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RESEARCH ARTICLE

COMPLIANCE WITH TETANUS TOXOID IMMUNIZATION SCHEDULE BY WOMEN USING THE IMMUNIZATION SERVICES AT THE UNIVERSITY OF PORT HARCOURT TEACHING HOSPITAL: A LESSON FOR CHILD IMMUNIZATION SERVICE PROVIDERS.

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ABSTRACT

Background: Maternal and neonatal tetanus (MNT) are major contributors to morbidity and mortality amongst women and neonates in Nigeria, with neonatal tetanus accounting for 20% of all neonatal deaths. MNT are preventable through immunization and hygienic birth practices. WHO recommends two doses of tetanus toxoid (TT) for pregnant women and three doses for women of child bearing age in high risk areas. **Aim**: To determine TT coverage rates amongst women using the University of Port Harcourt Teaching Hospital immunization centre. **Method**: Data in the TT immunization registers of UPTH kept from January 2011 to January 2015 (a period of 5 years) were reviewed. Information obtained included year of registration, vaccination dates, and intervals between consecutive doses. Women were considered eligible for a dose of TT if interval between consecutive doses was at least 4weeks between TT1 and TT2, 6months between TT2 and TT3, and 1 year between TT3 and TT4, and TT4 and TT5 respectively and to have defaulted if they did not receive vaccines for which they were eligible well after the minimum interval. Vaccines were considered invalid if received before the minimum interval between doses. Data were entered using Microsoft Excel spread sheet and analyzed using SPSS version 20.0. **Results**: During the 5year period, the number of women registered ranged from 1158-1625. One thousand, one hundred and fifty eight (71.3%) women received TT2 at the right interval, whereas 308 (19%) defaulted and 15(1.2%) were not eligible.16 (1.6 %,) received invalid doses while 137 (8.4%) had TT2 but were defaulters. Default rates increased with consecutive doses. Only 53 (3.3%) received TT1 – TT5 at appropriate intervals, 1266 (77.9%) defaulted, while 293 (18%) were not eligible for TT2-TT5. **Conclusion:** Tetanus toxoid coverage rates are low in our environment. The 5 dose tetanus toxoid schedule remain key to preventing maternal and neonatal tetanus. Concerted efforts should be made by all stakeholders to improve TT coverage using this schedule.

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INTRODUCTION

Maternal and neonatal tetanus (MNT) are major contributors to morbidity and mortality amongst women and neonates in many developing countries including Nigeria (http://www.unicef.org/ Corporate partners/files/Approved MNT Report 05.06.10.pdf). Of the 5 million babies born annually, 240,000 (4.8%) die within the first 4 weeks of life (Federal Ministry of Health Situation Analysis, 2005). Neonatal tetanus accounts for 7% of these deaths globally, while accounting for up to 20% of all neonatal deaths in Nigeria (Lawn, 2005; UNICEF, 2000).

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Nigeria is one of the 27 countries contributing to 90% of the global burden of neonatal tetanus and is indeed one of the 8 countries accounting for 74% of the global burden of the disease (UNICEF, 2000). In 1989, the World Health Assembly (WHA), called for global elimination of neonatal tetanus (NNT) by the year 1995 using a twofold strategy which consisted of achieving high levels of immunization coverage in women of childbearing age with Tetanus Toxoid and strengthening efforts to raise the proportion of clean deliveries (clean hands, clean delivery surface and clean cutting and care of the umbilical cord). [4,5]By December 1999, 104 out of the 161 developing countries have achieved elimination but due to problems in the remaining countries including Nigeria, UNICEF, the WHO and the United Nation Population Fund (UNFPA) agreed a new five-year strategic plan, setting the year 2005 as target date for Worldwide elimination (UNICEF, 2000; WHO).

This second target was also missed by most developing countries, especially those in the African region, Nigeria inclusive and this was blamed on lack of resources. NNT is eliminated when the incidence of the disease reduces to less than one case per 1000 live births in every district of every country (UNICEF, 2000; WHO, 2004). Maternal tetanus (MT) i.e. tetanus which strikes women during pregnancy or within 6 weeks of termination of pregnancy was added to the elimination goal, in recognition of its threat to mothers as well as babies during pregnancy and delivery (UNICEF, 2010; UNICEF).

Although, it has not been defined, the achievement of NNT elimination is being used as a proxy for MT elimination (UNICEF, 2010; UNICEF). MNT is easily preventable through immunization and hygienic birth practices (UNICEF). The WHO recommends two doses of tetanus toxoid (TT) for pregnant women during antenatal care and three doses to all women of child bearing age in high risk areas (UNICEF, 2010; UNICEF). Three doses will protect the woman for up to 5 years and will pass on immunity to their newborns for the first few months of life (UNICEF, 2010; UNICEF). The aim of this study was to determine the compliance of women with the schedules for TT immunization.

Materials and methods: TT vaccine records of 1625 women of child bearing age attending immunization centre of the University of Port Harcourt Teaching Hospital were reviewed over a five year period (2011-2015). Data were obtained from the immunization records routinely kept at the immunization centre of the Hospital. Information obtained included year of registration, dates of receiving each vaccine and intervals between consecutive doses of TT vaccines.

Women were considered eligible for a vaccine if the interval between each consecutive vaccine was within the recommended interval at least 4 weeks, 6 months and 12 months for TT1-2, TT2-3, TT3-4 and TT4-5 respectively. They were considered to have defaulted if they failed to receive a vaccine for which they were eligible or received it long after the minimum interval. Immunization status was complete if they had received all valid dose of vaccines for which they were eligible and full if they had received all TT doses as per the immunization schedule. Vaccines were considered invalid if they were received before the minimum acceptable interval. Data was analyzed using SPSS version 20.0 statistical software. Immunization status was analyzed for TT2 and TT5.

RESULTS

A total number of 1625 immunisation records were reviewed. Most of the women were pregnant women registered for antenatal care in the hospital. Tables 1- 4 show vaccine intervals for TT1-2, TT2-3, TT3-4, and TT4-5 respectively. Default rates increased with each consecutive dose of the vaccine. For TT2, 1158 (71.1%) of the women received valid doses, 308 (19%) defaulted, while 16 (1.6%) received invalid doses. For TT5, however, 1266 (77.9%) defaulted, 293 (18%) were not eligible, while only 53 (3.3%) received TT1 – TT5 at appropriate intervals. Table 5 summarises default rates for TT2-5. As already highlighted, over 70% of the women were fully immunized for TT2 while less than 5% of them were fully immunized for TT5.

Table 1. Vaccine intervals TT1-2

Interval	No of women	Percent
4-5 weeks	1158	71.2
> 5 weeks	143	8.8
Default	308	19
Invalid	16	1.0
Total	1625	100

Table 2. Vaccine intervals for TT2-3

Interval	No of women	Percent
Not eligible	7	0.4
6- 7.5 months	555	34.2
>7.5 months	122	7.5
Default	885	54.5
Invalid	56	3.4
Total	1625	100

Table 3. Vaccine intervals for TT3-4

Interval	No of women	Percent
Not eligible	237	14.6
12-15 months	158	9.8
>15 months	30	1.8
Default	1188	73.1
Invalid	12	0.6
Total	1625	100

Table 4. Vaccine intervals for TT4-5

Interval	No of women	Percent
Not eligible	293	18
12-15 months	53	3.3
> 15months	8	0.5
Default	1266	77.9
Invalid	5	0.3
Total	1625	100

Table 5. Default rates for TT2 – 5

Vaccine	Default rate (%)
TT2	19
TT3	54.5
TT4	73.1
TT5	77.9

DISCUSSION

Tetanus toxoid coverage rates are low in the University of Port Harcourt Teaching Hospital for the 5 dose schedule. The steady decline in immunization rates with each consecutive vaccine is a reflection of the general situation of the country where data is only often available for TT2, whereas data for TT5 are scant or nonexistent (Alex-Hart, 2015; Sule, 2014; Nwokeukwu, 2014; Akani, 2004). A study done previously in Rivers State identified certain factors responsible for high default rates; listed amongst these were: lack of awareness of multiple doses, missed opportunities and long waiting time. These factors may still be contributors to high default rates in this study. The TT2 coverage rate of 71.1% reported in this study is higher than the overall national coverage rate of 48%. (National Population Commission, 2014). The rate in our Hospital is not surprising and is in fact low considering its status as a tertiary institution where coverage rates should approach 100%. Previous studies (Blencowe, 2010; WHO, 2006; Abuwa, 1997) have reported higher coverage rates for TT2 and lower incidence of NNT amongst women with good

access to Health Services. This in fact leaves out those with poor access, and whose babies are at higher risk for NNT. An earlier study done in UPTH showed an annual admission rate of 30 -50 babies with neonatal tetanus, most of whom were born in and around Port Harcourt but outside the Hospital (Akani, 2004). This shows that coverage rates are lower outside the hospital. The place of attendance for ANC, and delivery and confinement outside medical establishments increased the risk for NNT.

The 5 dose schedule recommended for women of child bearing age (WCBA) has proven impractical and ineffective and so the focus is now only on pregnant women. The very low coverage rates of 3.3% for TT5 recorded in this study is alarming and questions the feasibility of the 5 dose schedule even amongst pregnant women. As part of the WHO strategy to accelerate elimination of NNT, the high risk approach was recommended (WHO, 2016). This approach achieves elimination rapidly and cost effectively and includes immunization of all WCBA in high risk areas with 3 appropriately spaced TT vaccines with special focus on those with zero dose (WHO, 2016). This approach is supposed to provide time for improvement of health infrastructure to the point where protection against MNT becomes routine. Where this does not happen, which is likely in our environment, an accumulation of susceptible women occurs, and another campaign targeting these women may be needed in 5-7 years. Even where elimination of MNT has been achieved with the high risk approach, strengthening routine immunization is a major key to sustenance.

The focus therefore should be towards measures to ensure effectiveness of routine immunization with the 5 dose schedule. This requires the concerted efforts of several stakeholders; adolescents, WCBA including pregnant women, healthcare providers at all levels, education and other sectors. In agreement with previous authors (Alex-Hart, 2015; Sule, 2014; Akani, 2004) it is recommended that there is a need for women to be informed about the 5 dose schedule at every contact with health personnel. Furthermore, this schedule which spans a period of 3 years should be incorporated into the School Health Programme. If it is commenced in the first year of secondary school (or better still in the last two years of primary school to increase coverage), then most adolescent girls would be protected for life before their first pregnancy. This would also help to improve awareness and acceptability.

Administration of multiple dose vaccine like TT is expected to be in accordance with the recommended interval between the doses to achieve optimal protection (Centers for Disease Control and Prevention, 2019). However, the study revealed invalid intervals (too short) between the administrations of the doses of the TT. These invalid doses occurred with TT2 to TT5. Doses that are administered too close together could lead to sub-optimal immune responses (Centers for Disease Control and Prevention, 2019). Doses of any vaccine administered greater than five days earlier than the minimum interval is not expected to be counted as valid and should be repeated (Centers for Disease Control and Prevention, 2019). However, the study did not reveal if the invalid doses were repeated. A similar study also reported administration of invalid doses to recipients of vaccine antigens (Stokley, 2008). In conclusion, tetanus toxoid coverage rates are low in our environment. The 5 dose tetanus toxoid schedule remains a key factor in preventing maternal and neonatal tetanus. Concerted efforts should be made by all stakeholders to improve TT coverage using this schedule. We therefore recommend that routine immunisation should be strengthened. There is a need for women of childbearing age to be informed of the 5 dose schedule at every contact with the health facility. Immunisation services should be incorporated into the school health programme.

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