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Original Article

Optimal Breastfeeding Practice and Associated Factors Among Employee Mothers in Central Tigray, Northern Ethiopia

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Abstract
Background: *Breastfeeding has significant short- and long-term medical and neurodevelopmental advantages. It is the most widely recognized and effective intervention for preventing early childhood deaths. However, there is limited evidence regarding optimal breastfeeding practices among employed mothers in Tigray specifically and Ethiopia more generally. Therefore, this study was conducted to estimate optimal breastfeeding practices and associated factors among employed mothers working in public institutions in Aksum town.*
Methods: *A cross-sectional study design was conducted among employed mothers in public institutions of Aksum town from May 1 to 30, 2018. A structured questionnaire was administered to collect data, which was then coded, cleaned, entered, and analyzed using Statistical Product and Service Solutions (SPSS) version 21. Results were presented using tables and charts. Descriptive statistics such as percentages, means, and standard deviations (SD) were computed. Binary and multiple logistic regression models examined associations between dependent and independent variables. Associations were considered statistically significant within a 95% confidence interval and P values less than or equal to 0.05.*
Result: *A total of 114 participants were included in the analysis. The mean age of the mothers and their children was 28.3(SD ± 4.4) years and 12.2 (SD ± 5.9) months, respectively. The study showed that the overall optimal breastfeeding practice was 54.4%. Teachers and accountants had reduced odds of practicing optimal breastfeeding compared to health professionals (AOR = 0.24, 95% CI: 0.06, 0.99; P = 0.049) and (AOR = 0.17, 95% CI: 0.04, 0.70; P = 0.015), respectively. Additionally, mothers who lacked supervisory support to breastfeed at their workplace had lower odds of optimal breastfeeding practice compared to those supported by supervisors (AOR = 0.17, 95% CI: 0.06, 0.46; P = 0.000).*
Conclusion*: The breastfeeding practices among employee mothers in our study were low. Factors associated with breastfeeding practices included the mother's occupation and lack of supervisor support at the workplace for breastfeeding.*

Keywords: *employee, optimal, breastfeeding, practice, Aksum, Tigray, Ethiopia*
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Introduction

Breastfeeding is the normative standard for infant feeding and nutrition and should be considered a national and international public health priority (1-3). It has documented short and long-term medical and neurodevelopmental advantages. Some of the benefits of breastfeeding include the prevention of diarrhea, otitis media, urinary tract infection, necrotizing enterocolitis, septicemia, infant botulism, insulin-dependent diabetes mellitus, and celiac disease (1, 4). Optimal breastfeeding practices for infants include initiating breastfeeding within one hour of birth, avoiding pre-lacteal feeds, emptying one breast before switching to the other (at least 10-15 minutes), and frequently breastfeeding on demand (8-12 times per day) (4) and exclusive breast-

feeding until the child is age 6 month without adding any water or other fluids or foods and to continue breastfeeding until the child turns age 2(5). In 2012, the World Health Assembly endorsed that one of the global nutrition targets by 2025 was to increase the rate of exclusive breastfeeding up to 50% (6).

Despite its benefits and established optimal interventions, effective practices fall short of the requirements. For instance, studies in Africa indicate that exclusive breastfeeding (EBF) rates among mothers range from less than 20% to 58% (5, 7). A study conducted in Ghana reported exclusive breastfeeding practice among public and private sector employee mothers to be below 20% (7). Ethiopian Demographic and Health Survey (EDHS) 2016 showed sub-optimal performance of breastfeeding practices in the general population. This large-scale country-wide study revealed that, between 2005 and 2016, EBF increased from 49% to 58% (5). In particular, breastfeeding practice in the workplace is challenging in developing countries. For example, in Ethiopia, a study showed government employee mothers reduced the odds of EBF by 50% (8).

The success of breastfeeding initiation and continuation depends on multiple factors, such as education about breastfeeding, hospital breastfeeding practices and policies, routine and timely follow-up care, and family and societal support (4). Understanding the magnitude and factors affecting the practice of optimal breastfeeding at the workplace is immensely important to mothers and children, in particular, and for society and policymakers, in general. Nonetheless, evidence on these is meager in developing countries, including Ethiopia.
In this study, we reported the magnitude of optimal breastfeeding practice and its factors among employee mothers in public institutions in Aksum town, Tigray, Ethiopia.

Methods and materials

Study design and population

The study was conducted at public institutions in Aksum. This town is a well-known tourist center featuring various obelisks and is also an archaeological area registered by the United Nations Educational, Scientific and Cultural Organization (UNESCO). A cross-sectional study design assessed optimal breastfeeding practices and their associated factors among governmental employee lactating mothers from May 1-30, 2018. Mothers with a last-born child under 2 years who were present at the workplace during data collection were included. Mothers who were unwilling to participate or who fed formula were excluded.

Sample size and sampling procedure

The single population proportion formula was used to determine the sample size, assuming a 95% confidence level, a 5% margin of error, and a 50% prevalence of optimal breastfeeding practice. After adding 10% for the non-response rate, and since our study population is less than 10,000, we used the sample size correction formula. During the study period, an estimated 155 lactating mothers worked in governmental organizations in the study area; thus, the final sample size was 114 mothers.

Mothers found in workplaces were selected from schools, colleges, health institutions, branches of commercial banks, and Aksum University, with proportional allocation to the population (Figure 1).

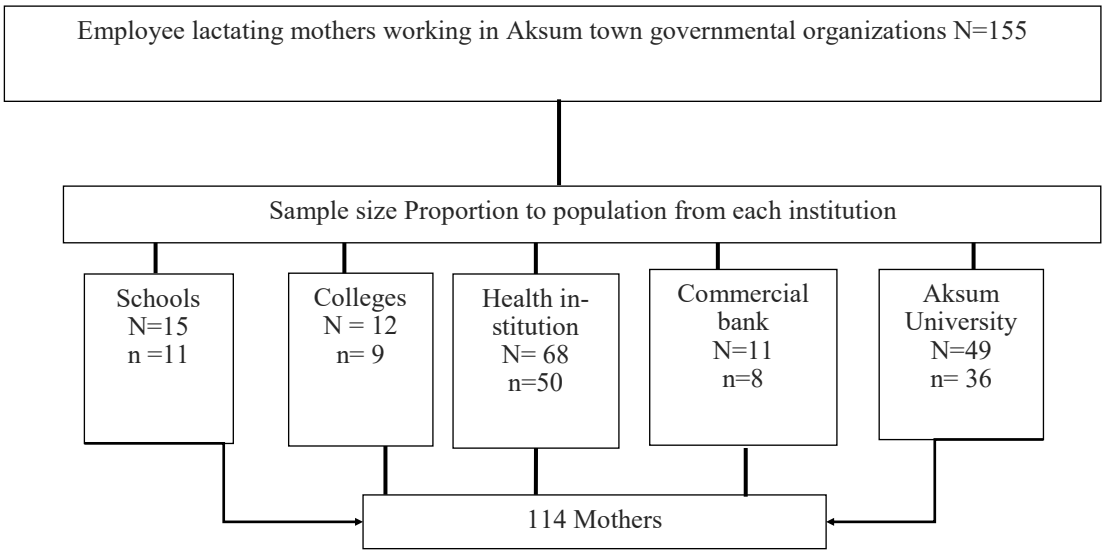

Figure 1: Schematic presentation of sampling procedure

Study Variables
The dependent variable in the study was breastfeeding practices. The explanatory variables included maternal age, infant age, religion, educational level, ethnicity, marital status, income level Parity, Sex of infant, antenatal counseling, postnatal counseling on breastfeeding, working institution, occupation, family support, coworker support, supervisor support, knowledge on and attitude towards breastfeeding.

Operational definition
Optimal breastfeeding practice**:** This was defined in terms of breastfeeding practices, including timely initiation of breastfeeding within one hour, EBF, frequent breastfeeding (8-12 times), no pre-lacteal feeding, and emptying one breast before switching to second (10-15 minutes) (4, 6)**.**

Adequate knowledge: These mothers answered 'yes' to more than 75% of the questions on breastfeeding (BF) knowledge (9).
Inadequate knowledge: These mothers answered 'yes' to less than 75% of the knowledge questions on BF (9).
Good attitude: These mothers responded positively to more than 75% of the questions on attitude towards BF (9).
Poor attitude: These mothers responded positively to less than 75% of the questions about attitudes towards BF(9).

Data collection
Data were collected using a structured self-administered questionnaire from mothers at their workplaces during the data collection period. The questionnaire consisted of five parts: sociodemographic characteristics, obstetric experiences, knowledge, attitudes, breastfeeding practices, and employment-related variables. Initially developed in English, the questionnaire was then translated into Tigrigna, the native language of the study area, and back-translated into English to ensure consistency. Two trained data collectors gathered the data under the continuous supervision of the principal investigator. To standardize the questionnaire, it was pretested on 5 mothers (5% of the study sample) from a non-selected organization.

Data quality assurance
To assure data quality, the questionnaire was translated into Tigrigna (the local language), pretested, and checked for clarity of language. At the end of the data collection days, the principal investigator checked the questionnaire's completeness. Regular meetings were held with the data collectors to clarify any ambiguity.

Data management and analysis
Data were coded, cleaned, entered, and analyzed using SPSS version 21. Descriptive statistics, such as percentages, means, and standard deviations, were computed. Binary and multiple logistic regression models with cutoff points at odds ratios in a 95% confidence interval and a p-value of ≤ 0.05 were employed to examine the associations between dependent and independent variables. The binary and multiple logistic regression models were conducted to assess these associations. Variables that were statistically significant at a p-value of ≤ 0.05 in the bivariate logistic regression were included in the multivariate logistic regression. Associations were considered statistically significant based on a 95% confidence interval and p-values less than or equal to 0.05.

Results
Sociodemographic characteristics and obstetric experiences of the respondents
A total of 114 respondents were included in the analysis, and the response rate was 100%. The mean age of the mothers and their children was 28.3 years (SD±4.4) and 12.2 months (±5.9), respectively. Most (87.7%) of the mothers were aged between 20 and 34 years, and approximately 86% of the children were older than 6 months. Sixty-five (57%) of the children were males. Most respondents (96.5%) identified as Orthodox Christians and were of Tigrayan ethnicity (98.2%). One third (32.5%) and the majority (85.1%) of the participants were health professionals and college graduates, respectively. Over half (51.8%) of the mothers were multiparous. More than two thirds (71.9%) and 81.6% of mothers were counseled on breastfeeding during their ANC and PNC follow-up, respectively. All mothers delivered in health institutions, with most having vaginal deliveries (Table 1).

Table 1: Sociodemographic characteristics and obstetric experiences of employed lactating mothers working in Aksum town governmental organizations Tigray, Aksum,2018 (N=114)

Characteristics	Category	N (%)
Age of mother in years	15-19	1(0.9)
	20-34	100 (87.7)
	35+	13(11.4)
Marital status	Married	114(100)
Ethnicity	Tigray	112(98.2)
	Amhara	2(1.8)
Religion of mother	Orthodox Christian	110(96.5)
	Muslim	4(3.5)

Occupation	**Health professional**	**37(32.5)**
	Teacher	17(14.9)
	Accountant	17(14.9)
	Others*	43(37.7)
Income level	High income (≥3317birr)	68(59.6)
	Low income(<3317birr)	46(40.4)
Educational level	5-12(elementary and high school)	17(14.9)
	College	97 (85.1)
Parity of mother	Primi-para	55(48.2)
	Multipara	59(51.8)
Counseled on breast feeding at ANC follow up	Yes	82(71.9)
	No	32(28.1)
Place of delivery	Health institution	114(100)
Mode of delivery	Vaginal delivery	105 (92.1)
	Cesarean section	9(7.9)
Counseled on breast feeding at PNC follow up	Yes	93(81.6)
	No	21(18.4)
Age of infant in months	0-5	16(14)
	6-11	42(38.8)
	12-17	27(23.7)
	18-23	29(25.4)
Sex of infants	Male	65(57)
	Female	49(43)

*Runners, secretaries, cleaners, librarians, and documentation and information technology workers

Knowledge, attitude, breastfeeding practice, and employment-related variables

The study showed that 103 participants (90.4%) and 94 participants (82.5%) had adequate knowledge about and good attitudes towards breastfeeding, respectively (Table 2).

Table 2: Knowledge, attitude, breastfeeding practices, and employment-related variables among mothers working in governmental organizations in Aksum Town, Aksum-Tigray, Ethiopia ,2018 (N=114)

Variable	**Category**	**N (%)**
Knowledge on breast feeding	Adequate	103 (90.4)
	Inadequate	11(9.6)
Attitude towards breast feeding	Good	94 (82.5)
	Poor	20 (12.5)
Optimal breastfeeding practice	Yes	62 (54.4)
	No	52 (45.6)
Type of employment	Permanent	102 (89.5)
	Temporary/contract	12 (10.5)
Working institution	Health institution	50 (43.9)
	Public School	11 (9.6)
	College and university	45 (39.5)
	Bank	8 (7)
Colleague support to breast feeding	Yes	77 (67.5)
	No	37 (32.5)
Supervisor support to breast feeding	Yes	63 (55.3)
	No	51 (44.7)
Working hours per day	< 8 hours	97 (85.1)
	≥ 8 hours	17 (14.9)

The initiation of breastfeeding within one hour of delivery was 98.2% (95% CI: 95.6, 100), and three mothers (2.6%) gave pre-lacteal feed (Figure 2).

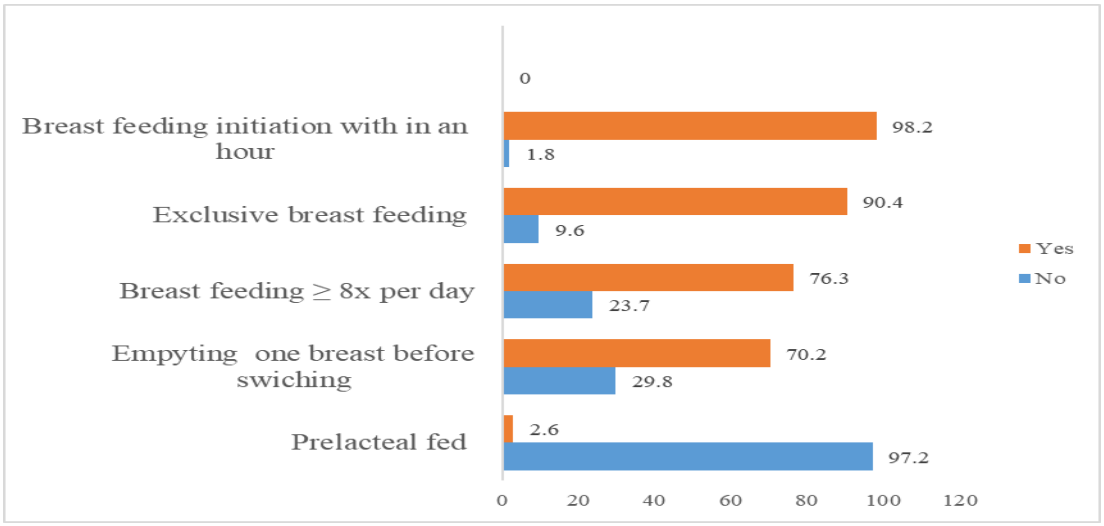

Figure 2: Percentage of OBF practice among employed lactating mothers in Aksum town working in governmental organizations, Aksum, Tigray, and northern Ethiopia, 2018 (N=114)

Most participants (89.5%) were permanently employed. Two-thirds (67.5%) and over half (55.3%) of the participants received support for breastfeeding from their colleagues and supervisor, respectively. Fifty participants (43.9%) were working in health institutions, regardless of their profession. The majority of mothers (85.1%) work ≤ 8 hours per day (Table 2)**.**The overall optimal breastfeeding practice rate was 54.4% (Figure 3)**.**

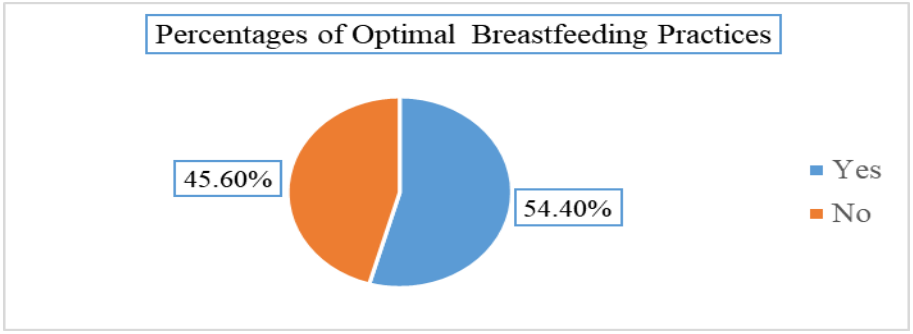

Figure 3: OBF Practice among respondents of public employees in Aksum town June, 2018

Factors Associated with Optimal Breastfeeding Practice

Variables with P values ≤ 0.05 from the bivariate analyses included maternal occupation, educational level, counseling on breastfeeding during ANC and PNC, working hours, and supervisor support for breastfeeding. These variables were included in the multivariable logistic regression analysis to develop the full study model. In the multivariate logistic regression, only maternal occupation and supervisor support for breastfeeding were statistically significant. Teachers and accountants had lower odds of optimal breastfeeding practices compared to health professionals (AOR = 0.24, 95% CI: 0.06, 0.99; P = 0.049) and (AOR =0.17, 95% CI: 0.041, 0.70; P = 0.015**),** respectively. Additionally, mothers without supervisor support for breastfeeding had lower odds of optimal breastfeeding practices than those with supervisor support (AOR = 0.17, 95% CI: 0.06, 0.46; P = 0.000**).** Variables such as counseling on breastfeeding during ANC and PNC, working hours, and educational level were not statistically associated (Table 3).

Discussion

The study's primary aim was to evaluate the extent of optimal breastfeeding practices from an employment perspective and its associated factors. The study indicated that overall optimal breastfeeding practices were low

(54.4%). The occupation of the mother, being both a teacher and an accountant, along with the lack of supervisor support, were factors associated with optimal breastfeeding practices

Though the overall optimal breastfeeding practice was low, it was higher than studies conducted in low-income countries, such as Pakistan (41.5%) and Ethiopia 35.6% (10, 11). The reasons might be due to differences in study settings, operational definitions, and socioeconomic factors. In our study, timely breastfeeding initiation within one hour was very high at 98.2%. This finding was significantly higher than studies conducted in Axum, Dembecha district, Gondar, and Gurage (11-15). This discrepancy could be due to the previous studies conducted in community settings where most mothers lack education. However, the literature is inconsistent on this (11, 15) and the government's intensive interventions on maternal and child health activities, including optimal breastfeeding practices through the health extension system in the country.

In our study, EBF was high (90.4 %), far greater than studies conducted in Axum and two studies in Gondar, which were 40.9%, 20.9% and 45.7% (11, 12, 14), respectively. Furthermore, a study conducted in Gozamin district, Ethiopia, revealed that government-employee mothers were less likely to breastfeed compared to housewives exclusively (8). The difference might be due to the opportunity for ANC and PNC counseling on breastfeeding practice and their high educational status, similar to a previous study that showed maternal education to college level and higher had higher odds of optimal breastfeeding practice (11).

Contrary to this, one study conducted in Gurage, southern Ethiopia, reported an early cessation of EBF in those with higher educational levels (13). Our finding was also almost nine times higher as compared to a study conducted among medical doctors in Nigeria working in one teaching hospital. However, the study analyzed a very small sample (16). In terms of breastfeeding frequency, 23.7% of mothers breastfed their babies fewer than 8 times per day, which is higher than findings from a study conducted in Gondar town. (11). The higher proportion in our study could be due to difference in study settings.

Three (2.6%) mothers had practiced pre-lacteal feeding. This figure is far less than that of the national survey of Ethiopia conducted in 2016 (5) and a study conducted in Axum (14). However, it should not be ignored, as no supplements are recommended unless medically indicated using standard evidence-based guidelines(1).

Despite the fact that the hind breast milk is more nutritious than the fore breast milk, one-third of the mothers had reported that they switch to the second breast in less than 10 minutes, which indicates a lack of awareness (1, 4). The proportion of optimal breastfeeding practices was comparable between primiparous and multiparous mothers. Multivariable logistic regression shows that the mother's occupation and the supervisor's support for breastfeeding were significantly associated with optimal breastfeeding practice (Table 3).

Table 3: Factors associated with OBF among employed mothers working in Aksum town public institutions, Tigray, north Ethiopia, 2018 (N=114)

Variable	Category	OBF		COR (95% CI)	AOR (95%CI)	P - value
		No	Yes			
Profession/occupation	Health professional	8	29	1	1	
	Teacher	10	7	0.19(0.05,0.66)	0.24(0.06,0.99)	0.049
	Accountant	10	7	0.19(0.05.0.66)	0.17(0.04,0.70)	0.015
	Others *	24	19	0.21(0.08,0.58)	0.29(0.08,1.02)	0.054
Educational level	5-12[a]	12	5	0.29(0.09,0.89)	0.46(0.08,2.4)	0.36
	College	40	57	1	1	
Counseled on BF during ANC follow up	Yes	31	51	1	1	
	No	21	11	0.31(0.13,0.74)	0.69(0.18,2.5)	0.58
Counseled on BF during PNC follow up	Yes	37	56	1	1	
	No	15	6	0.26(0.09,0.74)	0.61(0.13,2.88)	0.53
Working hours per day	< 8hrs	40	57	1	1	
	≥ 8hrs	12	5	0.29(0.07,0.89)	1.5(0.3,8.3)	0.58
Supervisor support	Yes	17	46	1	1	
	No	35	16	0.16(0.07,0.38)	0.17(0.06,0.46)	0.000

a; Elementary and high school; *Runners; secretaries; cleaners; librarians; documentation and IT workers

Teachers and accountants had reduced odds of optimal breastfeeding practice compared to health professionals. This could be because health professionals might have better knowledge about and attitude towards breastfeeding compared to teachers and accountants related to their discipline. Furthermore, accountants, especially bankers, had reported being busy breastfeeding. According to a study in Pakistan, EBF was significantly less in doctors and bankers compared with nurses and teachers, which was a consistent finding in our study in the case of bankers. Nonetheless, our report was in contrary with regard to nurses, doctors and teachers (10).

Study participants whose supervisors did not support breastfeeding in their workplace had reduced odds of optimal breastfeeding compared to those supported. Likewise, one study conducted among medical doctors in Nigeria showed that a significant proportion of participants reported that their colleagues and supervisors were unsupportive (16). Moreover, a community-based study conducted in eastern Gojjam, Motta town, revealed only 3.7% of employee mothers were encouraged to breastfeed by their supervisor (17) , which is a very small proportion when compared to our study.

One possible reason is the lack of attention to breastfeeding mothers by supervisors, which might be a result of poor knowledge about and attitude towards breastfeeding, and it can also be partially explained by the highly regulated working environment (no rearrangements program for breastfeeding mothers) in some institutions. Studies showed that the educational status of the mother, household income, work experience, mode of delivery, and postnatal care (PNC) follow-up and having good knowledge were significantly associated with breastfeeding practice, but none of these were statistically associated in our study (11). This might be partly explained by differences in socioeconomic status, policy, settings, and methodological approaches, like sample size and sampling technique.

The study has significant limitations. One is that there may be a potential recall bias as the mothers were asked about their previous experiences. Second, the study was limited to government employee mothers, and third, it utilized a small sample size.

Conclusion and recommendation

The study revealed that optimal breastfeeding practices among employees were low. Being a teacher, working as an accountant, and lacking supervisor support for breastfeeding were factors significantly associated with optimal breastfeeding practices in the workplace. We recommend that supervisors support employee mothers in breastfeeding at their workplaces. In addition, the government should formulate policies that advocate and enforce supportive rules for breastfeeding in the workplace. We suggest expanding and conducting further research by including private and non-governmental employees.

Declarations

Ethical approval

Ethical clearance was obtained from the Aksum University College of Health Sciences Institutional Review Board. Each institution's administration granted permission. Each study participant received a thorough explanation regarding the aim and confidentiality of information, and informed written consent was obtained from each participant.

Consent for publication

This is not applicable

Availability of data and materials

Dataset can be obtained upon reasonable request to the corresponding author.

Competing interest

There is no conflict of interest

Funding

No specific fund is available

Abbreviation: ANC: Antenatal care, AOR: Adjusted odds ratio, BF: Breastfeeding, COR: Crude odds ratio**,** EBF: Exclusive Breast Feeding**,** OBF: Optimal Breast Feeding, PNC: Postnatal care, UNESCO: United Nations Educational Scientific and Cultural Organization.

Authors' contribution

YL conceived and developed the study proposal. NB and ZW performed statistical analysis. YL wrote the manuscript draft. MH critically review the manuscript. All authors read and approved the final manuscript for publication.

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