Handwashing Practice and Its Predictors Among Mothers of Children Aged 0 to 23 Months in South Ethiopia: Community Based Cross-Sectional Study

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ABSTRACT

BACKGROUND: Maternal handwashing practice is an important measure to prevent the spreading of childhood disease. Handwashing is still being practiced to a very low extent especially at critical times since the global prevalence of handwashing with soap was estimated at 19% by a systematic review after compiling 42 studies all over the world.

OBJECTIVE: To assess the handwashing practice and its predictors among mothers of children aged 0 to 23 months in Mareka District, south Ethiopia, 2020.

METHOD: A community-based cross-sectional study was conducted with a multistage sampling technique on 520 women having children aged 0 to 23 months in Mareka District. Data were collected by using interviewer-administered pre-tested structured questionnaires. Data were checked for completeness and entered into Epi data entry 4.6.2. The data were exported into SPSS version 22 for analysis with multivariate logistic regression analysis at $P < .05$.

RESULT: Mothers wash their hands with soap and water after visiting the latrine (27.1%), after cleaning the child's bottom (28.5%), before cooking (6.2%), before eating (6.9%), and before feeding the child (21.2%). The most important predictors were water availability near the handwashing location with an adjusted odds ratio (AOR) 5.26 (95% CI 1.99-13.69) and soap availability near the handwashing location with AOR 0.40 (95% CI 0.18-0.89) for good handwashing practice.

CONCLUSION: The handwashing practice at critical times was low. The presences of water and soap near the handwashing location were the most important predictors. It is necessary to increase the provision of both water and soap near the handwashing location for improving handwashing with soap and water at key times.

KEYWORDS: Critical time, handwashing practice, children aged 0 to 23 months

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Introduction

Handwashing practice is the most affordable and effective means of stopping the spread of infection via faces, body fluids, and inanimate objects.[1,2] It is a basic everyday process skill and behavior that should become a lifelong habit in order to enjoy a better quality of life[3] though it is challenging to achieve universal handwashing behavior with soap. Handwashing with soap is important for mother—child paired aged 0 to 23 months. In addition to this due to the close proximity of children in household and child care settings, there is a high risk for the spread of infectious disease.[4,5]

Water, sanitation, and hygiene (WASH) interventions do not typically address these important sources to prevent harmful exposure to young kids.[6] Hand hygiene habit formation was supported by the ease of access to hardware and reinforcement of key hygiene behaviors and handwashing with soap was significantly associated with the desire to smell nice, interpersonal influences, presence of handwashing places within paces of the kitchen and latrine, and key handwashing moments (ie, after eating and after cleaning child's stools).[7]

An estimated 829 000 water sanitation and hygiene attributable deaths and 49.8 million disability-adjusted life years occurred from diarrheal diseases with an equivalent to 60% of all diarrheal deaths.[8] It has been reported that the frequency of handwashing with soap before handling food or after using a toilet was observed in only between 0% and 34.0% of cases.[9]

As our culture decades, it is our hand use while we dine unlike the western we eat without spoons, forks, or knives. In spite of awareness on the consequences of eating without washing ones, bare hands lead to deaths and disability particularly concerning sanitation and hygiene aspects with mal-absorption

nutrients that lead to malnutrition especially for long term consequences of stunting.[29]

Different studies in Ethiopia suggested that forgetting and a lack of any handwashing infrastructure hindered regular handwashing practice.[4,5,10]

Handwashing practice is one of the most cost-effective investments in public health and the economic benefits to the prevention of diarrhea, pneumonia, and community health-associated infections, which are extremely costly to individuals, healthcare systems, and countries.[11-13] Mothers are the immediate and reliable caregivers of children in many countries, and they play a central role in children's health.[14,15] Mothers' handwashing practices have a significant effect on the maintenance of child health.[16] About 88% of diarrhea-associated deaths are attributable to unsafe water, inadequate sanitation, and insufficient hygiene.[17]

Sustainable Development Goals (SDGs) have focused on the development of healthy lives and well-being for all children and to reduce the number of under-5 children deaths by 10 million between 2017 and 2030.[18,19] To achieve this goal, improving the hand hygiene of mothers and children is essential because hands are central to our day-to-day operations, and working with hands that may be contaminated for cooking and eating increases the transfer of contaminants which may cause ill health. Mothers play a dual role infant care, they are responsible for child hygiene (treating their faces, blowing their nostrils, etc.) and general housekeeper (preparing meals for the family, feeding children), and poor hygiene practices can increase the risk of disease spread to children. However, good handwashing practices are rare in low-income countries like Ethiopia,[20] and findings suggested that hand washing at critical times such as after defecation or cleaning an infant's perineum is not common practice.[21,22]

In Mareka District the 10 top causes of under-5 child morbidity and mortality were most of communicable disease like, typhoid fever, helimenthiasis, no bloody diarrhea and bloody diarrhea, and acute respiratory tract infections.[23] Besides these the magnitude of handwashing practice among mothers of children aged 0 to 23 months not identified, however children's sick with different preventable communicable diseases. Therefore, the aim of this study is initiated to assess handwashing practice and associated factors among mothers' who have children aged 0 to 23 months in Mareka District, south Ethiopia.

Method

Study setting and period

The study was conducted in Mareka district, Dawro zone, south Ethiopia from August 15 to September 15, 2020. Mareka district was one of the 11 districts in the Dawro zone. It is 455 km far from Addis Ababa which is the capital city of Ethiopia, and 311 km from Hawassa which was the capital city of the SNNPR state.

According to the projection of the Ethiopian census, the district had a total population of 63 022 of which 32 141 were males and 30 881 females. There were 3239 under 2-year-old children. There was 1 health center and 15 functional health posts in the district.[23] The communities largely depended on agriculture for their livelihood. The staple food in the highland was locally known as *enset (kocho)*, whereas corn and sorghum were common in low land areas. Common cash crops were wheat and teff.

Study design: A community-based cross-sectional study was conducted

Source population: All mothers having children aged 0 to 23 months living in Mareka district were the source population. Respondents drawn from the randomly selected rural kebeles were considered as the study population.

Exclusion and inclusion criteria: Mothers having children aged 0 to 23 months were excluded if they were not residents for more than 6 months in the district.

Sample size determination: The sample size was determined using single population proportion formula with the prevalence of 81% of the poor handwashing practice among mothers of children 6 to 59 months might not be clean even in the absence of dirt in Aman sub-city Benchi Maji zone south Ethiopia, 2017.[24] The assumption was used to calculate the required sample size with the confidence interval of (95%), the margin of error (5%), and the design effect of 2. Finally, adding a 10% none response rate.

$$\mathbf{n} = \frac{(z_{\alpha/2})^2 p(1-P)}{d^2} = \mathbf{n} = \frac{(1.96)^2 0.81(1-0.81)}{(0.05)^2}$$

$$\mathbf{n} = \frac{(1.96)^2 (0.81)(0.19)}{(0.05)^2} = \mathbf{236}$$

The actual sample size was 236 considering 10% of non-response rates and with the design effect of 2, the minimum final total sample size was 520.

Sampling technique and procedure: Mareka district has been selected purposively. A multistage sampling technique was employed. The selected district had a total of 15 kebeles, which were stratified into 2 urban and 13 rural kebeles. The 1 kebele from urban and 4 from rural were selected randomly. The list of mothers having children aged 0 to 23 months were available from the local health extension roaster. The sample size would be distributed to this 5 selected kebele based on the proportional size of mothers having children aged 0 to 23 months. The study units were selected using a systematic random sampling method (Figure 1).

Data collection procedure and quality assurance

Data were collected using interviewer-administered questionnaires. The questionnaire has socio-demographic, economic factors, availability of handwashing facility of handwashing

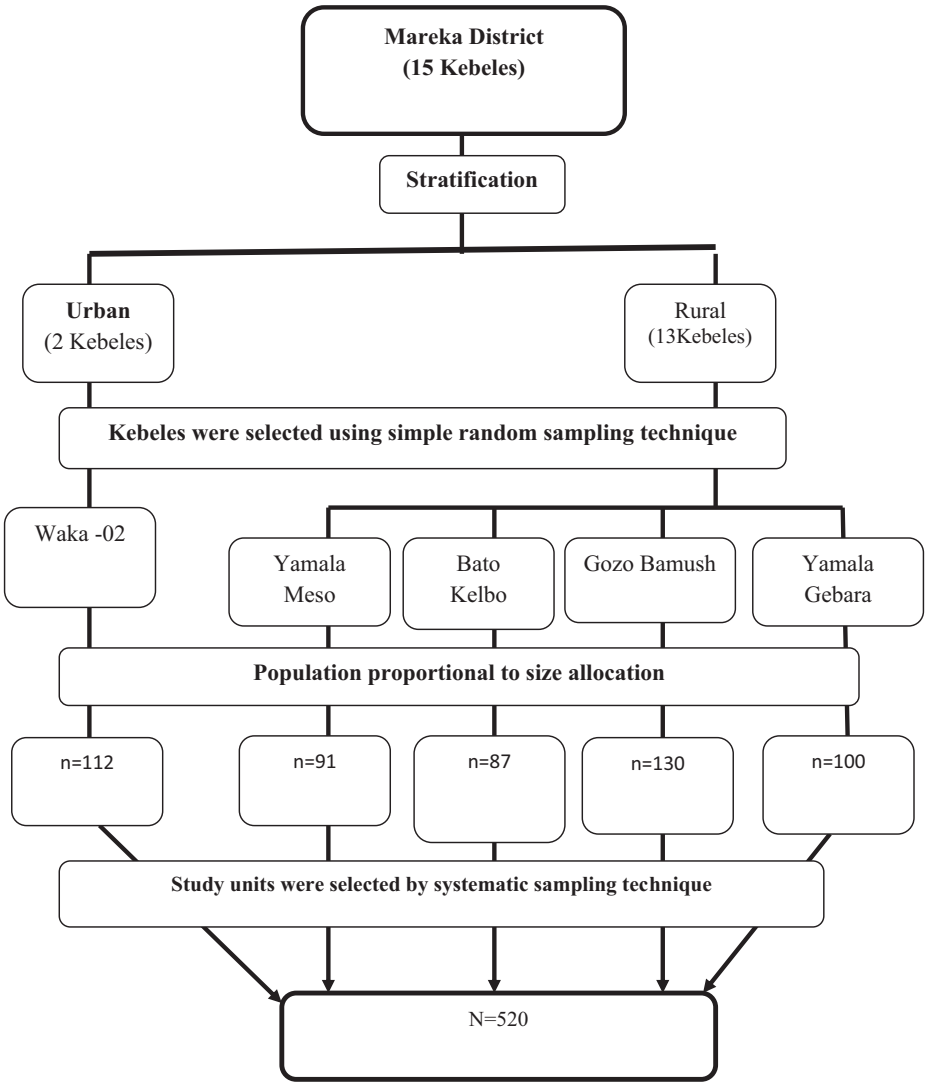

Figure 1. Schematic representations of the sampling procedure and sampling technique for handwashing practice of mother-child paired and its predictors in Mareka district, South Ethiopia.

practice questions. The questionnaire was developed originally in English and translated to the Amharic and Dawrgna language, and then the Amharic and Dawrgna language was translated to English to see the consistencies of both versions. Data were collected by 3 trained health professionals (diploma nurses) who have good communication skills. Two BSc nurses supervised the data collection process on daily basis. Data collectors informed the mothers about all details of the research purpose and procedures and what is expected of them, potential risks and benefits in order to encourage accurate and honest responses, and also the way how information was handled and also responded to any questions raised by study participants. Data quality was ensured during questionnaire development data collection, entry, and analysis. Before the actual data collection, a pre-test would be done to check the quality of the instrument. During data collection, 2 bachelor degree nurse supervisors and 3 diploma nurse data collectors with previous experience were recruited, and trained. A code was given to the questionnaires during data collection so that errors were timely addressed. The filled questionnaires were checked for completeness and consistency by the data collectors, supervisor, and principal investigator on a daily basis. The children's age was assessed by local health extension roaster, vaccination status card, BCG scar, and mother recalled. When there is a discrepancy it was corrected by checking the documentation of health extension roster and vaccination card especially during mothers unable to recall.

Data processing and analysis

After cleaning and editing, the data was entered into Epi-data version 4.6.2 and exported to the statistical package for social sciences (SPSS) software version 22 for further analysis. The result was presented using descriptive statistics such as frequency, percentage, and mean (±SD). The bivariable and multivariable logistic regression analyses were used to identify the potential predictors of the outcome variable. Independent variables that remain statistically significant in the bivariable

analysis at $P < .25$ were entered into a multivariable logistic regression model. The overall percentage of the model accurately classified was 73.4%, with Hosmer and Lemeshow goodness-of-fit test *P*-value of .443, indicating the model fits well. Finally, the statistical association was declared at a 95% confidence interval with an adjusted odds ratio at the multivariable logistic regression model.

Definition of terms

Handwashing: is the act of cleaning hands with water and soap for a purpose of removing soil, dirt, and microorganisms.[25]

Handwashing practice: is routinely/through the life/action of washing surfaces of lathered hands, followed by rinsing under a stream of water with soap in the critical time of before preparing food, before eating food, after eating food, after cleaning baby the baby bottom, after disposing child feces and after visiting toilet.[24,26]

Critical time: washing hand before preparing food, before eating food, after eating, after cleaning baby, and after visiting toilet.[26]

Good maternal handwashing practice: when mothers who have given birth or give care for child score at least 3 and above out of 5 handwashing practice questions.[24,26]

Results

Socio-demographic characteristics

The mean handwashing age of the mothers was 20.8 years and the median monthly household income was ETB 1440. About 43.8% of mothers were in the age group of 25 to 34 years and nearly half 51.2% of them had not attended the class. Most of the respondents were unemployed 72.3% and one-third 33.3% of them belonged to orthodox and more than half 52.5% were protestant by religion. Two-thirds 65.6% of the respondents lived in rural families (Table 1).

Handwashing practice

About 27.1% of the mothers having children aged 0 to 23 months wash their hands with soap and water after visiting the latrine, 28.5% wash after cleaning their child's bottom, 6.2% before cooking, 6.9% washed hands before eating, and only 21.2% washed before feeding the child. The overall good handwashing practice was 21.50% (Figure 2).

Predisposing factors of handwashing

Near to one-third of mother's 31.9% adhered to can cause diseases, fewer 30.4% of respondents need soap to wash their hands after toilet visit and more than half of the respondents don't need soap to wash their hands after a toilet visit 69.6%. Greater than half of them wash their hands with soap if hand looks like dirty 51.2% (Table 2).

Reinforcing factors for mothers handwashing practices

Of the total participants, 5.6%, and 85.0%, had got high pressure to wash their hands from husbands, and health professionals respectively. Only 6.3% of mothers having children aged 0 to 23 months participated in hygiene and sanitation promotion activities from any health programs (Table 3).

Enabling factors for mothers handwashing practice (n = 520)

In the observed residences of the respondents there were 5.4% had a basin and 94.6% were no basin assigned to wash their hands on the station. From the total observed only 3.8% of toilets had soap or ash and 9.4% of them with water available. About 1 in 3 (33%) mothers having children aged 0 to 23 months knew the importance of handwashing practice water with soap. But majority 96.2% and 90.6% of the observed residences had no soap or ash and water near to toilet respectively (Table 4).

Factors associated with handwashing practice

In multivariate logistic regression analysis, maternal age, presence of water, and soap near to latrine were significantly associated with the handwashing practice of mothers having children aged 0 to 23 months. Maternal age, soap, and water near to latrine were significantly associated with maternal handwashing practice, AOR 0.44 (95% CI 0.20-0.63), AOR 0.40 (95% CI 0.18-0.89), and AOR 5.26 (95% CI 1.99-13.89) respectively (Table 5).

Discussion

In this study handwashing practice with soap among mothers having children aged 0 to 23 months was 21.5%. it was lower than studies revealed from Northwest Ethiopia 39.1%.[27] Similar studies revealed from India showed that handwashing practice with soap was 79.49%.[28] Similarly, multiple studies showed that handwashing practice with soap was still challenging for universal practice. It is confirmed by the global prevalence of handwashing with soap was estimated nearly 1 among 5 19% with a systematic review after compiling 42 studies all over the world.[11,29] It was also only 8% households had handwashing facilities in Ethiopia which was very low.[10] On the other hand, multiple studies have shown that washing hands with soap or ash can reduce the risk of diarrheal diseases by 42% to 47% and this might save a million lives every year. Washing hands with soap and water also helps in the reduction of respiratory tract infections, and stunting among children.[30-32] This difference might be due to sampling size, study design, setting, climate, tradition, poverty status, and water sanitation and hygiene intervention strategies.

In this study, there was a significant association between handwashing practices and maternal age. It is supported by

Table 1. Socio-demographic and socio-economic factors of handwashing practice among mothers of children aged from 0 to 23 months in Mareka district, South Ethiopia in 2020.

VARIABLES	CATEGORY	FREQUENCY	PERCENT (%)
Age	15-24	139	26.7
	25-34	228	43.8
	35-44	153	29.4
Education	Not attended the class	266	51.2
	Elementary	79	15.2
	High school	135	26.0
	Collage	40	7.7
Religion	Orthodox	173	33.3
	Catholic	61	11.7
	Protestant	273	52.5
	Others	11	2.1
Occupation	House wife	376	72.3
	Daily labor	76	14.6
	Merchant	42	8.1
	Civil servant	26	5.0
Income (Birr)	0-1000	455	87.5
	1001-2000	33	6.3
	2001-3000	12	2.3
	>3001	20	3.8
Residence	Urban	179	34.4
	Rural	341	65.6
Ethnicity	Dawuro	432	83.1
	Wolaiyta	81	15.6

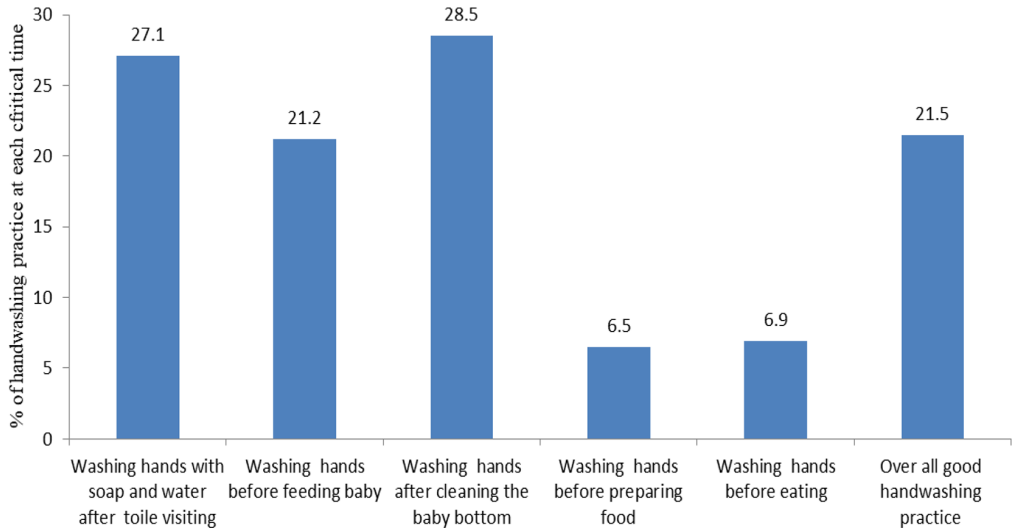

Figure 2. Handwashing practice of mothers of children aged from 0 to 23 months in Mareka district, South Ethiopia, 2020.

Table 2. Predisposing factors of handwashing practice among mothers of children aged from 0 to 23 months in Mareka district, South Ethiopia in 2020.

VARIABLE	CATEGORY	FREQUENCY	PERCENT (%)
Handwashing cause diseases	Yes	166	31.9
	No	354	68.1
Handwashing with water	Yes	47	9.0
	No	473	91.0
Hand washing with soap	Yes	158	30.4
	No	362	69.6
Handwashing without soap	Yes	267	51.3
	No	253	48.7
Washing hands with soap if the hands look like dirty or bad	Yes	266	51.2
	No	254	48.8

Table 3. Reinforcing factors of handwashing practice among mothers of children aged from 0 to 23 months in Mareka district, South Ethiopia, 2020.

VARIABLE	CATEGORY	FREQUENCY	PERCENT (%)
Mass media for handwashing	Television	41	7.9
	Radio	63	12.1
	Not I am heard from any one	405	77.9
Referents for handwashing practice	Husband	29	5.6
	Your friend	44	8.5
	Health professionals	442	85.0
Hygiene and sanitation promotion activities	Yes	123	23.7
	No	397	76.3
Ever participation of hygiene and sanitation promotion activities	Yes	33	6.3
	No	487	93.7

studies in India[28] the younger age-groups handwashing practices were found to be better. A significant association was also observed between presence of water and soap for better handwashing practice at critical times. Therefore handwashing is incorporated along with safe water and sanitations essential interventions for reduction of malnutrition globally and is part of national nutritional programs in many countries.[21,29]

Global Hygiene Council, World Health Organization and celebrations such as global handwashing day (15 October) emphasize various avenues which promote behavior change toward improved handwashing practices. These may include improvement of water supply at the household or community level as well as hygiene promotion interventions. The practice of handwashing with soap has been prominent in the last few years on the international hygiene agenda. The guiding vision of global handwashing day is a local and global culture of handwashing with the need for soap to wash hands after visiting the toilet. Multimodal programmers for increasing hand hygiene compliance are now recommended as the most reliable, evidence-based method for ensuring sustainable improvement in handwashing practice. In resource constraint countries like Ethiopia should also be motivated and supported who have better penetration among the rural communities toward the promotion of behavior change communication activities at the village level to promote proper and regular hand-washing practices.[17,32]

Limitation of the study

This study is a cross-sectional study that cannot assess the cause-effect relationship.

Conclusion

In conclusion, the handwashing practice was low. Presences of water and soap near to the handwashing location were

Table 4. Enabling factors of handwashing practice among mothers of children aged from 0 to 23 months in Mareka district, South Ethiopia, 2020.

VARIABLE	CATEGORY	FREQUENCY	PERCENT (%)
Hand washing basin near to toilet	Yes	28	5.4
	No	492	94.6
Availability of soap or ash near to toilet	Yes	20	3.8
	No	500	96.2
Water available near to toilet	Yes	49	9.4
	No	471	90.6

Table 5. Factors associated with handwashing practice among mothers of children aged from 0 to 23 months in Mareka district, South Ethiopia, 2020.

VARIABLES	HANDWASHING PRACTICE		95% CONFIDENCE INTERVAL	
	GOOD	POOR	COR	AOR
Age of respondent in year				
15-24	14	125	0.23 (0.12, 0.45)	**0.44 (0.20, 0.63)**
25-34	49	179	0.58 (0.36, 0.92)	0.83 (0.50, 1.39)
35-44	49	104	1.00	1.00
Education				
Illiterate	82	198	1.00	1.00
Literate	30	210	2.89 (1.82, 4.59)	0.62 (0.36, 1.06)
Residence				
Urban	16	163	1.00	1.00
Rural	96	245	0.25 (0.14, 0.44)	0.56 (0.25, 1.28)
Handwashing with soap near to handwashing location				
No	12	146	0.22 (0.11, 0.41)	**0.40 (0.18, 0.88)**
Yes	100	262	1.00	1.00
Only wash hands with soap if the hands look/feel dirty or bad				
Yes	29	237	0.25 (0.16, 0.40)	0.99 (0.39, 2.49)
No	83	171	1.00	1.00
Hearing about handwashing in mass media				
No	100	305	2.81 (1.49, 5.33)	0.75 (0.35, 1.60)
Yes	12	103	1.00	1.00
Participation in any hygiene and sanitation promotion activities				
Yes	13	110	0.36 (0.19, 0.66)	1.51 (0.41, 5.52)
No	99	298	1.00	1.00
Availability of water near to handwashing location				
Yes	5	44	0.39 (0.15, 0.99)	**5.26 (1.99, 13.89)**
No	107	364	1.00	1.00

significantly associated with handwashing practice for mothers having children aged 0 to 23 months. It is necessary to increase the provision of both water and soap near to the handwashing location for improving handwashing with soap and water at key times.

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Author Contributions

TM: conceived and designed the study, performed analysis, interpreted the data. AA, DD, YLL, and FWF involved in the analysis, interpretation of the data. FWF and DD prepare the original manuscript draft. All authors critically reviewed and approved the final manuscript.

Ethical Considerations

It was obtained from Wolaita Sodo University institutional review board (IRB). Permission letter was written from the school of public health for the main study to Mareka district main administrative office for the pre-test.

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Availability of Data and Materials

The data sets analyzed during the current study are available from the corresponding author.

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