

Determinants of Oral Health Behaviour Among Community Health Workers in Kottayam- A Cross-Sectional Study

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Research

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Abstract

Background

Beliefs and attitudes of community health workers affect their oral health behaviour and knowledge which in turn affects their potential to motivate the public to undertake preventive oral health measures. This study was performed to assess knowledge, attitude, and practices as well as determinants of oral health behaviour among community health workers in rural regions of Kerala.

Methods

A cross-sectional study was conducted among 123 community healthcare workers at primary health centres in the Ettumanoor block zone, Kottayam. A two-stage cluster sampling method was used. Data regarding knowledge, attitude, and practice of oral health were acquired through self-administered questionnaires and analyzed using SPSS software version 25. Statistical association between responses in different group of health workers were determined by using Chi-square test. Independent t-test and ANOVA were used to test the difference in attitude and knowledge scores. Bivariate and multivariate regression analyses were applied to identify factors associated with the oral health behaviour of community health workers.

Results

About 65% of the participants exhibited poor oral health behaviour. A positive attitude has a significant relation with oral health behaviour status of the participants ($p=0.003$). Community health workers who attended an oral health education program had a better oral health behaviour status when compared to those who had not attended ($p=0.006$).

Conclusions

The results emphasize that oral health education should be given to all the community health workers to enhance their awareness about preventive oral health care.

Background

The maintenance of the physical and mental health of an individual is multi-factorial, multi-dimensional, and imperative to lead a productive social and economic life. It is influenced by a wide range of factors such as genetics, lifestyle, environment, and socio-economic status (SES). [1] In response to these challenges, the traditional roles and services of healthcare providers have expanded with time and evolved into primary healthcare. [2] According to World Health Organisation (WHO), "Primary health care is a whole-of-society approach to health and well-being, centered on the needs and preferences of individuals, families, and communities". Community health workers (CHWs) play a vital role in the proper function and stability of the healthcare system, especially in rural areas and act as a link between the

community and the healthcare system by providing easier access to the healthcare system and disseminating scientific knowledge within the society. [3, 4]

The CHW Programme launched in India in 1977, was later reformed to the National Rural Health Mission (NRHM) program in 2005 under the health department of the Government of India. [5] Initially, Auxiliary Nurse-Midwife (ANM) system was created to work at the sub-center. Multipurpose Workers(MPWs) act as an interface with the community at the grass-root level, with the females providing primary health care services as Junior Public Health Nurses(JPHN) and males serving as Junior Health Inspectors(JHI). [6] Anganwadi Workers (AWW) are community based voluntary frontline workers of the Integrated Child Development Scheme (ICDS) program under the department of women and child development (DWCD). [5] In 2005, the National Rural Health Mission created another group of front-line workers called Accredited Social Health Activists (ASHAs) to help their communities with effective access to health services. A partnership between frontline healthcare workers and the community groups can go a long way in turning the vision of “health for all” to reality. [7]

Today, oral health is recognized as an indispensable subset of general health. Unfortunately, oral care practices are often treated as an unnecessary part of daily routine due to a lack of awareness among the masses. Several studies have revealed that the rural Indian community, which constitutes more than 70% of the population, has poor oral health. They lack awareness regarding hygiene practices and are less inclined to utilize oral healthcare services when compared to the urban population. [1] This negligence can be attributed to improper priorities among policymakers, community health workers, patients, and the dental workforce towards the maintenance of oral health. [8] Primary healthcare workers are the first contact with the community and can play a vital role in spreading oral healthcare awareness while dental surgeons are scarce.

The effectiveness of CHWs in improving the oral health of the population depends on the level of self-awareness and attitude towards oral health. [9] Imparting knowledge to CHWs can produce a ripple effect of oral health awareness within the community. Positive attitude towards oral health can be acquired by CHWs from their own experiences, cultural perceptions, familial beliefs, and other life situations that strongly influence oral health behaviour. [10] An understanding of oral health behaviour and attitude towards oral health among CHWs will help in estimating the perceived importance of preventive dental procedures and healthy self-care habits among them. Furthermore, it can potentially influence their ability to motivate the public to undertake preventive oral health measures. [11] There is a dearth of studies on oral health behaviour and perceptions of CHWs at both national and regional levels. The objective of this study is to assess the determinants of oral health behaviour, and perceptions of CHWs in the Ettumanoor block of Kottayam, Kerala.

Methods

Study design and population

A cross-sectional study was conducted among 123 CHWs over a period of six months from January 2019 to June 2019. The study population included four categories of CHWs viz. Junior Health Inspectors, Junior Public Health Nurses (JPHN), AWWs, and ASHA workers. The study was conducted in three primary health centres (PHCs) having a total of twelve sub-centres under the health administration block zone at Ettumanoor in Kottayam district of Kerala. Ethical clearance for the same was obtained from the Institutional Ethics Committee of Government Dental College, Kottayam. The permission was obtained from the block medical officer of PHC and ICDS project officers.

Sampling

A two-stage cluster sampling method was employed to select the study participants. In the first stage of sampling, three PHCs were randomly selected out of the five centres under the health administrative division of the Ettumanoor block zone. In the second stage, four sub-centres were randomly selected from each PHC. Across 3PHCs, 123 CHWs were sampled which included 9 Junior Health Inspectors, 15 Junior Public Health Nurses, 69 AWWs, and 32 ASHA workers. CHWs with a minimum of 1-year experience who volunteered to participate were included in the study after obtaining informed consent.

Sample size

The sample size was calculated with a consideration of the prevalence of good oral health behaviour as 43.2% and precision of 10%. [12] The estimated sample size was 99 subjects. A slightly higher sample size of 123 was randomly selected to account for incomplete questionnaires, if any.

Data collection

A questionnaire was developed by combining items from other similar validated questionnaires. [12, 13] The newly developed questionnaire was translated to the local language and subsequently checked for content and face validity through a panel discussion with six dental specialists. The reliability coefficient (Cronbach alpha =0.67), ease of comprehension, and relevance to the intended topics were evaluated with a pre-test conducted on 20 subjects. The final questionnaire consisted of four parts: Demography, oral health knowledge, attitude, and behaviour of the participants.

The demographic data included age, gender, education level, socio-economic status (Modified Kuppuswamy scale) [14], work experience, and exposure to oral health education programs. Knowledge about oral health was assessed with eight questions having a maximum score of 8 and consisted of queries related to oral hygiene, the role of sugar in the caries process, the relation of oral health to tobacco, and the role of health education. The section on attitude included nine questions (maximum score of 9) related to the importance of oral hygiene, need of dental check-ups in adults and children, and the importance of special oral care for pregnant women. Each question was provided with options as 'Yes' (scored as 1), 'No', and 'Don't know' (scored as 0).

The oral health behaviour section included 12 items regarding the practice of cleaning the teeth, frequency of dental visits, adoption of preventive measures, and the practice of recommending dental

check-ups. Seven items were rated on a 3-point Likert scale with the response option of 'Always', 'Sometimes', and 'Never' scored as 2,1, and 0, respectively. Other items had multiple-choice options and only the correct responses were scored.

Oral health behaviour and knowledge status responses were categorized as good or poor based on the median of the total score of the participants. If the individual knowledge or behaviour score was greater than or equal to the median knowledge score it was considered good and a score lesser than the median was considered as poor. Similarly, the attitude score was also categorized as positive or negative based on the median score.

Statistical analysis

The collected data was entered in MS Excel and analyzed using IBM SPSS software (version 25). Chi-square analysis was done to test the association between responses for each item and different categories of CHWs. Independent t-test and ANOVA were used to test the difference in mean scores between two and more than two groups respectively. A *p*-value < 0.05 was considered as statistically significant. Univariable and multivariable logistic regressions were employed to determine the factors related to the oral health behaviour status of the participants.

Results

Demographics

A total of 123 participants were included in the study with a mean age of 48.42 ±5.94 years, out of which 98% were females (Table1). Nearly 87% of the participants were above 40 years of age and 69.9% had completed higher secondary education. Nearly 95% of participants belonged to the middle socio-economic class and 70% of them have been working as a CHW for more than 10 years (Table 1). All the participants had undergone learning through health education programs during their service and 73.2% have attended oral health-specific education programs also. (Table 1) However, comparative analyses of different categories of CHWs revealed a significant difference in response to the questionnaire. (Table 2)

Table 1: Characteristics of the study participants

Characteristics		N(%)
Category of community health workers	Junior Public Health Nurses(JPHN)	15(12.2)
	Junior Health Inspectors(JHI)	9(7.3)
	ASHAworkers	32(26)
	Anganwadi workers	67(54.5)
Gender	Male	2(1.6)
	Female	121(98.4)
Age groups	20-40 Years	16(13)
	>40 Years	107(87)
Education	Profession or Honours	13(10.6)
	Graduate	16(13.0)
	Intermediate or diploma	57(46.3)
	High school certificate	37(30.1)
Socio-economic class	Upper Middle	51(41.5)
	Lower Middle	65(52.8)
	Upper Lower	7(5.7)
Working experience (in years)	0-10 years	38(30.9)
	11-20years	80(65.0)
	>20 years	5(4.1)
Attendance of oral health education program	Attended	90(73.2)
	Not attended	33(26.8)

Knowledge of oral health

More than 90% of the participants gave a positive response for daily oral hygiene practices to prevent dental diseases, the role of sugar consumption in dental decay, and the link of oral health to general health. The awareness about nursing bottle caries was the lowest among ASHA Workers in comparison to other CHWs ($p=0.02$). Most of the Junior Public Health Nurses (60%) were oblivious about the role of fluoridated toothpaste in the prevention of dental caries that showed a significant lack of awareness as compared to other groups ($p=0.001$). Of the total respondents, only 78% could correlate the use of tobacco with oral diseases. Moreover, only less than 40% of CHWs knew the appropriate time to commence oral healthcare in children. Around 71% of the participants reported previous educational programs as their source of knowledge on oral health.

Attitude towards preventive oral health care

All of the participants felt that oral hygiene is important in day to day life and most of them agreed that they could contribute actively in preventing oral diseases. A good majority of them (98%) reported willingness to attend oral health training programs, if given an opportunity. It was seen that about 40% of the participants believed that dental visits were the only effective means to prevent dental diseases. Most of the JHI (88.9%) and AWWs (53%) were negligent about the need for treatment of milk teeth ($p=0.02$). In addition, only 46.7% of the JPHN felt the requirement of ante-natal oral health care ($p=0.007$). Most of the participants agreed that parental education has a paramount role in preventing childhood caries and the families should be counselled on oral health-related behaviours. (Table 2)

Table 2: Responses for knowledge, attitude, and behavior according to category of community health worker

Questions	JPHNn(%)	JHIn(%)	ASHAn(%)	Anganwaadi workersn(%)	Total n(%)	p-value
KNOWLEDGE						
Q1. Do you know about Early Childhood Caries (ECC)?						
Yes	9(60.0)	8(88.9)	15(46.9)	34(50.7)	66(53.7)	0.02*
No	6(40.0)	1(11.1)	5(15.6)	18(26.9)	30(24.4)	
I don't know	0(0.0)	0(0.0)	12(37.5)	15(22.4)	27(22.0)	
Q2. Does fluoridated tooth paste has a role in preventing dental decay?						
Yes	6(40.0)	5(55.6)	24(75.0)	45(67.2)	80(65.0)	0.001*
No	9(60.0)	1(11.1)	1(3.1)	6(9.0)	17(13.8)	
I don't know	0(0.0)	3(33.3)	7(21.9)	16(23.9)	26(21.1)	
ATTITUDE						
Q3. Do you think that problems with milk teeth require treatment?						
Yes	8(53.3)	1(11.1)	19(59.4)	31(47.0)	59(48.4)	0.02*
No	7(46.7)	8(88.9)	9(28.1)	33(50.0)	57(46.7)	
I don't know	0(0.0)	0(0.0)	4(12.5)	2(3.0)	6(4.9)	
Q4. Do you think that pregnant women need special oral care?						
Yes	7(46.7)	8(88.9)	26(81.3)	59(88.1)	100(81.3)	0.007*
No	5(33.3)	0(0.0)	5(15.6)	3(4.5)	13(10.6)	
I don't know	3(20.0)	1(11.1)	1(3.1)	5(7.5)	10(8.1)	
Q5: Do you think that educating parents is important in preventing caries in children?						
Yes	14(93.3)	9(100.0)	32(100.0)	67(100.0)	122(99.2)	0.001*
No	1(6.7)	0(0.0)	0(0.0)	0(0.0)	1(0.8%)	
I don't know	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	
BEHAVIOUR						
Q6: What is your source of knowledge on oral health?						
Previous oral health education programs	7(46.7)	8(88.9)	21(65.6)	52(77.6)	88(71.5)	0.004*
Self- learning (books, media etc)	6(40.0)	1(11.1)	3(9.4)	2(3.0)	12(9.8)	

From co-workers	2(13.3)	0(0.0)	8(25.0)	11(16.4)	21(17.1)	
No specific source	0(0.0)	0(0.0)	0(0.0)	2(3.0)	2(1.6)	
Q7. Do you inform the community about dental problems associated with usage of bottle milk in children?						
Always	2(13.3)	2(22.2)	16(50.0)	50(74.6)	70(56.9)	0.001*
Some times	9(60.0)	6(66.7)	10(31.3)	16(23.9)	41(33.3)	
Chi square test, *Statistically significant($p < 0.05$)	4(26.7)	1(11.1)	6(18.8)	1(1.5)	12(9.8)	
Never						

Chi square test, *Statistically significant($p < 0.05$)

Behaviour pattern regarding oral health care

As a part of routine oral care, more than 80% of the participants reported brushing for more than a minute, twice a day, using fluoridated toothpaste and mouthwash while almost 60% of them changed their brush every three months. About 58% had never used dental floss to clean their teeth. More than 90% had visited a dentist at least once for dental problems in the past. During their door to door visits, only one-fourth of the participants recommended dental check-up as a part of antenatal care to mothers experiencing dental problems. A considerable variation was noticed in the responses when asked about the responsibility to educate the community about the problems associated with the use of bottle milk in children ($p=0.001$). While most of the AWWs and ASHAs were imparting knowledge regarding the harmful effects of using bottled milk on dentition, other workers were found reluctant in doing so. Among the various methods for the prevention of oral disease, about 50% of the participants made use of routine dental check-ups, 23% adopted caries prevention methods and 18.7% underwent professional cleaning of teeth.

The mean knowledge score (6.14 ± 1.11) and the mean attitude score (7.63 ± 1.03) of the participants were not significantly related to demographic characteristics (Table 3). CHWs who gained knowledge by attending previous oral health education programs showed a significantly better attitude score as compared to those who were not exposed to such programs ($p=0.01$). A significant difference in attitude score was obtained among the four groups of CHWs ($p=0.009$). (Table 3)

Table 3: Mean knowledge and attitude score of study participants

Parameters	Mean knowledge score ±SD	<i>p</i> value	Mean attitude score± SD	<i>p</i> value
Category of community health workers				
Junior Public Health Nurses(JPHN)	5.87± 1.30	0.45	6.87± 1.18	0.009*
Junior Health Inspectors(JHI)	6.44 ±0.88		8.11± 1.05 τ	
ASHAworkers	6.06 ±1.36		7.59 ±0.91	
Anganwadi workers	6.31 ±1.07		7.76 ± 0.97 τ	
Age groups				
20-40 years	6.38 ±0.80	0.41	7.81 ± 0.91	0.41
>40 years	6.18 ±1.21		7.60 ±1.05	
Level of education				
Profession or Honours	6.31 ±1.18	0.32	7.69 ± 0.85	0.36
Graduates	6.25± 1.18		7.69± 1.19	
Intermediate or diploma	6.23± 1.13		7.52 ± 1.06	
High school certificate	6.31±1.10		7.90 ± 0.84	
Socio-economic class				
Upper Middle	6.29 ± 1.15	0.77	7.55± 1.01	0.59
Lower Middle	6.14± 1.15		7.72 ± 1.03	
Upper Lower	6.14 ± 1.57		7.43± 1.27	
Working experience(in years)				
0-10 years	6.10± 1.08	0.47	7.76± 1.06	0.49
10-20 years	6.20± 1.20		7.57 ±1.03	
>20 years	6.80± 1.09		8.00 ±1.00	
Attendance of oral health education program				
Attended	6.27± 1.13	0.34	7.78 ± 0.97	0.01*
Not attended	6.03 ± 1.26		7.24± 1.09	

Sig. $p < 0.05$ *Independent t test , *ANOVA, τ Tukey HSD test

The results of the bivariate analysis (Table 4) showed a significant association between subjects' oral health behaviour status, their attitude level ($p=0.004$), and the attendance status in oral health education programs ($p=0.001$). Further multivariate regression analysis explained that positive attitude had a significant influence on oral health behaviour status ($p=0.006$, adjusted OR=4.87). The results showed that CHWs who attended oral health education programs were likely to have a better oral health behaviour status when compared to those who had not attended ($p=0.003$, adjusted OR= 14.58).

Table 4: Factors associated with Oral health behaviour status of the study participants

Oral health behaviour				
	OR(95% Conf. Interval)	<i>P</i> value	aOR(95%Conf.Interval)	<i>p</i> value
Age				
20-40 years of age	1.00		1.00	
>40 years	1.21(0.39-3.74)	0.73	1.04(0.24-4.50)	0.95
Level of education				
Profession or Honours	2.26(0.92-5.53)	0.07	2.32(0.74-7.31)	0.14
Graduates	0.38(0.07-2.00)	0.25	0.15(.01-1.44)	0.10
Intermediate or diploma	1.68(0.44-6.39)	0.44	3.64(0.39-33.5)	0.25
High school certificate	1.00			0.14
Socio economic class				
Upper middle	3.51(0.39-30.94)	0.25	1.77(0.14-21.35)	0.36
Lower middle	3.27(0.36-29.34)	0.28	3.58(0.23-55.76)	0.65
Upper lower	1.00		1.00	
Working experience				
0-10 years	1.00		1.00	
11-20 years	1.55(0.67-3.57)	0.30	0.97(0.32-2.95)	0.96
>20 years	0.61(0.06-6.12)	0.67	0.31(0.02-4.34)	0.39
Attendance related to oral health education programs				
Attended	8.00(2.27-28.13)	.001*	14.58(2.54-83.65)	.003*
Not attended	1.00		1.00	
Attitude level				
Positive	3.71(1.53-9.02)	0.004*	4.87(1.58-14.94)	.006*
Negative	1.00		1.00	
Knowledge level				
Good	1.44(0.68-3.07)	0.33	1.95(0.76-5.01)	0.16
Poor	1.00		1.00	

aOR=adjusted odds ratio, OR=odds ratio, *P-values <0.05 are statistically significant

Odds ratios are exponentated coefficients from multivariate logistic regression model, $R^2=0.377$

Discussion

CHWs are involved in primary prevention and can be further empowered to become an oral health guide for addressing the prevailing oral health problems in the community. [12] Their oral health knowledge and attitude are important determinants of preventive oral health behaviour.

As observed in previous studies, [7, 13, 14] the participants of the current study were also predominantly females as they are better accepted in the society for a regular door to door visits and services when compared to men. In addition, the health department offers financial and non-financial incentives that attract female CHWs by providing a stable source of income. The mean age of the study population was observed to be higher when compared to other studies. [13, 15] The current study revealed that the majority of the participants had attained at least higher secondary education, which would be a direct reflection on the higher female literacy rates in the state of Kerala. [16] It was observed that all the participants had completed general health education programs, enabling them to efficiently function as 'health activists' in the community. Unfortunately, around one-third of the participants had not received an opportunity to attend oral health education programs.

Most of the participants were well aware of oral health care practices. However, the study identified a few knowledge gaps. A study conducted by Sandhya et al [7] showed that most of the respondents knew the importance of daily oral hygiene measures that help in preventing dental diseases. In contrast, Yadav et al. [12] reported adequate awareness of the active role of sugar in dental decay but poor oral hygiene practices. About one-third of the participants were unaware of the capability of fluoride products in caries prevention, while the literature search reveals a mixed outcome on the knowledge scores.[17,18] A low level of awareness on tobacco and its products was seen in a study by Persai et al. [19] Despite the training on maternal and infant health care obtained by the ASHAs and AWWs, the current study observed that half of these health workers were ignorant about preventive strategies in antenatal oral care and early childhood caries, which is in agreement to previous studies. [9, 13] It was seen that the majority of the participants depend on health education programs as the source of knowledge, while awareness programs in mass media were reported as the primary source in other similar studies. [12, 13, 20] Despite having a profound effect in daily life, social media remains ineffective for the dissemination of oral health knowledge, especially in rural areas. Lack of oral health education, inadequate motivation, and insufficient allocation of resources by the local health administrative system might be the cause for lack of knowledge among CHWs.

CHWs in regular contact with the families can provide awareness concerning healthy diet and oral hygiene practices and recommend regular dental check-ups. Moreover, their oral care perceptions and practices can directly influence the community and hence the majority of primary health workers have shown a positive attitude towards participating in oral health training programs. [15] A difference was observed in the attitude scores of AWWs and junior health inspectors, which could be attributed to the

fact that the AWWs are permanent field workers in their community, whereas junior health inspector is a transferable position.

Observations from the current study suggest that behavioural pattern of routine oral hygiene measures such as brushing twice daily was consistent with studies in developed countries [21, 22] whereas the use of mouthwash was not in common practice. In the current study, the proportion of participants following the recommended frequency of changing toothbrush was lower when compared to the study conducted by Bhambal et al. [23] in the urban population in contrary to the population evaluated in our study. As observed in the previous studies, [15, 24] it was seen that the majority of the participants performed annual dental check-up, while very few of them followed routine dental visits. Moreover, almost half of the subjects believed that dental visits were the only effective means of preventing dental diseases. Curative oral health strategies are more commonly practiced as part of health promotion, especially in developing countries like India. Insufficient social intervention on behavioural modification of oral hygiene practices and lack of oral health care among CHWs reveals the need to improve awareness of self-prevention strategies in the community. The results of the present study showed that there was no significant relationship between higher levels of education and good knowledge scores on oral health care. Similar findings were reported by Eskandari et al. [9] and Nair et al. [25] The current study shows that the direct relationship between knowledge and work experience in the field is in contrast to the findings in a study conducted in Iran. [9] CHWs who have attended oral health training programs demonstrated a positive attitude and good behaviour towards oral health. Suggestions by Rathod et al. [26] motivates the CHWs to attend more oral health training programs for attaining better oral health behaviour. Low attendance in oral health education programs indicates that the CHWs have not been sufficiently equipped to perform the functions of oral health promotion. These facts were also stated by the researchers in Brazil explaining that the CHWs did not have any training to facilitate educational activities regarding oral health. [27, 28] Self-reported data was one of the limitations of this study. For further exploration in this area, there is a need for interventional studies evaluating the efficacy of oral health education programs in the domain of behavioural change.

Conclusion

The study has shown a positive relation with training programs experience levels to better oral health behaviour outcomes. The CHWs play a vital role in preventive oral health care activities that in turn positively impact maternal and child health care at the grass-root level. Therefore, equipping the CHWs with better practices through regular assessment of the awareness level and provision of providing incentives to the CHWs for improving oral health behaviour is essential to promote the overall health of the community.

Abbreviations

ANM - Auxilliary Nurse Midwife

ANOVA - Analysis of Variance

ASHA - Accredited Social Health Activist

AWW - Anganawadi Worker

CHW - Community Health Workers

CI - Confidence Interval

DWCD- Department of Women and Child Development

ICDS - Integrated Child Development Scheme

JHI - Junior Health Inspector

JPHN - Junior Public Health Nurse

MPHW - Multi Purpose Health Worker

MPW - Multi Purpose Worker

NRHM- National Rural Health Mission

OR - Odds Ratio

PHC - Primary Health Centres

SES - Socio-Economic Status

WHO- World Health Organisation

Declarations

Ethics approval and consent to participate

This study was approved by Institutional Ethics Committee of Government Dental College, Kottayam(No: IEC/M/16/2018/DCK) accordance to the principle outlined in the Declaration of Helsinki. The study was explained, and written informed consent was obtained from the participants

Consent for publication

The consent for publication has been obtained

Availability of data and materials

The datasets used and/or analysed during the current study are available from the

Corresponding author on reasonable request.

Competing interests

We declared that authors have no competing interests

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Authors' contributions

STATEMENT OF CONTRIBUTION

SL. No.	AUTHOR(Initial)	CONTRIBUTION
1	Dr. Najmunnisa. K.P	Conception and design, acquisition of data, analysis and interpretation of data, drafting the article, revising it critically for important intellectual content and final approval of the version to be published
2	Dr. Susan Thomas	Conception and design, acquisition of data, analysis and interpretation of data, drafting the article, revising it critically for important intellectual content and final approval of the version to be published
3	Dr. MaryShimi S Gomez	Conception and design, analysis and interpretation of data, drafting the article, revising it critically for important intellectual content and final approval of the version to be published
4	Dr. Jesline Merly James	Analysis and interpretation of data, drafting the article, revising it critically for important intellectual content and final approval of the version to be published
5	Dr. Vivek Narayanan	Acquisition of data, Analysis and interpretation of data, drafting the article, revising it critically for important intellectual content and final approval of the version to be published

The manuscript has been read and approved by all authors and the requirements for authorship as per journal guidelines have been met.

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