

Maternal health literacy, utilisation of maternal healthcare services and pregnancy outcomes among newly delivered mothers: A cross-sectional study in Nigeria

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ABSTRACT

Objectives: The aim of this study was to assess and determine associations between maternal health literacy (MHL) levels, utilisation of maternal healthcare services and pregnancy outcomes among newly delivered mothers.

Study design: Cross-sectional descriptive study.

Methods: In total, 185 newly delivered mothers were selected from two health facilities using a purposive sampling technique. Data were collected using an adapted structured questionnaire. Analyses of data were performed using frequency, percentage, mean, standard deviation, Kruskal-Wallis test and logistic regression. The level of significance was set at 0.05 ($p < 0.05$).

Results: More than one-third of participants (41.6%) had inadequate MHL. Utilisation of maternal healthcare services was moderate; only 55.7% of participants were registered for antenatal care at ≤ 14 weeks of pregnancy and 59.5% received three doses of tetanus vaccine, however, the majority of participants (85.9%) attended antenatal care with skilled birth attendants. Almost half of participants (49.2%) had poor pregnancy outcomes. A significant association was found between MHL and utilisation of maternal healthcare services ($p < 0.05$). MHL was also significantly associated with certain sociodemographic characteristics of participants (i.e. age, educational level, occupation and income).

Conclusions: More than one-third of participants had inadequate MHL, utilisation of maternal healthcare services was moderate and approximately half of study participants had poor pregnancy outcomes. Health workers should provide training sessions for pregnant women to improve MHL.

1. Introduction

Health literacy is defined as an individual's knowledge, motivation and ability to access, comprehend, appraise and apply health information in order to make judgments and decisions about healthcare, disease prevention and health promotion to improve health throughout life [1]. Health literacy is crucial to the reproductive health of women [2,3]. In the field of obstetrics and gynaecology, health literacy is regarded as maternal health literacy (MHL). MHL is significant because it has implications on maternal and child outcomes in pregnancy [4]. MHL includes knowledge and social skills required by individuals to embrace good nutrition and healthy lifestyles, to be aware of risk factors and to make the right decisions during pregnancy and childbirth [5,6].

Pregnant women are at risk of many life-threatening complications. Maternal healthcare services are available for early detection and prevention of complications in pregnancy and childbirth [7,8]. Antenatal care (ANC) is an important element of maternal healthcare services [8]. There is poor utilisation of maternal healthcare services in Nigeria [9]. A previous study [8] has acknowledged an association between utilisation of maternal health services and maternal and child health outcomes.

Pregnancy outcomes can be described as positive or negative when viewed from both maternal and child aspects. An uneventful pregnancy, childbirth and delivery of a healthy baby are considered as positive pregnancy outcomes. Whereas, presence of complications, such as anaemia, preeclampsia and maternal mortality, are viewed as negative pregnancy outcomes. Adequate utilisation of appropriate maternal

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healthcare services, especially ANC, is important to achieve positive pregnancy outcomes [8]. The knowledge and skills of pregnant women on the health information required in pregnancy (i.e. MHL), including the benefits of maternal healthcare services [10], directly influences their utilisation of maternal healthcare services to achieve positive pregnancy outcomes. For example, some women are unaware of the importance of taking certain medications or undergoing certain investigations during pregnancy [11].

Improving MHL is a significant factor in empowering pregnant women to change their behaviour towards the use of available maternal healthcare services. Despite the continuous reduction in maternal mortality globally, Nigeria remains one of the countries with a very high number of maternal deaths in Africa [12]. Previous studies [13,14] have identified poverty and poor use of maternal healthcare services as the fundamental cause of maternal mortality in Nigeria. Awotunde et al. [15] suggested that improving utilisation of maternal healthcare services would be a vital strategy to improving maternal health.

Researchers have linked the use of healthcare services and health outcomes to health literacy [16,17]. Inadequate health literacy results in an inability to make timely pregnancy-related health decisions, make choices about location of ANC services and understand appropriate timings of first ANC visit, which may lead to negative impacts on maternal and child health [18]. MHL can be improved during the antenatal period by health workers targeting specific knowledge, skills and competencies that pregnant women require to engage with maternal healthcare services to achieve good pregnancy outcomes.

Previous research aimed at reducing maternal deaths has focussed on decreasing poverty and increasing access to maternal health services; however, there is limited information on the MHL status of pregnant women in the study area. Increasing MHL is an important strategy to improve utilisation of maternal healthcare services, maternal health and pregnancy outcomes. This study therefore assessed MHL, utilisation of maternal healthcare services and pregnancy outcomes among newly delivered mothers attending selected healthcare facilities.

2. Methods

A descriptive cross-sectional survey was adopted. The study was conducted in a teaching hospital and a comprehensive health centre in Ado-Ekiti, Nigeria. The study population comprised 185 newly delivered mothers in postnatal units. A purposive sampling technique was used to select participants. Mothers who delivered, either through normal vaginal delivery or caesarean section, within the previous 24–48 h and who were currently on a postnatal ward were recruited. Individuals working in the health/medical field were excluded from participation.

A questionnaire and checklist adapted from the Maternal Health Literacy and Pregnancy Outcome Questionnaire (MHLAPQ) [4] were used to collect data. To assess MHL, a 14-item structured questionnaire was used. In total, 13 items were adopted from the MHLAPQ and the remaining item was as follows: ‘I understand the difference in delivery places with skilled and those without skilled birth attendants’. This final item was included based on reports of the significance of utilisation of skilled birth attendance as a strategy to reduce maternal mortality [19] and improve newborn health in Nigeria [20]. MHL was measured using a 4-point Likert scale: strongly agree = 4, agree = 3, disagree = 2 and strongly disagree = 1. Four items were negatively worded, with reverse scoring. A higher score indicates a higher level of MHL. Scores were classified as ‘high’ and ‘low’. A reliability test was conducted on the 14 items, which showed a Cronbach’s Alpha coefficient of 0.822.

Utilisation of maternal healthcare services and pregnancy outcomes were determined using a checklist with 17 items using Yes/No response options. Items 1–4 addressed maternal healthcare services, while items 5–17 addressed pregnancy outcomes. A reliability test conducted showed a Cronbach’s Alpha coefficient of 0.791. Participants were assisted by the researchers when completing the questionnaire; participants were asked questions from the check list and the researcher ticked

‘yes’ or ‘no’ as necessary.

Antenatal and birth records were checked. In addition, physical observations/examinations were carried out on the mother and child as necessary to confirm information provided by participants.

Data were collected within a 4-month study period between March and June 2020. Participants were contacted in the postnatal ward within 24–48 h of delivery. Informed consent was obtained from participants before the commencement of data collection. Completed questionnaires were retrieved immediately, coded and stored (access was limited to the researchers only).

Data were analysed using the Statistical Package for Social Sciences (SPSS) version 20. Sociodemographic characteristics and pregnancy outcomes were analysed using frequency and percentage. MHL was analysed using mean and standard deviation. Associations were tested using logistic regression and the Kruskal-Wallis test.

3. Results

Table 1 shows the distribution of participant sociodemographic variables. The mean age of participants was 29.16 years (± 5.05), with 42.7% being aged between 30 and 34 years. The majority were married (74.6%), of the Yoruba ethnic group (60.0%) and were traders (37.3%). In addition, most participants had tertiary education (70.0%) and were Christians (76.2%). In total, 31.4% of participants received a monthly income of Nigerian naira 41,000–60,000.

Table 2 shows the distribution of MHL mean scores among participants. The majority of participants (70.3%) disagreed with the statement ‘I have adequate skills to prepare a balanced diet’ (mean score = 2.17 ± 0.69). More than half of participants (54.0%) disagreed with the statement ‘I have adequate knowledge and skills on how to care for my baby after delivery (breastfeeding, bathing)’ (mean score = 2.44 ± 0.66). In addition, more than half of participants (53.5%) disagreed with the statement ‘I can read health pamphlets and acquire information and skills to maintain personal and food hygiene during pregnancy and after delivery’ (mean score = 2.46 ± 0.68), while more than one-third (37.9%) disagreed with the statement ‘I have a basic understanding of

Table 1
Sociodemographic characteristics of participants (n = 185).

Characteristics		N	%
Health facility of data collection	EKSUTH	111	60.0
	CHC Okesa	74	40.0
Age (years) [mean age = 29.16 \pm 5.05]	15–19	6	3.2
	20–24	28	15.1
	24–29	61	33.0
	30–34	79	42.7
	35–39	4	2.2
	40 & above	7	3.8
Marital Status	Single	28	15.1
	Married	138	74.6
	Separated	19	10.3
Ethnicity	Yoruba	111	60.0
	Igbo	49	26.5
	Hausa	4	2.2
	Others	21	11.4
Occupation	Farming	13	7.0
	Trading	69	37.3
	Civil servant	35	18.9
	Private section	26	14.1
	Artisan	23	12.4
	Unemployed	19	10.3
	Educational Level	Primary	4
	Secondary	48	25.9
	Tertiary	133	71.9
Income (Nigerian naira)	<20,000	14	7.6
	20,000–40,000	44	23.8
	41,000–60,000	58	31.4
	61,000–80,000	36	19.5
	81,000–100,000	23	12.4
	>100,000	10	5.4

Table 2
Distribution of Maternal Health Literacy among participants.

Maternal Health Literacy question items	Strongly agree n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)	Mean	±SD
1. I cannot look for health information in a library or on the internet.	0 (0.0)	27 (14.6)	123 (66.5)	35 (18.9)	3.04	0.57
2. I can understand and interpret basic health information accurately	57 (30.8)	122 (65.9)	4 (2.2)	2 (1.1)	3.26	0.55
3. I cannot read, understand & interpret medical prescriptions or instructions accurately	2 (1.1)	43 (23.2)	109 (58.9)	31 (16.8)	2.91	0.66
4. I cannot read and understand dates of medical appointments, (such as dates for immunization, screening, physical examination)	2 (1.1)	41 (22.2)	114 (61.6)	28 (15.1)	2.91	0.64
5. I have a basic understanding of medical terms	33 (17.8)	82 (44.3)	66 (35.7)	4 (2.2)	2.78	0.75
6. I can read and understand health pamphlets correctly	31 (16.8)	115 (62.2)	34 (18.4)	5 (2.7)	2.93	0.67
7. I have adequate knowledge on diets to take during pregnancy and after delivery	26 (14.1)	115 (62.2)	44 (23.8)	0 (0.0)	2.90	0.60
8. I cannot read and understand danger signs in pregnancy (such as anaemia, pallor, raised BP, swelling, bleeding, early labor, etc.)	0 (0.0)	4 (2.2)	122 (65.9)	59 (31.9)	3.30	0.50
9. I can read, write and do basic numeric skills	49 (26.5)	101 (54.6)	35 (18.9)	0 (0.0)	3.08	0.67
10. I understand the difference in delivery places with skilled and those without skilled birth attendants.	120 (64.9)	57 (30.8)	8 (4.3)	0 (0.0)	3.61	0.57
11. I have ability to read, understand and act on the health care	40 (21.6)	120 (64.9)	23 (12.4)	2 (1.1)	3.07	0.61

Table 2 (continued)

Maternal Health Literacy question items	Strongly agree n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)	Mean	±SD
information positively						
12. I have adequate knowledge and skills on how to care for my baby after delivery (breastfeeding, bathing)	7 (3.8)	78 (42.2)	89 (48.1)	11 (5.9)	2.44	0.66
13. I can read health pamphlets and acquire information and skills to maintain personal and food hygiene during pregnancy and after delivery	10 (5.4)	76 (41.1)	89 (48.1)	10 (5.4)	2.46	0.68
14. I have adequate skills to prepare a balanced diet	4 (2.2)	51 (27.6)	103 (55.7)	27 (14.6)	2.17	0.69

medical terms' (mean score = 2.78 ± 0.75). The overall mean score of MHL was calculated. More than one-third of participants (41.6%) had inadequate MHL, with a mean score of 2.59 ± 0.23 (see [Table S1](#) in the supplementary material).

[Fig. 1](#) shows the distribution of utilisation of maternal healthcare services and pregnancy outcomes among participants. The majority (76.8%) did not attend ≥4 ANC visits. More than one-third of participants (40.5%) did not take up to three doses of tetanus vaccine in pregnancy and said 'No' to ANC booking at ≤14 weeks of pregnancy (44.3%). More than one-fifth of participants (29.2%) had anaemia, approximately one-quarter (24.9%) had hypertension in pregnancy, while few (14.1%) did not attend ANC in a facility with skilled labour (birth attendant). Overall, scoring of pregnancy outcomes revealed that almost half of participants (49.2%) had poor pregnancy outcomes.

[Table 3](#) shows the association of MHL, utilisation of maternal healthcare services and pregnancy outcomes among participants. Findings showed that there was a significant positive association between MHL and the following maternal healthcare services: uptake of three doses of tetanus vaccine in pregnancy (Exp (B) or odds ratio [OR] = 5.154, p = 0.000); attended ANC in a skilled labour health setting (Exp (B) or OR = 13.356, p = 0.009); and ANC booking at ≤14 weeks of pregnancy (Exp (B) or OR = 4.046, p = 0.003). Thus, women who received three doses of tetanus vaccine were 5.154 more likely to have higher MHL than women who did not receive three doses of tetanus vaccine; women who attended ANC in a skilled labour health facility were 13.356 more likely to have higher MHL than women who attended ANC in other facilities without skilled birth attendants; and women who had an ANC booking at ≤14 weeks of pregnancy were 4.046 more likely to have higher MHL than those who booked at >14 weeks of pregnancy. Further findings showed no significant association between MHL and pregnancy outcomes. However, MHL showed a negative association with Apgar score >7 after 5 min (Exp (B) or OR = 0.050, p = 0.021).

[Table 4](#) shows the association between MHL and selected socio-demographic characteristics using the Kruskal-Wallis test. MHL was significantly associated with the following characteristics: age ($\chi^2 = 19.589$, df = 5, p = 0.001), occupation ($\chi^2 = 66.339$, df = 5, p = 0.000), level of education ($\chi^2 = 44.164$, df = 2, p = 0.000) and monthly income

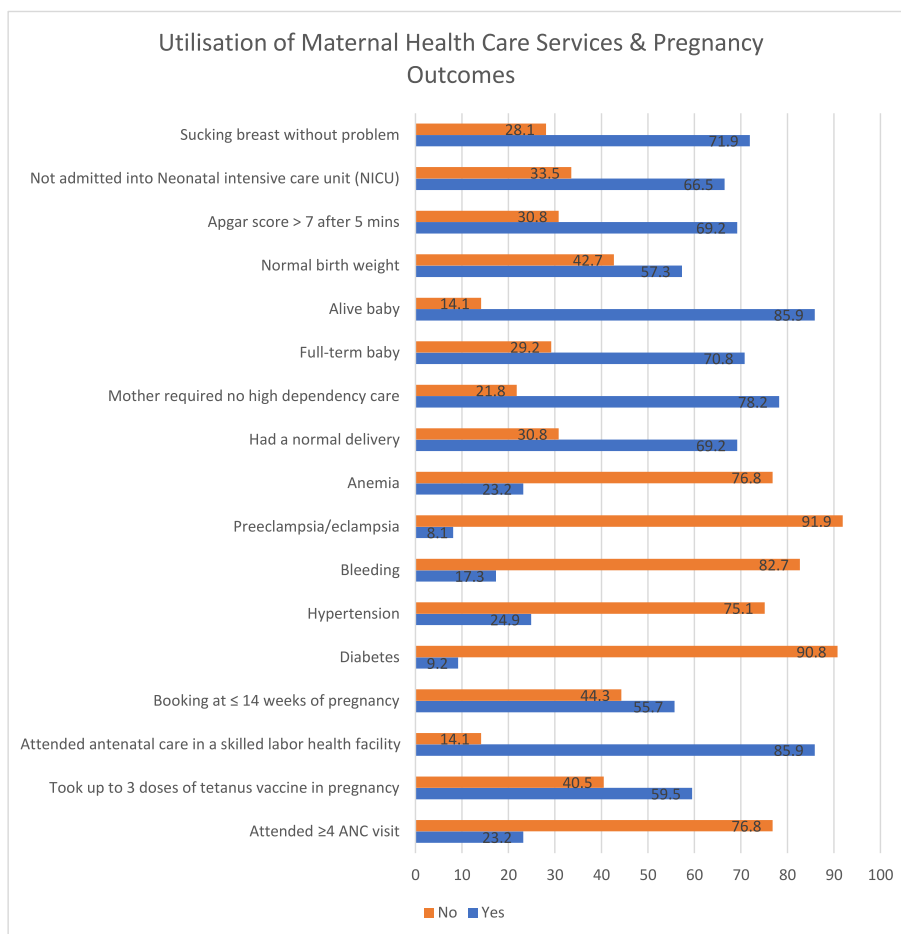


Fig. 1. The distribution of utilisation of maternal healthcare services and pregnancy outcomes among participants. ANC, antenatal care.

Table 3
Association Between Maternal Health Literacy and Pregnancy Outcomes using Logistic Regression.

Item	B	S.E	Wald	df	Sig	Exp (B) [OR]	95% CI for EXP(B) [OR]	
							Lower	Upper
1 Attended ≥4 ANC visits	0.760	0.551	1.903	1	0.168	2.139	0.726	6.301
2 Took up to 3 doses of tetanus vaccine in pregnancy***	1.640	0.464	12.478	1	0.000	5.154	2.075	12.802
3 Attended antenatal care in a skilled labor health facility****	2.592	0.998	6.745	1	0.009	13.356	1.889	94.441
4 Booking at ≤14 weeks of pregnancy**	1.398	0.476	8.628	1	0.003	4.046	1.592	10.280
Had the following complications in pregnancy								
5 Diabetes	0.462	1.100	0.177	1	0.674	1.587	0.184	13.696
6 Hypertension	0.233	0.613	0.144	1	0.704	1.263	0.379	4.201
7 Bleeding	-0.752	0.640	1.383	1	0.240	0.471	0.135	1.651
8 Pre-eclampsia/eclampsia	-0.364	1.143	0.102	1	0.750	0.695	0.074	6.522
9 Anemia	0.927	0.658	1.981	1	0.159	2.526	0.695	9.179
10 Had a normal delivery	-0.472	0.682	0.479	1	0.489	0.624	0.164	2.374
11 Mother required no high dependency care after delivery	-0.712	0.641	1.236	1	0.266	0.491	0.140	1.722
12 Full-term baby	0.537	0.549	0.955	1	0.329	1.710	0.583	5.019
13 Alive baby	-0.670	0.889	0.568	1	0.451	0.512	0.090	2.922
14 Normal birth weight	-1.019	0.684	2.222	1	0.136	0.361	0.095	1.378
15 Apgar score >7 after 5 min***	-2.987	1.292	5.342	1	0.021	0.050	0.004	0.635
16 Not admitted into neonatal intensive care unit (NICU)	1.127	0.939	1.441	1	0.230	3.085	0.490	19.415
17 Sucking breast without problem	2.276	1.553	2.149	1	0.143	9.735	0.464	204.112

ANC, antenatal care; CI, confidence interval; OR, odds ratio.

($\chi^2 = 61.838$, $df = 5$, $p = 0.000$).

4. Discussion

4.1. Maternal health literacy among respondents

Limited health literacy is a worldwide public health problem [17]. Lack of ability to read and understand medical instructions and medical

Table 4

Association between maternal health literacy and selected sociodemographic characteristics of participants.

Sociodemographic Characteristics		Maternal Health Literacy			
		Mean	±SD	Mean ranking	Index statistics
Age group (years)	15–19	2.40	0.32	26.83	$\chi^2 = 19.598$ df = 5 p = 0.001
	20–24	2.79	0.36	69.18	
	25–29	2.95	0.28	98.76	
	30–34	2.98	0.36	103.89	
	35–39	2.85	0.16	73.75	
	40–44	2.90	0.36	82.93	
Marital status	Single	2.82	0.34	77.46	$\chi^2 = 2.985$ df = 2 p = 0.225
	Married	2.94	0.36	96.45	
	Separated	2.89	0.26	90.84	
Occupation	Farming	2.43	0.27	26.81	$\chi^2 = 66.339$ df = 5 p = 0.000
	Trading	2.90	0.32	92.22	
	Civil servant	3.19	0.23	141.47	
	Private sector	3.07	0.29	112.35	
	Artisan	2.76	0.18	59.72	
	Unemployed	2.74	0.35	65.63	
Level of education	Primary	2.89	0.37	89.00	$\chi^2 = 44.164$ df = 2 p = 0.000
	Secondary	2.62	0.34	49.25	
	Tertiary	3.02	0.28	108.91	
Monthly income (Nigerian naira)	<20,000	2.61	0.31	45.57	$\chi^2 = 61.838$ df = 5 p = 0.000
	20,000–40,000	2.65	0.35	57.38	
	41,000–60,000	2.94	0.19	95.92	
	61,000–80,000	2.99	0.27	105.31	
	81,000–100,000	3.23	0.31	135.61	
	>100,000	3.31	0.20	156.90	

terms, poor knowledge of basic information required for health in pregnancy (such as diet and food hygiene), poor knowledge and skills in caring for the newborn (such as breastfeeding and bathing), poor knowledge on symptoms of complications in pregnancy and how to prevent them are all evidence of poor MHL [11]. Findings from this study show inadequate MHL in activities such as skills to prepare a balanced diet, knowledge and skills on how to care for the baby after delivery and ability to read health pamphlets, and acquire skills to maintain personal and food hygiene in pregnancy and after delivery. Sufficient access, understanding and ability to apply health information during specific vulnerable health conditions, such as during pregnancy, are significant factors in achieving good health outcomes [21]. According to Kaufman et al. [22] and as cited in Nawabi et al. [21], women with limited health literacy are unlikely to breastfeed their babies immediately after delivery and find written health information about ANC difficult to comprehend; thus, these individuals depend on health information from friends, family and health workers [2]. Further findings from the current study showed that more than one-third of participants (41.6%) had inadequate MHL, which is consistent with findings in similar studies that reported 30% [20] of pregnant women had low health literacy, and 34% [5] and 80% [23] of women had inadequate MHL. Poor MHL may result in making poor decisions or in an inability to make timely decisions about personal and child health during the antenatal period, childbirth and after childbirth [24]. Maternal mortality and newborn deaths are a result of many factors, including poor or late decisions on important antenatal issues that have implications on pregnancy outcomes.

4.2. Relationship between maternal health literacy, utilisation of maternal healthcare services and pregnancy outcomes

The current study found a significant association between MHL and utilisation of maternal healthcare services (specifically, ANC attendance in facilities with skilled birth attendants, uptake of the tetanus toxoid vaccine and early initiation of ANC). Participants with higher MHL attended ANC in facilities with skilled birth attendants. To the best of the authors' knowledge, there are no previous studies on the relationship

between MHL and ANC attendance in facilities with skilled birth attendants; however, a study in Nigeria [25] reported that more than one-third of women do not attend ANC in health facilities. In addition, a study in Turkey reported that obtaining adequate prenatal care was influenced by the level of health literacy [26].

This study showed that participants with higher MHL received at least three doses of the tetanus toxoid vaccine. There is limited information on the association between MHL and uptake of tetanus toxoid vaccine. However, MHL was associated with child immunisation in India [27]. In addition, one study reported that women who had access to mass media, such as television, radio and mobile phones, requested the correct doses of tetanus vaccine compared with women who did not have access to mass media [28]. Obtaining adequate and correct information from social media improves MHL. Receiving at least three doses of the tetanus vaccine is recommended by the WHO to prevent both the mother and child developing tetanus infection. Tetanus is one of the leading causes of death among neonates in Africa [29].

The current study revealed that participants with higher MHL engaged in ANC at an early stage of their pregnancy. This finding is similar to results reported in a study that showed a significant association of high MHL and early initiation of ANC [30]. In contrast, a previous study reported no significant association of MHL and early initiation of ANC [17]. In another study [31], maternal knowledge of the right time for first ANC visit was a determinant of first ANC visit in the first 3 months of pregnancy. Seeking ANC early in pregnancy, especially in the first trimester, provides an opportunity to receive health information that is crucial for achieving good health outcomes [26]. According to Nawabi et al. [21], individuals with low health literacy engage more frequently in emergency hospital visits and have poor utilisation of preventive services; whereas, higher health literacy was associated with an informed decision to obtain prenatal testing [32]. Also, the current study showed that participants with lower MHL had an Apgar score >7 after 5 min. Another study reported no significant relationship between MHL and Apgar score [5].

4.3. Relationship between maternal health literacy and sociodemographic characteristics of respondents

MHL was significantly associated with age, education, occupation and personal income of respondents. Mothers who were aged between 25 and 34 years had higher MHL compared with mothers who were older or younger than this age group. This result is similar to findings from a previous study [33], but in contrast with another study [34]. A higher MHL among women age 25 and 34 years can be attributed to an increase in cognitive ability, more physical power and skills to access health information from different sources at this age. Shabi and Oyewusi [5] suggest that the true relationship between MHL and age varies with population.

In the current study, mothers with tertiary education had a higher MHL level compared with women who only had primary or secondary education. This result is similar to previous studies [33,34]. Higher education equips individuals with the knowledge and skills to search, read and understand health instructions, and to make informed decisions during pregnancy. Approximately 40% of the total Nigerian population are illiterate and the majority are women [35,36], which increases the risk of poor MHL.

MHL of participants increased with higher monthly income, which is consistent with findings in previous studies [33,34]. An increase in income improves socio-economic conditions of individuals and increases access to resources for health, including healthcare services in pregnancy [33]. Furthermore, participants who had white collar jobs had higher MHL than artisans; this finding is in agreement with previous studies [37,38]. An individual's occupation determines their socio-economic status, and a higher socio-economic status can predict a better life and access to resources that promote good health during pregnancy. According to Seno et al. [26], individuals who are

impoverished, unemployed or have temporary jobs often have low health literacy.

Improving MHL is crucial in reducing maternal and neonatal morbidity and mortality, which is currently high in Nigeria. In order to improve the MHL of women during ANC, health workers should aim to target women who have no formal education or a low level of education, and women who are unemployed or low-income earners. Health workers play a crucial role in improving the MHL of women and consequently improving maternal and neonatal outcomes.

4.4. Limitations

A direct causal association between MHL, utilisation of maternal healthcare services and pregnancy outcomes cannot be predicted by this study because of the study design. Cross-sectional studies cannot confirm causal relationships.

4.5. Conclusion

More than one-third of participants in the current study had inadequate MHL and the utilisation of maternal healthcare services was only moderate, resulting in approximately half of the study participants experiencing poor pregnancy outcomes. Improved MHL will increase utilisation of maternal healthcare services in pregnancy. Health workers should provide training sessions for all pregnant women during ANC. Attention should be focussed on women who are younger, with low education, low income and low-income occupations because these population groups are more at risk of inadequate MHL.

Ethical approval

This research was granted ethical approval by the ethical committee with Number EKSUTH/A67/2019/12/09. Permission for the conduct of the study was also obtained from the management of Comprehensive Health Center.

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Author contributions

CBB: conceptualisation, supervision, writing - original draft preparation. DTE: methodology, writing - review and editing. SAA: investigation, visualisation. RIF: writing - review and editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.puhip.2022.100266>.

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