Knowledge, Attitude and Practices of Pregnant Women Attending University of Ilorin Teaching Hospital with Regard to Rubella

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Abstract

Objective: This study was carried out to clarify the potential health-risk and to determinant the prevalence of antenatal rubella infection in North-Central, Nigeria.

Materials and methods: A descriptive cross-sectional survey was carried out among pregnant women to establish the knowledge, attitude and practices with regards to antenatal rubella infection in early pregnancy in Ilorin. A total of 92 subjects were recruited by simple random selection from the antenatal clinics of the University of Ilorin Teaching Hospital, Nigeria.

Results: Results showed that congenitally defective eyes or ears were regarded as a greater burden to bear than a congenitally defective heart. Pregnant mothers are more likely to abort a congenitally defective fetus before term. Multigravid pregnant women are more likely to have an abortion (X^2 = 12.48, df = 4, p = 0.014), just as married pregnant women were more likely to abort a congenitally defective fetus before term (X^2 = 23.64, df = 4, p = 0.0).

Conclusion: It is a general assumption that Nigeria today is majorly rural, therefore, health educational activities for prompt antenatal reporting in sub-urban Ilorin, and Nigeria as a whole, may be a relevant intervention for pregnant women.

Keywords: Pregnant Women, Rubella, Antenatal, Congenital, Syndrome

Introduction

Rubella virus is a single stranded positive sense RNA virus of the family *Rubiviridae* (1). It is the causative agent for rubella infection in all ages and sexes (2, 3) – the only known natural and reservoir hosts of the virus (3). The spread of virions is through airborne droplets, contact with nose or throat secretions of an infected person (4) and across the placenta of pregnant women (1).

Consequent to the infection of the upper respiratory tract with the rubella virus during the first or second trimester of pregnancy (5, 6), the virus spreads to the local lymph nodes and the monocyte-

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macrophage system where it replicates and coincides with a period of lymphadenopathy (7). This is followed by an established viraemia that spreads the virus to other tissues and the skin, leading to congenital infection via the placenta (8, 7) resulting in neonatal manifestations (9). Acute rubella infections that occur in early pregnancy may induce abortion, miscarriage, stillbirth or multiple birth defects, such as sensorineural hearing loss, cataracts, congenital glaucoma, retinitis, patent ductus arteriosus, and pulmonary artery stenosis (7, 5).

Common symptoms of rubella virus infection (lymphadenopathy, erythematous rash and low-grade fever) have been readily confused with similar illnesses associated with maculopapula rash caused by other common viral and non-viral pathogens or even some drugs (3). As a result, clinical diagnosis of rubella infection is unreliable (10). A definitive diagnosis of rubella can only be established using specific laboratory tests (6, 3). A laboratory-confirmed rubella case is a suspected case with a positive test for rubella-specific IgM (11).

In 1969, a monovalent (inactivated) vaccine and a trivalent vaccine (i.e. MMR) were developed (11, 9), as responses to outbreaks of rubella infections and a pandemic that ensued in the 1960s (7, 2). Since then, the MMR have been accepted by over 123 countries worldwide and introduced into the WHO Expanded Program on Immunization (12) with a primary purpose of vaccination in women to prevent the occurrence of Congenital Rubella Syndrome (CRS) (12, 3).

Although the burden of congenital rubella syndrome is not well characterized in most countries (13, 6), it is estimated that over 100,000 infants are born with CRS each year, mostly occurring in developing countries that are yet to introduce rubella vaccines (13, 14). Studies have shown that although rubella vaccination is contraindicated during pregnancy, no cases of CRS have ever been reported in susceptible pregnant women who received rubella vaccine early in pregnancy. Thus, rubella vaccination during pregnancy has not been proven to be an indication for abortion (5). Recently, a sero-prevalence of 16.3% of antenatal rubella virus infection was recorded in Ilorin, Nigeria (15). There are no scientific data with regards to the knowledge, attitude and practices of the pregnant women in Ilorin and immediate environs to the occurrence of congenital rubella syndrome. Although the 1979 Expanded Program on Immunisation of the Federal Government of Nigeria was re-vitalized in 1999 to reduce disease burden from vaccine-preventable diseases, till date, there is no national program to vaccinate children and women against rubella (15).

This study was carried out to determine the knowledge, attitude and practices of pregnant women in Ilorin regarding rubella virus infection in early pregnancy, and to correlate these with the socio-demographic data of the pregnant women to serve as tools for health planners for possible interventions.

Materials and methods

Ethical approval was obtained from the Research Ethics Committee of the University of Ilorin Teaching Hospital (UITH), Ilorin, Nigeria before this study was carried out. The study aims and objectives, including the terms of consent were explained to each participant in languages they understood, before individual consent was obtained from participants via a duly signed informed consent form.

The study is a descriptive and analytic cross-sectional survey. A total of 92 subjects were recruited. Inclusion criteria for subjects included pregnant women not exceeding 24 weeks of gestation who were registered as attendees at the antenatal clinics of the UITH, Ilorin, Nigeria. Pregnant women above 24 weeks of gestation, including other pregnant women who were not registered at, nor attended the antenatal clinics of the UITH were excluded from the study.

The study was carried out during the rainy season, at the antenatal clinic of the UITH; located in Ilorin South Local Government Area (LGA), Ilorin, Nigeria. Ilorin is an ancient city located 306 km north of Lagos and 500 km southwest of Abuja, the Federal Capital Territory of Nigeria. Kwara state lies in the North Central part of Nigeria, which falls within the African Measles/ Meningitic belt and serves as a gateway between the northern and the southern part of the country (15). It has an estimated population of 847,582 according to the 2006 National Population and Housing Census provisional figures. It is made up of four main ethnic groups, namely: Yoruba, Nupe, Fulani and Baruba (16).

A structured questionnaire containing six sections of a total of 27 open and closed questions was designed to obtain information on the participants' demographic profile, general knowledge, knowledge about rubella, history of antirubella immunization, history of congenital anomalies, and attitude towards congenital anomalies. Participants were recruited by simple random selection and interviewed by trained

research assistants in local languages understood by the respondents.

Data entry was with the SPSS 11 software. Data were statistically tested at a critical level for statistical significance of 95% (p=0.05) using the Chi-square method.

Results

Socio-Demographic Data

A total of 129 pregnant women were invited to participate with a response rate of 71.32%. Of the 92 pregnant women who participated, 73 (79%) were Yorubas, 4 (4.4%) were Igbos, 3 (3.3%) were Nupes and 12 (13.3%) belonged to other ethnic groups, such as: Fulani, Hausa, Bendel, Delta, Zuru, Ebira and Idoma. The pregnant women were between 16 and 50 years of age; it was however observed that most of the pregnant women were within the age brackets of 21–25 years (22.8%) and 26–30 years (39.1%) and were married. Table 1 shows the relationship between the women's age groups and their residential areas in Kwara State. Most of the pregnant women (54; 59%) were Muslims, 30 (33%) were Christians, while

8 (9%) did not specify their religion. Forty-nine (53%) had tertiary education, 23 (25%) had secondary school education, 5 (5%) had only primary education, while 15 (16%) had no form of education. Of the 49, 23, 5 and 15 pregnant women who had tertiary, secondary, primary and no form of education, respectively, 22.4%, 8.7%, 20% and 33.3%, correspondingly, would opt for an abortion if diagnosed to have congenitally malformed fetuses. Thirty-eight (41%) were employed in private organisations or were involved in private businesses, 20 (22%) were civil servants, 20 (22%) were students, while 14 (15%) were unemployed for gain outside their home.

History of Pregnancy

Of the 92 pregnant women, 50 (54.35%) were multigravid, 37 (40.22%) were primigravid, while 5 (5.43%) did not specify. Most of the pregnant women (68; 73.9%) were in their second trimester pregnancy, while 23 (25%) were in the first trimester of pregnancy. Forty-eight (52%) had living children while 39 (42%) did not. Seventy-three (79.3%) had no history of pregnancy loss, 13 (14.1%) had previous abortions – most of which occurred around the 10^{th} week of gestation, while 6 (6.5%) gave no response to the question.

Knowledge and Attitude

Pregnant women with tertiary education were observed to be the only group that had any knowledge about rubella virus infections (see comment above). Of the 92 pregnant women, 19 (20.7%) would abort a pregnancy if diagnosed to be carrying a fetus with congenitally defective eyes and ears, respectively (how would they know?), while 20 (21.7%) would abort their pregnancies if diagnosed to be carrying a fetus with congenitally defective heart. The study also showed that more Muslims would resort to abortion if diagnosed to be carrying a fetus with congenitally defective ears (12; 22.2%), eyes (12; 22.2%) and heart (13; 24.1%), as compared to Christians (6; 20%), diagnosed to be carrying a fetus with congenitally defective ears, eyes and heart, respectively. However,

Table 1: Relationship between Age Groups of the Pregnant Women and their Residential Areas in Kwara State

Areas of residence in Kwara State (LGA)	AGE GROUP IN YEARS						
	Total %	16-20 %	21-25 %	26-30 %	31-35 %	36-40 %	41-50 %
Not specified	12.2	1.1	2.2	6.5	2.2	1.1	.0
Ilorin West	20.7	2.2	6.5	9.8	.0	2.2	.0
Ilorin South	23.9	.0	8.7	13.0	1.1	1.1	.0
Ilorin East	14.2	1.1	1.1	3.3	5.4	3.3	.0
Oyun	7.7	1.1	3.3	3.3	.0	.0	.0
Asa	6.6	.0	3.3	1.1	.0	2.2	.0
Moro	4.4	.0	1.1	3.3	.0	.0	.0
Edu	3.3	.0	.0	2.2	.0	.0	1.1
Ifelodun	4.4	.0	.0	1.1	2.2	1.1	.0
Shao	1.1	.0	.0	1.1	.0	.0	.0
Offa	1.1	.0	.0	1.1	.0	.0	.0

$X^2 = 75.766$, df = 50, p = 0.011

most of the pregnant women neither specified their religion nor responded to the question. This result was not statistically significant p>0.05.

Of the 92 pregnant women, 39 (42.4%) had living children, 48 (52.2%) did not, while 5 (5.4%) did not specify. Of the 19 pregnant women who would opt for aborting a fetus diagnosed to have congenitally defective eyes and ears, respectively, 52.6% had live children, while 47.4% did not (p<0.05) (Table 2). A total of 31.6% were in their first trimester of pregnancy while 68.4% were in their second trimester of pregnancy (p>0.05). However, 54 (58.7%) pregnant women would opt for abortion if diagnosed to be carrying a fetus with congenitally defective eyes and ears, respectively, while 53 (57.6%) would opt for abortion if diagnosed to be carrying a fetus with congenitally defective heart (p<0.05). Of the 54 pregnant women who would opt for abortion if diagnosed to be carrying a fetus with congenitally defective eyes and ears, 38.9% were primigravid while 57.9% were multigravid (p<0.05), similarly, of the 53 pregnant women who would opt for aborting a fetus diagnosed to have a congenitally defective heart, 37.7% were primigravid while 60.4% were multigravid (p<0.05). The study also showed that 20 pregnant women who would opt for aborting a fetus diagnosed to have a congenitally defective heart, 30% of whom were in their first trimester of pregnancy while 70% were in their second trimester of pregnancy (p>0.05) (Table 3).

This study however showed that most of the married women (92.6%) would opt for aborting a fetus diagnosed to have congenitally defective heart, eyes and ears, respectively (p<0.05) (Table 4). However, most of the privately employed pregnant women (26.1%) agreed to opt for abortion (p>0.05).

Table 2: Relationship between having live children and tendency to abort congenital defective pregnancies

		Live Children								
		No response			Yes			No		
Abort pregnancy if		Count	Row N	Table N	Count	Row N	Table N	Count	Row N	Table N
Congenitally defective eye	NR	4	21.1%	4.3%	7	36.8%	7.6%	8	42.1%	8.7%
	Yes	0	.0%	.0%	10	52.6%	10.9%	9	47.4%	9.8%
	No	1	1.9%	1.1%	22	40.7%	23.9%	31	57.4%	33.7%
Congenitally defective ear	NR	4	21.1%	4.3%	7	36.8%	7.6%	8	42.1%	8.7%
	Yes	0	.0%	.0%	10	52.6%	10.9%	9	47.4%	9.8%
	No	1	1.9%	1.1%	22	40.7%	23.9%	31	57.4%	33.7%
Congenitally defective heart	NR	4	21.1%	4.3%	7	36.8%	7.6%	8	42.1%	8.7%
	Yes	0	.0%	.0%	10	50.0%	10.9%	10	50.0%	10.9%
	No	1	1.9%	1.1%	22	41.5%	23.9%	30	56.6%	32.6%

NR: No response $X^2 = 12.215$, df = 4, p = 0. .016

Table 3: Relationship between type of pregnancy and tendency to abort congenital defective pregnancies

		Pregnancy type								
		No response			Primi gravidity			Multi gravidity		
Abort pregnancy if		Count	Row N	Table N	Count	Row N	Table N	Count	Row N	Table N
Congenitally defective eyes	NR	4	21.1%	4.3%	8	42.1%	8.7%	7	36.8%	7.6%
	Yes	1	1.9%	1.1%	21	38.9%	22.8%	32	59.3%	34.8%
	No	0	.0%	.0%	8	42.1%	8.7%	11	57.9%	12.0%
Congenitally defective ears	NR	4	21.1%	4.3%	8	42.1%	8.7%	7	36.8%	7.6%
	Yes	1	1.9%	1.1%	21	38.9%	22.8%	32	59.3%	34.8%
	No	0	.0%	.0%	8	42.1%	8.7%	11	57.9%	12.0%
Congenitally defective heart	NR	4	21.1%	4.3%	8	42.1%	8.7%	7	36.8%	7.6%
	Yes	1	1.9%	1.1%	20	37.7%	21.7%	32	60.4%	34.8%
	No	0	.0%	.0%	9	45.0%	9.8%	11	55.0%	12.0%

NR: No response X2 = 12.481, df = 4, p = 0.014

Table 4: Relationship between marital status and tendency to abort congenital defective pregnancies

		Marital status								
		Not specified			Single			Married		
Abort pregnancy if		Count	Row N	Table N	Count	Row N	Table N	Count	Row N	Table N
	NR	5	26.3%	5.4%	5	26.3%	5.4%	9	47.4%	9.8%
Congenitally defective eye	Yes	2	3.7%	2.2%	2	3.7%	2.2%	50	92.6%	54.3%
	No	0	.0%	.0%	1	5.3%	1.1%	18	94.7%	19.6%
	NR	5	26.3%	5.4%	5	26.3%	5.4%	9	47.4%	9.8%
Congenitally defective ear	Yes	2	3.7%	2.2%	2	3.7%	2.2%	50	92.6%	54.3%
	No	0	.0%	.0%	1	5.3%	1.1%	18	94.7%	19.6%
	NR	5	26.3%	5.4%	5	26.3%	5.4%	9	47.4%	9.8%
Congenitally defective heart	Yes	2	3.8%	2.2%	2	3.8%	2.2%	49	92.5%	53.3%
	No	0	.0%	.0%	1	5.0%	1.1%	19	95.0%	20.7%

NR: No response X2 = 23.64, df = 4, p = 0.0

Discussion

The aim of this study was to establish baseline data on the knowledge attitude and practice of congenital rubella infection in Ilorin. Participants recruited for this study were pregnant women of diverse ethnicity in their first and second trimesters of pregnancy. The observable elevated number of respondents from Ilorin South Local Government Area may be due to the fact that UITH is a Tertiary Health Institution that renders outpatient services.

The observed high number of pregnant women with tertiary education may be as a result of the fact that in the rural areas in Nigeria, primary and secondary school girls who become pregnant are often withdrawn from schools and prevented from continuing with their education as a form of deterrence to teenage pregnancies. Thus, the desire to abort may be greater amongst teenagers and school girls.

Although most of the pregnant women who participated had children (52%), some reported pregnancy losses that occurred during organogenesis. This may be a reflection of the teratogenic effect of rubella infection or the effect of other teratogenic agents of the TORCH complex on first trimester pregnancies (17).

Despite the high level of literacy observed among the pregnant women, there was an observed low knowledge of rubella. This may be adducible to the fact that rubella virus screenings are not carried out in antenatal clinics in Nigeria. In addition, rubella vaccines (single or in combination) are not components of the Nigerian Extended Program on Immunisation and is, therefore, not readily available in most health facilities. However, such vaccines are only made available on request, usually as a migratory requirement for persons intending to travel to countries that no longer have rubella virus in circulation.

As reported by the WHO (2000), the elimination of rubella may be achieved through vaccination of infants and young children coupled with surveillance that ensures immunity in women of child bearing age. In that regard, it is expected that the level of knowledge of rubella amongst various age groups will be high in countries where routine immunisation against rubella virus infections are carried out, contrary to that obtained in this study.

Pregnant women who are infected with Rubella virus in the first and second trimesters of pregnancy are at risk of having a congenitally defective fetus (5, 8). Early diagnosis has been made possible by PCR testing of the chorionic villi (5). It was, however, observed that the pregnant women regarded a congenitally defective heart of the fetus most unbearable as 21.7% of the 92 pregnant women would opt for an abortion if diagnosis were possible to reveal the state of the fetus. Similarly, 20.7% would opt for an abortion if diagnosis revealed congenitally defective eyes or ears, respectively. This may be a reflection of their inability to cope with children of such deformities.

It was also observed that more Muslim pregnant women resorted to abortions than Christians ($p>0.05$), although reasons were not given for reporting that they would opt for an abortion, which is presently illegal, but not enforced in Nigeria. It was also observed that fetuses with congenitally defective eyes or ears were regarded as a greater burden for the

pregnant women to bear (57.6%) than congenitally defective heart ($p<0.05$).

Further analysis revealed that pregnant women with children intended to abort congenitally defective fetus before term as compared to pregnant women without children if diagnosed to be carrying such fetus ($p<0.05$).

Although reasons for their answers are not fully known, some of the respondents revealed that the social, religious and/ or financial implications and emotional demands of having a child with the rubella triad defects would be too much to bear. However, none of the pregnant women reported having a child with any congenital defect, which were also considered to be a curse.

It is a general assumption that Nigeria today is 70% rural, therefore, health educational activities for prompt antenatal reporting in sub-urban Ilorin, and Nigeria as a whole, may be a relevant intervention for pregnant women. As a result of the high incidence of pregnancy losses reported during organogenesis, it may be beneficial to establish the prevalence of congenital rubella syndrome in Nigeria. Such interventions should be accompanied with antenatal rubella screenings tests with adequate counselling for pregnant women before such pregnancies come to term.

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References

1. Deka D, Rustgi R, Singh S, Roy KK, Malhotra N . Diagnosis of acute rubella infection during pregnancy. J Obstet Gynecol India 2006; 56: 44-6.
2. Plotkin SA, Orenstein WA. Rubella in Vaccines. 3rd ed. Philadelphia, Pa: WB Saunders Co, 1999.
3. Hobman T, Chantler JK. Rubella virus. In: Fields BN, Knipe DM, Howley PM (eds), Fields Virology, 5th edn , Philadelphia: Lippincott Williams & Wilkins, 2007.
4. Brooks GF, Carroll KC, Butel JS, Morse SA, eds. Paramyxoviruses and Rubella Virus. In: Jawetz, Melnick and Adelberg's Medical Microbiology, 23th edn, USA: McGraw-Hill, 2004.
5. WHO. Manuals for the laboratory diagnosis of measles and rubella virus infection, 2nd edn, Geneva: WHO, 2007.
6. Ho-Terry L, George M, Terry Z, Londesborough P. Diagnosis of foetal rubella virus infection by polymerase chain reaction. Journal of General Virology 1990; 71: 1607-11.
7. Katow S. Rubella virus genome diagnosis during pregnancy and mechanism of congenital rubella. Intervirology 1998;41:163-9.
8. Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA, eds. Togaviruses and flaviviruses. In Medical Microbiology. 4th ed. St. Louis: Mosby; 2002.
9. Dontigny L, Arsenault MY, Martel MJ, Biringer A, Cormier J, Delaney M, Et al. Rubella in pregnancy. J Obstet Gynaecol Can 2008 ;30:152-68.
10. Banatvala JE, Brown DW. Rubella. Lancet 2004;363:1127-37.
11. Robertson SE, Featherstone DA, Gacic-Dobo M, Hersh BS. Rubella and congenital rubella syndrome: global update. Rev Panam Salud Publica 2003;14**:**306-15.
12. WHO. WHO–recommended standards for surveillance of selected vaccine-preventable diseases. Geneva: WHO, 2003.
13. Cutts FT, Robertson SE, Diaz-Ortega JL, Samuel R. Control of rubella and congenital rubella syndrome (CRS) in developing countries, part 1: burden of disease from CRS. Bulletin of the World Health Organization, 1997;75:55-68.
14. WHO. Weekly epidemiological record. 2000; 75: 161–72.
15. Agbede OO, Adeyemi OO, Olatinwo AWO, Salisu TJ, Kolawole OM. Sero-prevalence of antenatal rubella in UITH. The Open Public Health Journal 2011;4:10-6.
16. About Kwara State. Kwara State Government. Retrieved 15 July 2012 at, http://www.kwarastate.gov.ng
17. Carol MP. Pathophysiology Concepts of Altered Health States 4th edn, Philadelphia: JB, Lippincott Company, 1994.