

Full Length Research Paper

Analysis of the correlation between morning sickness and rhesus status in pregnant women in Nigeria

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Erythroblastosis fetalis is a haemolytic disease of the rhesus negative [Rh-] mother after the first gestation of a [Rh+] neonate. Morning sickness (MS) describes a series of neuro-endocrine disturbances characterized by nausea, hyperemesis gravidarum, nutritional selectivity, general debility, confusion and sometimes coma, especially in early pregnancy. It may be mild, moderate or severe and if managed unprofessionally may lead to teratogenicity, recurrent abortion or persistent neonatal death. The influence of the Rhesus negative factor on the intensity of MS was studied in 100 [Rh-] mothers. Another sample of 100 mothers served as control. The studied women were drawn from different social and tribal backgrounds. The study was conducted via questionnaires, personal interviews and medical history of the subjects obtained with their oral consent and that of their doctors. Data analysis showed that about 70% of the [Rh-] negative women belonged to blood group O, 22% to A, 40% to B, and 2% to AB. There was no significant difference ($p > 0.05$) in the intensity and duration of MS between the test and control groups. Using the number of MS cases as an index, there were 90% cases of MS in [Rh-] test and 88% cases in [Rh+] control groups respectively. The number of live births for each group was similar with 262 and 194 for [Rh+] mothers and [Rh-] ones submitted to IgG Anti D (Rhagam) therapy. This study has established higher incidence of [Rh-] factor in blood group O in the sample population. It did not establish any relationship between the intensity of MS and Rhesus negative pregnant women. We, therefore, conclude that MS is independent of Rhesus status in pregnant women.

Key Words: Rhesus negativity, pregnancy, morning sickness, blood group.

INTRODUCTION

Morning sickness (MS) describes a series of pathophysiological condition of most women in the state of pregnancy. It is often characterized by some of the following: nausea, hyperemesis, anxiety, migraine, fatigue, debility, anorexia, irritability, dehydration and weight loss. If adequate medical attention is not provided, it could degenerate to neurosis, hypoglycemia, coma and

possibly death (Gravenhorst, 1982; Thompson, 2000). Cases of teratogeniaty have been observed in situation where unwholesome therapies were employed to alleviate the condition (Dundee et al., 1998; Slotnick, 2001). These symptoms were described as far back as 2000 B.C. by an Egyptian physician (Montgomery, 1990). Until this day, there seems to be no pharmacologic treatment to this sickness (Wilkinson, 2000). Can MS be related to the rhesus status of the pregnant women? As far as we know, this question is still waiting for an answer (Czaja, 1975; Wilkison, 2000; Werntoft et al., 2001; Idowu et al., 2003). Twenty-one blood group systems are identified in

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man. Among these, the ABO, Rhesus, Lewis and MN ones are the most relevant biologically, while the ABO and Rhesus systems are the most significant clinically (Murray et al., 2000). The ABO system is classified based on the presence of specific antigenic proteins on the erythrocyte membrane (Glew and Peters, 1987).

The gene that encodes the antigenic proteins is found on chromosome-9 where A and B alleles are co-dominant and dominate the recessive allele O (Murray et al., 2000). These allelic interactions give rise to the phenotypic blood groups [A], [B], [AB] and [O]. The antigenic proteins are complex glycosphingolipids found on the membrane of the erythrocytes (Glew and Peters, 1987). For instance, a blood group [A] individual possesses antigen B antibodies in his blood plasma. This explains why there is agglutination when such persons are transfused with blood group [B] or [AB]. A blood group [AB] individuals has neither A nor B antibodies. Therefore, such individuals can be transfused by any of the ABO blood group types. The Rhesus blood group system possesses six antigenic proteins: C, D, E, c, d and e (Montgomery et al., 1990). The antigen D is the most prevalent and possesses higher immunochemical and clinical significance than the others (Murray et al., 2000). As such, rhesus compatibility is predicted on the D antigen, that is, blood group A⁺/A⁻, B⁺/B⁻, AB⁺/AB⁻, or O⁺/O⁻ denotes the presence or absence of rhesus antigen D in the respective blood of the individuals. It follows from this classification that a rhesus positive [Rh⁺] blood group cannot be transfused by a rhesus negative [Rh⁻] one; otherwise, there will be immunochemical sensitization with consequent agglutination due to rhesus incompatibility (William, 1997; Flaxman and Sherma, 2000). The biochemistry of the rhesus blood group system is not completely understood, but the clinical consequences of its ignorance may be fatal. Nevertheless, the rhesus antigen D has been biochemically and genetically characterized. It is a 30 KDa protein with specific amino acids, found in the erythrocyte membrane and called the rhesus factor (Glew and Peters, 1987). This factor is absent in 15 - 20% of Caucasians and 1 - 5% Negroid. The presence or absence of the rhesus factor confers specific biochemical reactivity of clinical importance on the subject, such as the immunochemical interaction of the antibody and the antigen in the case of rhesus incompatibility (Keith, 1979; Murray et al., 2000). In particular, a [Rh⁻] mother who had been previously sensitized due to a [Rh⁺] foetus would produce anti-Rhesus positive antibodies. In subsequent gestations, such antibodies would cross the placenta barrier to agglutinate and haemolyse subsequent foetal erythrocytes. This often leads to intra-uterine death.

The phenomenon is also called erythroblastosis fetalis or the haemolytic disease of the newborn. Immunosenitization of a [Rh⁻] mother could also occur due to an accident, miscarriage, abortion, ectopic pregnancy or amniocentesis (Keith, 1979). However, the episodes could be prevented if the [Rh⁻] mother receives adequate medical care within the first 24 - 72 h following immunosentization.

In fact, within this period, the mother is expected to receive anti-D gamma-immunoglobulin injection, commonly called "Rhogam". The drug is effective in preventing active formation of anti-Rhesus positive antibodies by the sensitized mother (Keith, 1982). The injection is repeated after subsequent deliveries to forestall neonatal mortality. The literature is inundated with questions linking MS to rhesus negativity (Czaja, 1975; Ferrara - Love et al., 1996; Allen et al., 1998; Idowu et al., 2003; Verberg et al., 2005). From the information at our disposal, there are no previous studies about the eventual correlation between these states. Therefore, the present study aims to provide some scientific information in this area, especially with regards to the Negroid population of Nigeria.

MATERIALS AND METHODS

The influence of [Rh⁻] on the intensity of MS was investigated on 200 women ([100 Rh⁻] mothers served as test sample and 100 [Rh⁺] mothers as control sample). The mean age of the subjects was 31 years. They were drawn from mixed tribal, social and economic backgrounds residing in South Eastern Nigeria.

The study was conducted between January and August 2005, adopting the use of carefully structured questionnaires, personal interviews and medical history of the mothers, obtained with their oral consent and written consent of their doctors at the Federal Medical Centre, Owerri, Nigeria. Thirty pairs of trained field interviewers were assigned to the study. The written report and data from the groups were assembled and analyzed.

RESULTS

Table 1 shows that there was no significant difference ($p > 0.05$) between the intensity of MS in the [Rh⁺] control (90%) and the [Rh⁻] test (88%) subjects. The live births in both groups were comparable, with about 26% difference. The [Rh⁻] types occurred in 70% of individuals with blood group O, 22% A, 4% B and 2% AB, against 52%, 22%, 2% and 2% in the [Rh⁺] control.

The Rhesus status of the women had no apparent influence on the presence or absence, as well as the intensity of menstrual pain experienced by the subjects (Table 2). Table 2 also shows that 78% of the (Rh⁻) pregnant women were not anaemic and the rhesus status did not confer any specific debility on them (93% not debilitated). Table 3 indicates that the duration of MS in both (Rh⁻) and (Rh⁺) women lasted beyond 3 months, with 54 and 57% respectively. The MS occurred mainly in the first trimester of pregnancy.

DISCUSSIONS AND CONCLUSION

The physical and mental trauma which a pregnant woman undergoes in the course of moderate to severe MS have thrown some challenges to medical researchers. An attempt is made in this study to contribute to the knowledge in this area.

Table 1. Comparison of the MS and number of live births between (RH+) and Rh-) mothers. Morning Sickness

Parameter	Absent	Mild	Moderate	Severe	% total	Parity	Blood group			
							0	A	B	AB
[Rh+]	6 (6%)	56 (56%)	20 (20%)	14 (14%)	90 (90%)	262 -	52 (52%)	22 (22%)	2 (2%)	2 (2%)
[Rh-]	12 (12%)	62 (62%)	16 (16%)	10 (10%)	88 (88%)	194 -	70 (70%)	22 (22%)	4 (4%)	2 (2%)
% Difference	6	6	4	4	2	26	8	Null	2	Null

Table 2. Percentage outcome of some parameters associated with MS in [Rh-] / [Rh+] women.

Index	Menstrual pain		Anaemia in pregnancy		General health		Familial occurrence	
	Rh ⁻	Rh ⁺	Rh ⁻	Rh ⁺	Rh ⁻	Rh ⁺	Rh ⁻	Rh ⁺
Present	30	45	20	20	92	89	60	87
Absent	36	4	78	80	6	10	6	12

Legend: The rhesus status did not affect the menstrual behavior, the general health and the incidence of anaemia in pregnancy. The familial occurrence of [Rh] is depicted.

NB: (Some respondents could not provide the required information because of their educational status. As such, some of the data do not add up to a 100%).

Table 3. Percentage outcome of duration and period of MS in [Rh-] / [Rh+] women.

Rhesus status	Duration in months			Period in pregnancy		
	1	2	≥ 3	1 st	2 nd	3 rd
[Rh+]	7	14	57	50	14	14
[Rh-]	6	12	54	42	12	18

Legend: The percentage difference in the test and the control groups are negligible.

Existing studies reported the occurrence of MS in 50 - 90% of pregnant women (Czaja, 1975; Goodwin, 2000; Reymunde et al., 2001). It was also reported that there were equal chances of live births between [Rh+] and [Rh-] pregnancies, provided the [Rh-] mothers were treated with "Rhygan" accordingly (White et al., 1978; Idowu et al., 2003). It has also been established that MS lasts for more than 3 months in 50 - 60% of pregnant women irrespective of their rhesus status (Llewellyn-Jones, 1998; Verberg et al., 2005). Goodwin (2000), showed that, there was a strong correlation between the intensity of MS and the plasma level of human chorionic gonadotropin hormone (HCgh) in pregnant women.

It was interesting to observe that most pregnant women manage their MS out of the hospital settings (Wilkison, 2000; Idowu et al., 2003). This was also seen in this study. The common understanding is that orthodox medicine does not have a cure for MS (Dundee et al., 1998; Goodwin, 2000; Rosen et al., 2003). Nonetheless, a negligible percentage patronize natural healers (2%, Table 3). Cases of teratogenicity have been reported on account of such patronage (Idowu et al., 2003). The phocomelia associated with thalidomide and its congeners in

the 1940s and 50s were linked to MS (Fickentscher and Kohler, 1974; Moos et al., 2003).

We conclude that there was no apparent relationship between the intensity of MS and [Rh-] pregnant women, neither do such women, nor their progeny exhibit abnormal obstetric or physiological behaviour on account of their mother's rhesus status. More studies should be done to ascertain the validity or otherwise of these observations. It is recommended that research efforts be intensified to find clinical remedies to treat moderate and severe MS. Again, the relevant bodies should create awareness about the obstetrics implications of [Rh-] factor among women of child-bearing age, especially in developing countries. They should also consider subsidizing the high cost of "Rhogam" injection, especially in developing economies.

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