age, and SHC participants were more likely to return the completed questionnaire. The analysis included responses from 3,673 male and 4,167 female respondents, after excluding those with missing values. All eligible responses were included in the analyses of both age groups, and information on SHC attendance in the year prior to this study, provided by the Bureau of Public Health and Welfare of Nagasaki Prefecture, was also used in the analyses. Table 3 shows respondents' characteristics. Respondents aged 40–59 years were more likely to have higher levels of education and alcohol use (χ^2 test, $P<0.001$ and $P<0.001$, respectively). Respondents aged 60−74 years were more likely to self-rate their economic status as "average/comfortable", to receive medical treatment for a disease, and to exercise daily or sometimes (chi-square test, $P<0.001$, $P<0.001$, and $P<0.001$, respectively).

Table 4 demonstrates the factors that facilitate participation in health check-ups by attendance in the year before this study. Among respondents aged 40−59 years who did

Table 2 Response rate of questionnaire survey (%)

	Matsuura city	Hasami twon	Minamishimabara city
Overall response rate	48.0	58.8	43.8
Sex			
Male	43.1	54.4	39.9
Female	53.5	63.6	47.9
Age group			
40–59 years old	31.9	39.8	29.8
60–74 years old	53.0	65.5	50.2
Health check-ups participation in 2019			
No	38.2	42.4	31.4
Yes	64.8	72.6	60.3

Table 3 Sociodemographic information and lifestyle among study respondents

	40–59 years old (n=1,543)		60–74 years old (n=6,297)		*P*-value
	n	%	n	%	
Sex: male	761	49.3	2,912	46.2	0.030
Education level: university or additional education after high school	547	35.5	1,395	22.2	<0.001
Living alone	97	6.3	772	12.3	<0.001
Self-rated economic status: average/comfortable	744	48.2	4,146	65.8	<0.001
Currently receiving medical treatment for some disease	957	62.0	5,389	85.6	<0.001
Self-rated health: good/very good	1,218	78.9	4,832	76.7	0.065
Daily exercise or sometimes	543	35.2	3,140	49.9	<0.001
Drinking alcohol more than once a month	738	47.8	2,514	41.5	<0.001

χ^2 test.

Table 4 A comparison of factors that facilitate participation in health check-ups by attendance in the year before this study (multiple answers allowed)

	40–59 years old (n=1,543)					60–74 years old (n=6,297)				
	Not undergoing the year before this study (n=865)		Undergoing the year before this study (n=678)		*P*-value	Not undergoing the year before this study (n=2,391)		Undergoing the year before this study (n=3,906)		*P*-value
	n	%	n	%		n	%	n	%	
Being permitted work leave for health check-ups	137	15.8	144	21.2	0.006	171	7.2	322	8.2	0.117
Being able to undergo health check-ups near home/work	165	19.1	303	44.7	<0.001	436	18.2	1,663	42.6	<0.001
Being able to undergo health check-ups during regular hospital/clinic visit	301	34.8	248	36.6	0.468	1,219	51.0	2,054	52.6	0.217
Children can be looked after during check-ups	7	0.8	13	1.9	0.056	9	0.4	28	0.7	0.086
Possible to undergo health check-ups in the evening	243	28.1	202	29.8	0.464	220	9.2	360	9.2	0.984
Possible to undergo health check-ups on weekends	130	15.0	137	20.2	0.008	114	4.8	230	5.9	0.058
Can receive some kind of incentive	62	7.2	91	13.4	<0.001	77	3.2	219	5.6	<0.001

χ^2 test.

not undergo health check-ups in the year prior to this study, most favored "being able to undergo health check-ups during regular hospital/clinic visits" and "being able to undergo health check-ups in the evening". Respondents aged 40–59 years who underwent health check-ups in the year prior to this study preferred "being able to undergo health check-ups near their home/work", in addition to "being able to undergo health check-ups during regular hospital/clinic visits". Among the respondents aged 60–74 years, "being able to undergo health check-ups during regular hospital/clinic visits" and "being able to undergo health check-ups near their home/work" were the preferred conditions regardless of health check-up status.

Table 5 shows the reasons for not participating health check-ups among the respondents who did not undergo SHCs in the year before completing the questionnaire survey by current medical treatment status, which relates to the major factor facilitating health check-ups such as "being able to undergo health check-ups during regular hospital/clinic visits". "Lack of time" and being "too bothersome" were the most popular reasons for not receiving health check-ups in both age groups, regardless of current medical treatment status; other reasons were "fear of finding health problems" and "too troublesome to be lectured about health" in both age groups. Among respondents aged 60–74 years without current medical treatment, 16.7% reported "not necessary" as a reason for not attending health check-ups.

Factors associated with undergoing health check-ups among respondents aged 40–59 and 60–74 years are shown in Tables 6 and 7, respectively. In the logistic regression

Table 5 Reasons for not undergoing health check-ups among respondents who did not undergo health check-ups in the year before this study by current medical treatment status (multiple answers allowed)

	40–59 years old (n=865)					60–74 years old (n=2,391)				
	Without medical treatment (n=364)		With medical treatment (n=501)		*P*-value	Without medical treatment (n=503)		With medical treatment (n=1,888)		*P*-value
	n	%	n	%		n	%	n	%	
Not necessary	27	7.4	13	2.6	<0.001	84	16.7	86	4.6	<0.001
Lack of time	178	48.9	189	37.7	0.001	122	24.3	336	17.8	0.001
Too bothersome	100	27.5	128	25.5	0.526	144	28.6	356	18.9	<0.001
Place of health check-ups is too far	17	4.7	19	3.8	0.523	13	2.6	60	3.2	0.492
Fear of finding health problem	50	13.7	43	8.6	0.016	57	11.3	114	6.0	<0.001
Too troublesome to be lectured about health	57	15.7	44	8.8	0.002	65	12.9	157	8.3	0.002

χ^2 test.

Table 6 Factors associated with undergoing health check-ups in the year before this study among those aged 40–59 years (n=1,543)

	OR	95% CI	*P*-value	AOR	95% CI	*P*-value
Sex (ref: male)						
Female	1.23	1.00, 1.50	0.047	1.22	0.98, 1.51	0.076
Education level (ref: ≤high school)						
University or additional education after high school	1.14	0.93, 1.41	0.212	1.13	0.91, 1.40	0.285
Whether or not living with someone (ref: living with someone)						
Living alone	0.52	0.33, 0.82	0.005	0.59	0.38, 0.94	0.025
Self-rated economic status (ref: not comfortable)						
Average/comfortable	1.58	1.29, 1.93	<0.001	1.43	1.16, 1.76	<0.001
Present illness (ref: not receiving medical treatment)						
Currently receiving medical treatment for some disease	1.49	1.21, 1.84	<0.001	1.69	1.36, 2.10	<0.001
Self-rated health (ref: not good/bad)						
Good/very good	1.80	1.39, 2.33	<0.001	1.83	1.36, 2.40	<0.001
Exercise (ref: no exercise or rarely)						
Daily exercise or sometimes	1.11	0.90, 1.38	0.313	1.01	0.82, 1.26	0.904
Alcohol drinking (ref: no drinking or less than once a month)						
Drinking alcohol more than once a month	1.00	0.745, 1.35	0.993	1.14	0.92, 1.41	0.241

Logistic regression analysis with forced entry method. OR: odds ratios; AOR: adjusted odds ratios; 95% CI: 95% confidence interval.

Table 7 Factors associated with undergoing health check-ups in the year before this study among those aged 60–74 years (n=6,297)

	OR	95% CI	*P*-value	AOR	95% CI	*P*-value
Sex (ref: male)						
Female	1.32	1.19, 1.47	<0.001	1.30	1.15, 1.46	<0.001
Education level (ref: ≤high school)						
University or additional education after high school	0.90	0.80, 1.02	0.100	0.85	0.75, 0.97	0.012
Whether or not living with someone (ref: living with someone)						
Living alone	0.75	0.64, 0.87	<0.001	0.77	0.65, 0.90	<0.001
Self-rated economic status (ref: not comfortable)						
Average/comfortable	1.46	1.32, 1.63	<0.001	1.30	1.17, 1.45	<0.001
Present illness (ref: not receiving medical treatment)						
Currently receiving medical treatment for some disease	2.30	2.00, 2.66	<0.001	2.47	2.13, 2.86	<0.001
Self-rated health (ref: not good/bad)						
Good/very good	1.67	1.39, 1.77	<0.001	1.57	1.38, 1.78	<0.001
Exercise (ref: no exercise or rarely)						
Daily exercise or sometimes	1.66	1.50, 1.84	<0.001	1.54	1.38, 1.71	<0.001
Alcohol drinking (ref: no drinking or less than once a month)						
Drinking alcohol more than once a month	0.90	0.76, 1.06	0.199	1.02	0.90, 1.15	0.752

Logistic regression analysis with forced entry method. OR: odds ratios; AOR: adjusted odds ratios; 95% CI: 95% confidence interval.

analysis, "living alone" was identified as a negative factor for receiving health check-ups in both age groups. "Higher self-rated economic status" was a statistically significant positive factor for receiving health check-ups in both age groups. "Currently receiving medical treatment for some disease" and having "higher self-rated health" were positive factors for receiving health check-ups among both age groups. Among respondents aged 60–74 years, exercise performed daily or sometimes was positively associated with receiving health check-ups.

Discussion

Middle-aged and older individuals were more likely to attribute their noncompliance with health check-ups to a lack of time, health check-ups being too bothersome, fear of finding health problems, and a desire to not be lectured about health. Positive factors were the ability to obtain health check-ups during regular hospital/clinic visits, near home/work, and in the evenings. Exercise was also associated with health check-ups among respondents aged 60–74 years.

"Lack of time" and "too bothersome" were reported as reasons for not receiving health check-ups. Therefore, making receipt of health check-ups more flexible by providing appointments in the evenings and on weekends is an important strategy that has been implemented in several municipalities. From these findings, we recognized that reconsidering the practicalities of SHCs themselves would be valuable, for example, by providing broader venues and appointment hours, especially for middle-aged and older individuals who feel that they lack time and/or find health check-ups too bothersome. Older adults who exercised were more likely to undergo health check-ups in this study. The authors assume that people who can afford to be concerned about their own health tend to exercise and undergo health check-ups, which can be healthy practices. On the other hand, people who cannot afford to be concerned about their own health, such as those who are economically disadvantaged and/or live alone, tend to not engage in healthy behaviors such as exercising and attending health check-ups. The authors assume that middle-aged men who are healthy enough to drink can undergo health check-ups. In other words, those who need to abstain from alcohol due to some disease may undergo treatment but not health check-ups. Thus, no statistical association was observed between receiving health check-ups and drinking habits in this study. Segmentation not only by age and sex but also by socioeconomic status is suggested to develop strategies to help reduce the risks of lifestyle-related diseases and to improve healthy behaviors, including paying attention to one's own health conditions.

In addition, being able to obtain health check-ups during regular hospital/clinic visits was a preference among individuals who did and did not undergo health check-ups. Better coordination between the NHI and medical institutions is needed; clearly, being able to undergo health check-ups during regular hospital/clinic visits was found to be preferable for people undergoing clinical treatment, especially older persons. The NHI has implemented a project to share clinical information between insurers and medical institutions where the insured receives clinical treatment. With the consent of the insured, the insurer and medical institutions will have the same information that will enable them to be more responsive to individuals' needs. This project should be vigorously promoted by the NHI. However, insured individuals who have not undergone SCHs and have no clinical history at a medical institution will still be isolated from health-promoting services. Mobile health check-ups and home health check-ups that enable individuals to send laboratory samples via delivery services could help facilitate SCHs for people without services and for those who feel that ordinary health check-ups are too time-consuming and/or bothersome[11].

"Fear of finding health problems" was also a popular reason for not receiving health check-ups. Although background details need to be assessed regarding the perception of health and diseases, middle-aged males who have low participation in health check-ups may believe that they are somehow exempt from illnesses, as they are often the breadwinners of households who need to earn a living. Such perception then produces fear of finding health problems, leading to avoidance of health check-ups as long as they have no serious symptoms. According to a study by the MHLW in 2014, 50.2% of middle-aged people and 31.1% of older people did not practice anything to prevent diseases. In addition, actually getting a disease (27.2%) or a family member/friend getting a disease (15.4%) was found to be a major trigger for starting self-care to prevent diseases among the general population who take care of their health[12]. It is important that the values and advantages of health check-ups be promoted, especially among middle-aged males, before falling into the disease.

This study also found that middle-aged and older persons living alone were more likely to be isolated from regular health services, such as health check-ups. Among older males, living alone was also a negative factor for undergoing health check-ups in general[5–7]. This suggests that for health check-ups to function as a means for early detection of health risks or problems, change health behaviors, and/or provide timely referrals to medical treatment, it is important that middle-aged and older persons be included in outreach approaches, despite their living arrangements. Individual approaches by public health nurses are required, especially when providing individual support, including health consultations and home visits for health promotion, which is the role of the municipal public health nurses in Japan because they engage community dwellers in improving their health

conditions through health consultation and guidance[13, 14].

This study found that low self-rated economic status could influence individuals' decisions to undergo health check-ups. The average annual income per capita among those insured by the National Federation of Health Insurance Societies was 2.07 million yen, while that of those insured by the Japan Health Insurance Association was 1.42 million yen and that of the people insured by NHI was 0.68 million yen in 2014[15]. Socioeconomic disadvantages are associated with low health status and are challenges in improving health conditions[16, 17]. Economically disadvantaged people who are insured by NHI might be on the poverty line, although they are not covered by the governmental welfare program. They may have concerns and challenges regarding not only health issues but also welfare and human security that need to be addressed[18, 19]. Regardless of age, emphasizing home visits by public health nurses may be needed to increase awareness of health conditions for people living in economically disadvantaged conditions.

This study has several limitations. First, respondents to the questionnaire may have had better health conditions and perceptions of health than those who did not respond. Nevertheless, we believe that it is significant that responses were retrieved from both participants and non-participants of health check-ups. Most previous studies regarding health check-up participation focused only on individuals who underwent health check-ups. However, this study included 46.8% of people insured by the NHI in target municipalities, and 41.5% were non-attendees of health check-ups in the previous year of data collection among the respondents analyzed in this study. We believe that despite the data being partial, it remains beneficial to reflect on the conditions of the non-attendees of health check-ups that have been found in this study. Second, this study was conducted in three municipalities in Nagasaki Prefecture, which is located at the western end of Japan. We should bear in mind that these findings might be influenced by local culture and perceptions. Despite this, people living alone and economically disadvantaged were found to be vulnerable in terms of health promotion, which is the same finding as that of previous studies. Global phenomena can be observed in local settings in Japan, and local governments should provide community-based health services according to local needs and conditions, including outreach approaches by municipal public health nurses. This study provides some viewpoints for understanding and locally tailoring recommendations for community-based health promotion. Third, this study did not discuss the effectiveness of health check-ups. Previous studies have revealed that various types of health check-ups have been implemented with limited success in improving the health of the general population. For example, general health check-ups did not provide benefits in reducing the risks of death from any cause[20]. However, considering that the MHLW continues to implement SHCs and SHG, researchers would like to encourage at least effective and efficient provisions for community-based health promotion.

Conclusions

Vulnerable middle-aged and older persons, such as those living alone and with low economic status, were less likely to undergo health check-ups. Vigorous coordination is needed between the NHI and medical institutions for effective health check-ups. Tailor-made strategies for each segment group would be important if the NHI intends to increase health check-up coverage and the practice of healthy behaviors. Regardless of age, emphasis on home visits by public health nurses may be required to increase awareness of one's own health condition among people living alone and economically disadvantaged populations.

Authors' contributions: MO contributed to the conception, design and statistical analyses and drafted the manuscript for publication. RN, RK, JT, SK and UM contributed to conceptualizing, designing, and revising the manuscript. All authors provided feedback and approved the final manuscript.

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