Masresha BG, Shibeshi M, Kaiser R, Luce R, Katsande R, Mihigo R. Congenital Rubella Syndrome in The African Region - Data from Sentinel Surveillance. J Immunol Sci (2018); S (022): 145-149

Journal of Immunological Sciences

Journal of Immunological Sciences

Research Article Open Access

Congenital Rubella Syndrome in The African Region - Data from Sentinel Surveillance

Balcha Masresha[1]*, Messeret Shibeshi[2], Reinhard Kaiser[4], Richard Luce[3], Regis Katsande[1], Richard Mihigo[1]

[1]WHO Regional Office for Africa. Brazzaville, Congo
[2]WHO Inter-country Support Team for East and Southern Africa. Harare, Zimbabwe
[3]WHO Inter-country Support Team for Central Africa. Libreville, Gabon
[4]Formerly with the WHO Inter-country Support Team for East and Southern Africa. Harare, Zimbabwe

Article Info

Article Notes
Published: August 02, 2018

***Correspondence:**
Dr. Balcha G Masresha, WHO Regional Office for Africa, Brazzaville, Congo; Telephone No: +263 77 503 5369; Email: masreshab@who.int.

Keywords:
Congenital Rubella Syndrome
Sentinel Surveillance
African Region

ABSTRACT

Introduction: Rubella is a mild febrile rash illness caused by the rubella virus. The most serious consequence of rubella is congenital rubella syndrome (CRS), which occurs if the primary rubella infection occurs during early pregnancy, with subsequent infection of the placenta and the developing fetus.

Methods: WHO supported countries to set up sentinel surveillance for CRS using standard case definitions, protocols, and case classification scheme. This descriptive analysis summarises the data from 5 countries which have been regularly reporting.

Results : A total of 383 suspected cases of CRS were notified from the 5 countries as of December 2016, of which 52 cases were laboratory confirmed and 67 were confirmed on clinical grounds.

The majority (43%) of confirmed CRS cases were in the age group 6 – 11 months. The most common major clinical manifestation (Group A) among the confirmed cases is congenital heart disease (72%) followed by cataracts (32%) and glaucoma (10%).

Discussion and conclusions: The number of years of reporting from these sentinel sites is too short to describe trends in CRS occurrence across the years. However, the limited surveillance data has yielded comparable information with other developing countries prior to introduction of rubella vaccine. As more countries introduce rubella vaccine into their immunisation programs, there is a need to ensure that all rubella outbreaks are thoroughly investigated and documented, to expand sentinel surveillance for CRS in more countries in the Region, and to complement this with retrospective record reviews for CRS cases in selected countries.

Introduction

Rubella is a mild febrile rash illness caused by the rubella virus. In childhood, the illness is characterized by a transient, erythematous rash, low grade fever, post-auricular and sub-occipital lymphadenopathy, sore throat, red eyes, headache, malaise and anorexia[1, 2].

The most serious consequence of rubella is congenital rubella syndrome (CRS), which occurs if the primary rubella infection occurs during early pregnancy, with subsequent infection of the placenta and the developing fetus. The risk for congenital defects has been estimated at 90% for maternal infection before 11 weeks of gestation. Nerve deafness is the single most common finding among infants with CRS. Unilateral or bilateral cataracts are the most serious eye finding, occurring in about a third of infants. Patent ductus arteriosus is the most frequently reported cardiac defect[1, 3].

A laboratory-confirmed CRS case is an infant with a positive blood test for rubella IgM who has clinically-confirmed CRS. An infant with a positive blood test for rubella IgM who does not have clinically confirmed CRS is classified as having congenital rubella infection[18].

The surveillance and laboratory information which is captured using a standard case investigation form is later entered into a computerized database at each sentinel site, and is shared with WHO on a monthly basis. We reviewed the sentinel surveillance data submitted from the 4 countries (Burkina Faso, Rwanda, Zimbabwe, Zambia, Tanzania) that had regularly shared data with the WHO. We used descriptive analysis to characterize the demographic and clinical characteristics of the cases.

Results

A total of 383 suspected cases of CRS were notified from the 5 countries as of December 2016. Tanzania reported 152 suspected cases while 143 were reported from Zimbabwe. Fifty five percent of the suspected cases (211 out of 383) were classified as discarded (not CRS cases) as per the case classification algorithm, while 52 were laboratory confirmed and 67 were confirmed on clinical grounds. (Table 1)

Table 1. Classification of suspected cases of CRS by country. 2012 – 2016.

	Clinically confirmed CRS	Lab confirmed CRS	Congenital Rubella Infection	Discarded	Not classified	TOTAL
Burkina Faso	0	0	0	28	41	69
Rwanda	0	0	0	5	0	5
Tanzania	48	17	0	83	4	152
Zambia	3	3	0	0	8	14
Zimbabwe	16	32	0	95	0	143
TOTAL	67	52	0	211	53	383

The clinical picture of the suspected cases indicates that 51% were reported with a congenital heart disease, while 22 had cataracts. Hearing impairment was reported in only 5% of the suspected cases. Among the group B clinical signs, microcephaly was reported in 32% and neonatal jaundice in 30%. (Table 2). A history of maternal febrile rash during pregnancy was elicited in only 41 (10.7%) of the suspected cases.

Table 2. Clinical signs in 383 suspected CRS cases. 2012 – 2016. Sentinel sites in 5 countries in AFR.

Clinical sign		Number of cases	% cases
Group A	Congenital Heart Disease	195	51%
	Cataracts	83	22%
	Pigmentary retinopathy	26	7%
	Glaucoma	22	6%
	Hearing impairment	20	5%
Group B	Microcephaly	121	32%
	Jaundice	113	30%
	Splenomegaly	80	21%
	Purpura	54	14%
	Mental retardation	16	4%
	Radiolucent bone disease	10	3%
	Meningo-encephalitis	7	2%

Table 3. Confirmed cases of CRS by country by year.

	2012	2013	2014	2015	2016	TOTAL
Burkina Faso				0	0	0
Rwanda				0	0	0
Tanzania			20	44	1	65
Zambia			1	5	0	6
Zimbabwe	14	6	2	20	6	48
Total	14	6	23	69	7	119

Out of the 119 confirmed CRS cases, 65 were from Tanzania and 48 were reported from Zimbabwe, while Burkina Faso and Rwanda did not have any confirmed case. (Table 3) Burkina Faso did not classify 41 of the reported 69 cases, and these make up the majority of the 53 cases that were not classified at all in the databases from the respective sentinel surveillance sites. (Table 1) The majority (43%) of confirmed CRS cases were in the age group 6 – 11 months, while 21 were newborns. (Table 4)

Table 4. Confirmed cases of CRS by age group. 2012 – 2016. Sentinel surveillance in 5 countries.

	0 - 28 days	1 - 5 months	6 - 11 months	1 year or more of age	Age missing	Total
Burkina Faso	0	0	0	0	0	0
Rwanda	0	0	0	0	0	0
Tanzania	5	15	44	0	1	65
Zambia	2	0	3	0	1	6
Zimbabwe	14	20	4	2	8	48
Total	21	35	51	2	10	119

The most common major clinical manifestation (Group A) among the confirmed cases is congenital heart disease (72%) followed by cataracts (32%) and glaucoma (10%). Among the Group B manifestations, microcephaly and splenomegaly were detected in 34% and 25% of the confirmed cases respectively. (Table 5)

Table 5. Clinical presentation in the 119 confirmed cases of CRS in 5 countries. 2012 – 2016.

Clinical sign		Number of cases	% cases
Group A	Congenital Heart Disease	86	72%
	Cataracts	38	32%
	Glaucoma	12	10%
	Hearing impairment	6	5%
	Pigmentary retinopathy	1	1%
Group B	Microcephaly	40	34%
	Splenomegaly	30	25%
	Jaundice	16	13%
	Purpura	14	12%
	Mental retardation	10	8%
	Meningo-encephalitis	4	3%
	Radiolucent bone disease	0	0%

References

1. Mason WH, Rubella, Kliegman RM, et al. Eds. Nelson Textbook of Pediatrics, 19th Edition. 2011; P 1075 – 1078.
2. Lambert N, Strebel P, Orenstein W, et al. Rubella. *Lancet.* 2015; 385: 2297–307.
3. Banatvala JE, Brown DW. Rubella. *Lancet.* 2004; 363: 1127–37.
4. World Health Organisation. Manual for the laboratory diagnosis of measles and rubella virus infection. Second edition. August 2007. WHO/IVB/07.01.
5. World Health Organization. Introducing rubella vaccine into national immunization programmes: a step by step guide. 2015. WHO/IVB/15.07/
6. Nsambu MN, Coulibaly T, Donnen P, et al. Fréquence de la rubéole à Kinshasa de 2010 à 2012, République Démocratique Du Congo: données issues du système de surveillance de la rougeole. *Santé publique.* Volume 26 / N°3: 393- 397.
7. Goodson JL, Masresha B, Dosseh A, et al. Rubella Epidemiology in Africa in the Prevaccine Era, 2002–2009. *J Infect Dis.* 2011; 203: S215–S225.
8. Mitiku K, Bedada T, Masresha B, et al. The Epidemiology of Rubella Disease in Ethiopia: Data From the Measles Case-based Surveillance System. *J Infect Dis*. 2011; 203: S239–S242.
9. Chimhuya S, Manangazira P, Mukaratirwa A, et al. Trends of rubella incidence during a 5-year period of case based surveillance in Zimbabwe. *BMC Public Health.* 2015; 15: 294. DOI 10.1186/s12889-015-1642-4.
10. Farra A, Pagonendji M, Manikariza A, et al. Epidemiology of primary rubella infection in the Central African Republic: data from measles surveillance, 2007–2014. *BMC Infectious Diseases.* 2016; 16: 505. DOI 10.1186/s12879-016-1842-2.
11. Tahita MC, Hübschen JM, Tarnagda Z, et al. Rubella seroprevalence among pregnant women in Burkina Faso. *BMC Infectious Diseases.* 2013; **13**: 164. https://doi.org/10.1186/1471-2334-13-164]
12. Jonas A, Cardemil CV, Beukes A, et al. Rubella immunity among pregnant women aged 15–44 years, Namibia, 2010. *Int J Infect Dis.* 2016; 49: 196–201.
13. WHO Regional Committee for Africa. Measles Elimination by 2020: A Strategy for the African Region. AFR/RC61/R1. Available at: http://www.afro.who.int/en/sixty-first-session.html Last accessed February 2017.
14. World Health Organisation, Regional office for Africa. Regional Strategic Plan for Immunization 2014-2020. Brazzaville Congo: 2015.
15. World Health Organisation. Position paper on rubella vaccine. *Wkly Epidemiol Rec* No 29. 2011; 86: 301–316.
16. GAVI support for measles and measles-rubella vaccine. http://www.gavi.org/support/nvs/measles-rubella/ last accessed on 14 Sept 2017.
17. Rubella vaccine introduction in AFR. In "Progress with measles elimination in the WHO African region". Paper presented to the Mid Term Review of the Regional Strategic Plan for Immunisation. Sept 2017.
18. World Health Organization. Regional Office for Africa. African Regional guidelines for measles and rubella surveillance- Revised April 2015. Available at http://www.afro.who.int/index.php?option=com_docman&task=doc_download&gid=10814&Itemid=2593, Last accessed 17 April 2017.
19. Annual reports of CRS cases to the WHO, by country by year. http://apps.who.int/immunization_monitoring/globalsummary/timeseries/tsincidencecrs.html last accessed on Sept 16, 2017.
20. Emilia Vynnycky, Elisabeth J Adams, Felicity T Cutts, et al. Seroprevalence and Immunisation Using Coverage Data to Estimate the Global Burden of Congenital Rubella Syndrome, 1996-2010: A Systematic Review. PLoS ONE. 2016; 11(3). e0149160. doi:10.1371/journal. one.0149160
21. Alleman MM, Wannemuehler KA, Hao L, et al. Estimating the burden of rubella virus infection and congenital rubella syndrome through a rubella immunity assessment among pregnant women in the Democratic Republic of the Congo: Potential impact on vaccination policy. *Vaccine.* 2016; 34: 6502–6511. http://dx.doi.org/10.1016/j.vaccine.2016.10.059
22. World Health Organisation. WHO–recommended standards for surveillance of selected vaccine-preventable diseases. Revised July 2008. WHO/V&B/03.01 http://apps.who.int/iris/bitstream/10665/68334/1/WHO_V-B_03.01_eng.pdf last accessed 17 Sept 2017.
23. Adam O, El Hussein A, El Eragi A, et al. Primary investigation of 31 infants with suspected congenital rubella syndrome in Sudan. Clin Microbiol Infect. 2010;16(6):678-82.
24. Kyaw Zin Thant. Active surveillance for congenital rubella syndrome in Myanmar: *Bull WHO.* 2006; 84: 12 – 20
25. Thant KZ, Oo WM, Myint TT, et al. Congenital rubella syndrome (CRS) in Vietnam 2011–2012: CRS epidemic after rubella epidemic in 2010–2011. *Vaccine.* 2015; 33: 3673–3677. http://dx.doi.org/10.1016/j.vaccine.2015.06.035
26. Durski KN, Tituli C, Ogaoga D, et al. An outbreak investigation of congenital rubella syndrome in Solomon Islands, 2013. *Western Pac Surveill Response J*. 2016; 7(1): 10-13.
27. Abernathy ES, Hübschen JM, Muller CP, et al. Status of Global Virologic Surveillance for Rubella Viruses. *J Infect Dis.* 2011; 204: S524–S532.
28. Mulders MN, Rota PA, Icenogle JP, et al. Global measles and rubella laboratory network support for elimination goals, 2010–2015. *Wkly Epidemiol rec*. 2016; No 18, 91: 237–248.