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Awareness of congenital cytomegalovirus among reproductive age women in southwest Nigeria

Medical Science

KEYWORDS: Cytomegalovirus, pregnancy, awareness, symptoms, prevention, Nigeria.

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ABSTRACT

Objective: This study explores the level of awareness of congenital CMV infection among reproductive age women in southwest Nigeria.

Methods: A validated questionnaire instrument was employed to obtain information from 796 women about the awareness of, sources of information, and known manifestations of congenital CMV.

Results: The prevalence of CMV awareness was 21.4%, much lower than awareness of HIV (91.3%) and Hepatitis B Virus (83.4%). The odds of CMV awareness was higher among women living in urban areas (AOR: 3.46; 95% CI: 2.18-5.50), who are healthcare workers (AOR: 6.87; 95% CI: 3.21-14.72) and/or in polygamous relationship (AOR: 4.40; 95% CI: 1.39-13.98). Those currently pregnant were less likely to have heard of CMV (AOR: 0.17; 95% CI: 0.09-0.32). Commonest source of information was from health workers but correct knowledge of manifestations and preventive measures was poor.

Conclusion: Routine information about CMV infection, its manifestations and prevention should be promoted in women clinics and schools.

INTRODUCTION

Cytomegalovirus (CMV) is one of the causes of congenital infections and has a tendency to lead to childhood disabilities, psychomotor delays, speech and language impairment. Epidemiologically, each year about 28,000 cases of congenital CMV infections occur in the United States out of which nearly 20% of the babies suffer varying degrees of disabilities [1, 2]. Of note, CMV infection is commoner in low- and middle- income countries (LMIC), particularly among those with poor socioeconomic conditions [3].

While an established source of maternal infection is from contact with the saliva or urine of an infected young child [4], congenital infection stems from vertical transmission of the virus from the mother, who was infected just before or during pregnancy, to her fetus [5]. Incidentally, though the virus can cause significant neonatal morbidity, there is currently no vaccine for its prevention neither is there any recommendation for routine maternal or newborn screening. Treatment options are also limited. To therefore safeguard the newborn from the burden of the infection, maternal health education and good hygienic practices is the handy option [4, 6 – 9].

A survey emanating from the West shows that only 14-22% of women have heard of CMV, with a small percentage being conversant with its outcomes, transmission modes, or preventive measures [10, 11]. This brings to question what is likely to be the gap between knowledge and disease burden in a typical LMIC setting reputed to have higher CMV infection rates? Are reproductive age women aware of this infection? What socio-demographic features predict awareness? An insight into theanswers should guide public health campaigns and policy towards orienting and promoting preventive measures against congenital CMV transmission among reproductive age women.

METHODOLOGY

This multicentre, institution-based cross-sectional survey was conducted from December 1, 2015 to January 31, 2016 in Ekiti State, southwest Nigeria. Ekiti State is inhabited by the Yoruba ethnic group who are mostly farmers. The Stateowns a tertiary hospital and some educational institutions.

Eligible participants were reproductive age women, 15-49 years. The participants were drawn from the gynaecological, antenatal and postnatal clinic attendees of the Ekiti State University Teaching Hospital; the female undergraduate students of the Ekiti State University, the School of Nursing and the College of Health Technology. Based on the CMV awareness rate of 22% [10], we calculated that a minimum sample size of 264 respondents is needed for a precision of 0.05 at 95% level of confidence. To ensure robustness, 150 consenting women were conveniently sampled from each of the hospital clinics and the educational institutions, making a total of 900.

An informed consent was obtained from the respondents prior to administration of questionnaires by the research assistants. The study instrument was a pre-validated questionnaire adapted from similar studies [12, 13]. It assessed the knowledge of various congenital infections; the specific source of CMV knowledge, if any; its routes of transmission, manifestation in the newborn and the older children, etc. The questionnaire was however pretested in the study centres to ensure content clarity, comprehensibility and remove ambiguities. The pretested survey was not included in the final analysis.

The data obtained were entered, cleaned and analysed using the Statistical Package for Social Sciences version 17 [SPSS Inc., Chicago, USA]. The results were expressed as descriptive statistics, and multivariate logistic regression analysis was employed for inferential purpose. The level of significance was set at $p < 0.05$.

The study was approved by the Ethics Committee of Ekiti State University Teaching Hospital, Ado-Ekiti.

RESULTS

From the 900 questionnaires distributed, 796 were correctly completed; data analysis and result presentations were therefore based on them. A hundred and seven (13.4%) respondents were between the ages of 15-19 years and 641 (80.5%) were 20-35 years old. More than half, (64%), had no parous experience. Forty (5.0%) had history of stillbirth. Out of the 389 (48.9%) that were married, 20 (2.5%) were in polygamous relationship. Among the 333(41.8%) that were currently pregnant, 10% were in their first trimester, 47% in second trimester and 43% in the last trimester.

Figure 1 shows the comparative knowledge of transmissible perinatal infections among the women. The participants were most familiar with HIV infection (91.3%), followed by Hepatitis B virus infection (83.4%).Knowledge of toxoplasmosis, rubella, CMV and herpes simplex infections were least popular among respondents. Specifically, only about afifth hadever heard of CMV.

Table 1 summarizes sources of information among those aware of congenital CMV. Majority, 120 (70.6%), heard of CMV from healthcare providers, then 41(5.2%) from the media; least source of information was from family or friends. The assessment of the accuracy of CMV knowledge shows that the correctness of it being transmitted sexually, through breastfeeding or by blood contact was above average (Table 2). Erroneously however, close to half of the respondents felt CMV could be transmitted by air or direct skin contact. Only 19% correctly answered that CMV could be contracted by improper hygienic practice when changing diapers.

Correct knowledge of the manifestation of congenital CMV in newborn was below average. The commonest known neonatal manifestation in 41.8% of those aware of the disease was microcephaly. A third or less of women with awareness of CMV rightly knew that congenital CMV does not cause neonatal heart defect, excessive clot formation or a big baby. But for the older children, occurrence of hearing loss, visual problems and poor mental ability from CMV was correctly identified by 50%, 51.2% and 54.7% of the women respectively.

As regards hygienic measures that can prevent acquisition of the infection, washing of hands after changing diapers was properly identified by 58% of women with CMV awareness. Another 52% identified avoidance of kissing of a child as another preventive strategy. Surprisingly, 41% and 38% of the women felt respectively that CMV can be prevented through the use of insecticides or by exercising during pregnancy.

In predicting factors associated with the awareness of CMV infection, logistic regression model (Table 3) showed that the odds of awareness is higher amongthose living in urban residence (AOR: 3.46; 95% CI: 2.18-5.50), who are healthcare workers (AOR: 6.87; 95% CI: 3.21-14.72) and in polygamous relationship (AOR: 4.40; 95% CI: 1.39-13.98). The odds of CMV awareness was significantly lower among those who were currently pregnant (AOR: 0.17; 95% CI: 0.09-0.32).

DISCUSSION

Our study revealed that a small percentage (21.4%) of women of reproductive age in Ekiti State were aware of CMV infection. This is similar to 20% reported by Lim et al [14] among pregnant Singaporean women, and 22% in the US [10]. However, it is greater than 12.5% awareness level in Netherlands [15], but less than 39% among Swiss women though only in reference to the immediate postpartum period [16].

Awareness of CMV was much lower than that of other perinatally transmissible infections such as HIV, Hepatitis B Virus, Syphilis and Gonorrhoea, notwithstanding that its documented prevalence is higher than others among reproductive age women in settings like ours [16 – 20]. Although the few women who were aware of CMV heard from healthcare providers, many respondents still gave inaccurate answers to the questions on transmission, manifestations and prevention. As research findings have suggested, this could be due to inadequate knowledge of CMV by the healthcare workers themselves [13, 21 – 23] and/or ineffective communication of the evidence-based facts about the virus to the women [1].

Since the survey also revealed that women who were or had ever worked as healthcare providers were more likely to be aware of congenital CMV, the observed accurate knowledge gap among reproductive age women may be bridged through enhanced effective medical education and communication training for health workers. In addition, because health education materials have been shown to improve women's knowledge of CMV and encouraged them to adopt preventive behaviours [1], appropriately packaged educational materials on CMVwith a high appeal style may be particularly useful in promoting awareness. The materials should be adapted to local context in order to reach rural dwellers.

Awareness of CMV was significantly poor among those who were currently pregnant. It raises a serious concern as this group is most susceptible to the congenital effect of CMV on babies. It further underscores the need for improved healthcare professionals' awareness of CMV and inclusion of information about it in childbirth discourse for expecting parents [10, 24]. More so, a French study confirmed that simple information on basic hygiene measures given to women at the beginning of pregnancy could significantly reduce the rate of primary CMV infection during pregnancy [7].

Our survey revealed that women who were in a polygamous marriage were more likely to be aware of CMV than those who were not. It may be that the women sought more information about STIs since they knew they shared husbands. A Malawian study showed that as women moved from a monogamous marriage to a polygamous one, they perceived their risk of HIV infection to be three times as high as when they were in a monogamous union [25].

Although our study may be limited by selection bias as the participants were from hospital settings and academic institutions, its strength lies in the adequacy of sampling size that cut across various strata of reproductive age women and a validated questionnaire instrument. The results are therefore generalizable to the women of reproductive age in southwest Nigeria.

In concluding, the index survey revealed that while the awareness of congenital CMV infection is low among women of reproductive age in our environment, many of those who were aware had inaccurate knowledge about the disease. Expectant mothers, non-health professionals and rural dwellers were mostly not in the know of the virus. Scaling up public health campaigns on it is advised. Healthcare workers, the prime source of CMV information, should also have up-to-date knowledge about the infection and be equipped to transmit same to their patients. Information about CMV and its prevention should be routinely given to women receiving prenatal and antenatal care.

AUTHORS' CONTRIBUTIONS:

AJO: Project conceptualization and design, Data acquisition, Drafting of the work and gave final approval to the submitted version. AAI: Project design, Data analysis and interpretation, Critical revision and gave final approval to the submitted version.

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CONFLICT OF INTEREST:

The authors declare that there is no competing interest regarding this work.

Table 1: Source of CMV awareness

Source	Frequency (%)
Healthcare provider	120(15.1)
Media	41(5.2)
Family or friends	9(1.1)
No awareness	626(78.6)

Total awareness 170(21.4%)

Table 2: Knowledge of respondents on transmission, symptoms and hygienic prevention of CMV, n=170

Variable	Yes (%)	No (%)	Do not know (%)
Route of transmission			
Air	15.3	47.1*	37.6
Sexual intercourse	65.9*	16.5	17.6
Kissing	42.9*	34.1	22.9
Changing baby's diapers	19.4*	48.8	31.8
Breastfeeding	57.6*	15.3	27.1

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Direct skin contact	30.0	40.6*	29.4
Blood contact	71.8*	11.2	17.1
Manifestations in newborn			
No symptom	12.9*	40.6	46.5
Convulsion	38.2*	21.8	40.0
Microcephaly	41.8*	22.4	35.9
Congenital heart defect	40.6	21.8*	37.6
Excessive blood clots formation	28.8	22.4*	48.8
Petechiae	30.6*	22.9	46.5
Jaundice	39.4*	23.5	37.1
Baby to big at birth	25.9	31.2*	42.9
Death	41.8	21.2*	37.1
Manifestations in older child			
Hearing loss	50.0*	17.1	32.9
Visual problems	51.2*	19.4	29.4
Obesity	21.8	34.7*	43.5
Heart problems	45.3	19.4*	35.3
Convulsions	41.2*	19.4	39.4
Poor mental ability	54.7*	15.9	29.4
Increased risk of cancer	40.6	18.8*	40.6
Hygienic measures that can prevent CMV			
Not eating raw meat/milk during pregnancy	35.9	34.1*	30.0
Using gloves when handling domestic cat	57.1	18.2*	24.7
Washing hands after changing diapers	57.1*	18.8	24.1
Avoid sharing cutleries with child	47.1*	30.0	22.9
Avoid direct contact with urine, tears or catarrh of child	44.1*	27.1	28.8
Avoid kissing a child directly	51.8*	18.8	29.4
Using insecticides	27.1	40.6*	32.4
Exercise during pregnancy	28.2	37.6*	34.1

**Correct response*

Table 3: Logistic regression analysis of awareness of congenital CMV, n=796

Characteristics	CMV		AOR	95% CI	p value
	Aware	Unaware			
Age (years)					
≤19	14(13.1)	93(86.9)	1.00		
20-35	143(22.3)	498(77.7)	1.71	0.90-3.25	0.10
≥36	13(27.1)	35(72.9)	1.65	0.57-4.80	0.36
Parity					
Nullipara	96(18.9)	411(81.1)	1.00		
1-2	54(23.2)	179(76.8)	1.22	0.56-2.67	0.62
≥3	20(35.7)	36(64.3)	1.11	0.38-3.24	0.84
Previous stillbirth					
No	157(20.8)	599(79.2)	1.00		
Yes	13(32.5)	27(67.5)	0.87	0.40-2.14	0.75
Child less than 5 years old					
No	125(20.7)	478(79.3)	1.00		
Yes	45(23.3)	148(76.7)	1.00	0.52-1.91	0.99
Level of education					
Up to secondary	88(19.8)	357(80.2)	1.00		
Tertiary	82(23.4)	269(76.6)	0.96	0.53-1.75	0.89
Marital status					
Single	84(20.6)	323(79.4)	1.00		
Married	86(22.1)	303(77.9)	1.99	0.84-4.72	0.12
Husband has another wife?					
No	158(20.4)	618(79.6)	1.00		
Yes	12(60.0)	8(40.0)	4.40	1.39-13.98	0.01*
Ever worked as healthcare professional?					
No	139(18.5)	611(81.5)	1.00		
Yes	31(67.4)	15(32.6)	6.87	3.21-14.72	0.01*
Ever worked as a day-care worker?					
No	149(20.5)	578(79.5)	1.00		
Yes	21(30.4)	48(69.6)	1.40	0.74-2.64	0.31
Residence					
Rural	40(14.4)	237(85.6)	1.00		
Urban	130(25.0)	389(75.0)	3.46	2.18-5.50	0.01*
Currently pregnant?					
No	120(25.9)	343(74.1)	1.00		
Yes	50(15.0)	283(85.0)	0.17	0.09-0.32	0.01*

**significant at p<0.05*

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