Outbreak of Serotype W135 *Neisseria Meningitides* in Central River Region of the Gambia- A Clinical perspective

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Introduction

Background: Meningitis still accounts for many deaths in children especially during epidemics in countries within the African meningitis belt. The Gambia recently witnessed another outbreak with the W135 strain of *Neisseria Meningitides* between February and June 2012 . This study presents a clinical perspective of the most recent outbreak in Central River Region (CRR) of the Gambia and evaluated risk factors associated with acquiring the infection among children.

Aim: i) To describe the clinical perspective of the outbreak in children. ii) To evaluate risk factors associated with acquiring the infection among children

Methods

Study Area: The Central River Region (CRR) is one of the 6 regions of the Gambia**.** It has a total land area of 2,895 sq km with a population of 201,506 and a population density of 64.2 persons per square km[12] It is the third most populated region in the Gambia with average temperature of 26.5°C (max. is 32-37°C between April -November and min. of 19°C in Jan-Feb[13]. This study was carried out in Children ward of the Bansang hospital which is the largest of the 9 Public health facilities in the CRR and serves as a referral centre to others health facilities in the region[14]

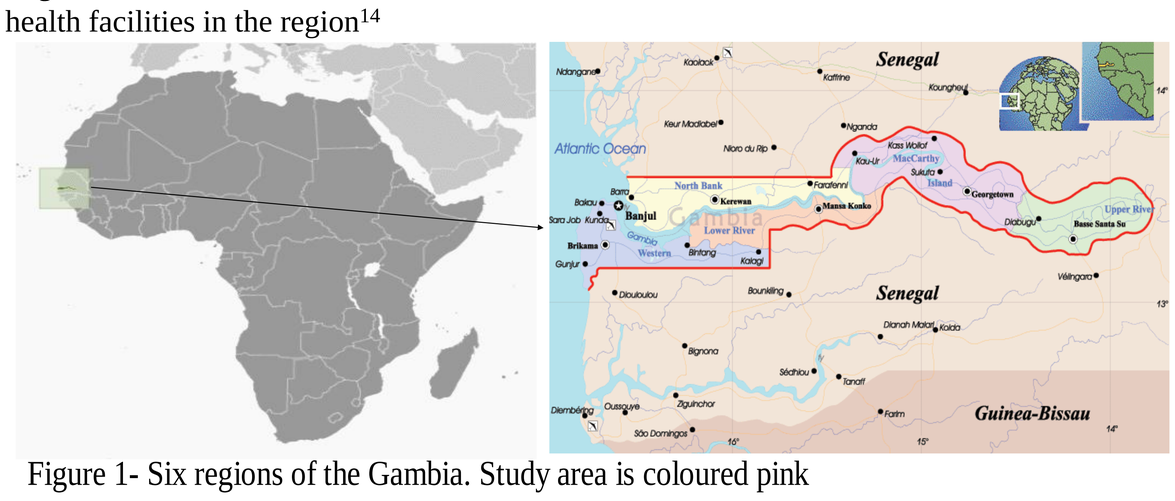


Figure 1- Six regions of the Gambia. Study area is coloured pink

Study Participants:

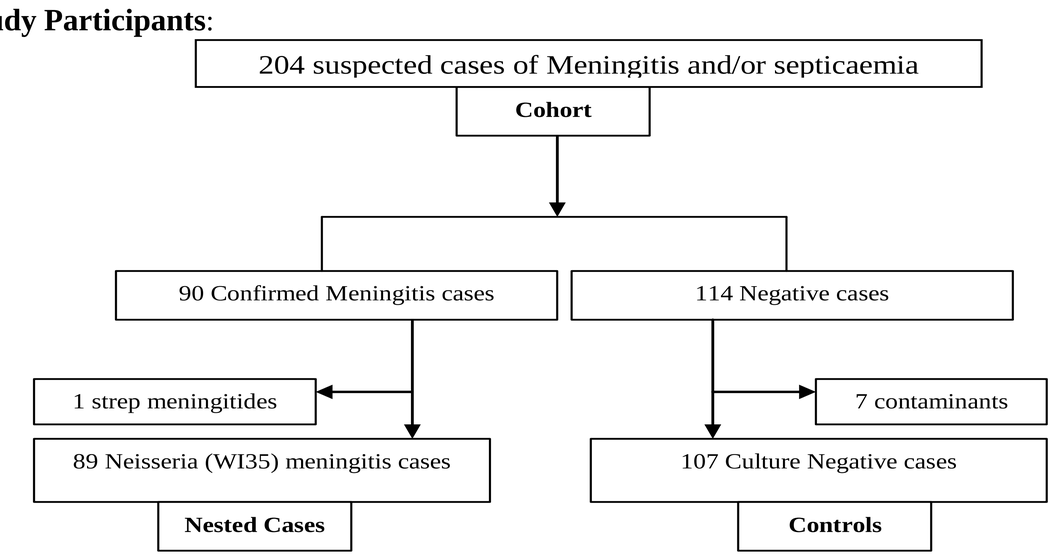


Figure 2. Selection Procedure

Results

Table 1: Characteristics of study Participants

Characteristics	Cases N=89	Controls N=114	χ^2 (df) p-value
Age groups	n (%)	n (%)	
Less than 1 months (Neonates)	1(1.1)	3(2.6)	4.10(3)†[1]
2-11 months (Infants)	14(15.7)	28(24.6)	0.251
12-59 months (Under-5)	64(71.9)	67(58.8)	
5- 18years (Above-5)	10(11.2)	16(14.0)	
Sex			
Male	53(59.6)	65(55.3)	0.21(1)
Female	35(40.4)	49(44.7)	0.646
Immunization status†[2]			
Complete for age	42(47.2)	52(45.7)	0.05(1)
Incomplete for age	47(52.8)	62(54.3)	0.823
Malaria parasite†[3]			
Positive	6(6.7)	12(5.5)	0.89(1)
Negative	83(93.3)	102(94.5)	0.347
Haemoglobin†[4]			
Normal	28(31.6)	37(25.9)	0.02(1)
Low	61(68.4)	77(74.1)	0.880
Contact in preceding 2 wks of illness with person with			
Fever	36(40.5)	9(22.5)	14.96(1)
Travel outside region	20(22.4)	29(26.9)	**0.001**
X-ray findings†[5]			
Pathology seen	15(16.9)	19(11.9)	0.01(1)
Normal X-ray	74(83.2)	95(88.1)	0.972
Outcome			
Alive	82(92.1)	101(87.9)	0.71(1)
Death	7(7.9)	13(12.1)	0.401

Table 2: Clinical features study subjects †[5]Pathogy: Consolidation and Pleural effusion

Clinical presentation	Cases n (%)	Control n (%)	p-valve
Fever	84(94.4)	104(96.3)	0.766
Cough	39(43.9)	51(47.2)	0.633
Convulsion	17(19.1)	11(10.2)	0.075
Joint swelling	15(16.9)	2(1.9)	**0.002†**
Skin Infection	11(12.4)	8(7.4)	0.241
Petechial haemorrhage	1(1.1)	0(0)	0.923
Meningism	71(79.8)	1(0.9)	**0.001†**
Conjunctivitis	9(10.1)	0(0)	**0.002†**
Positive X-ray findings	15(17)	13(11)	0.335

Results continued

Figure 2- Age distribution of Cases

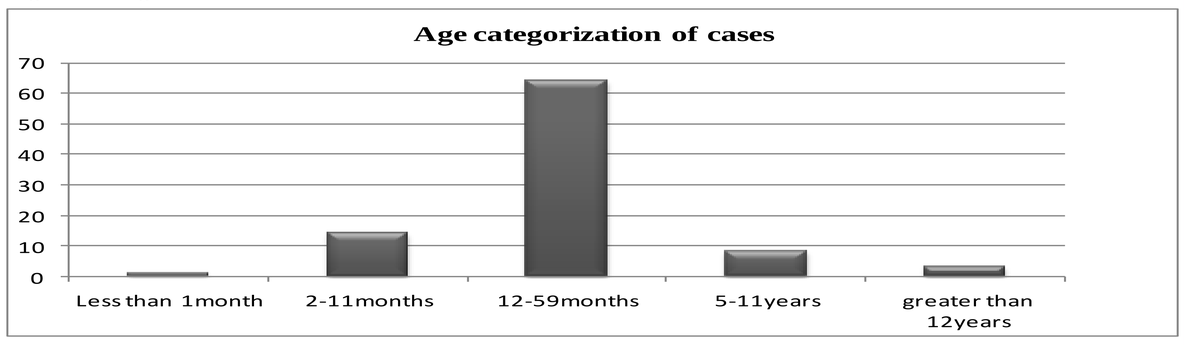
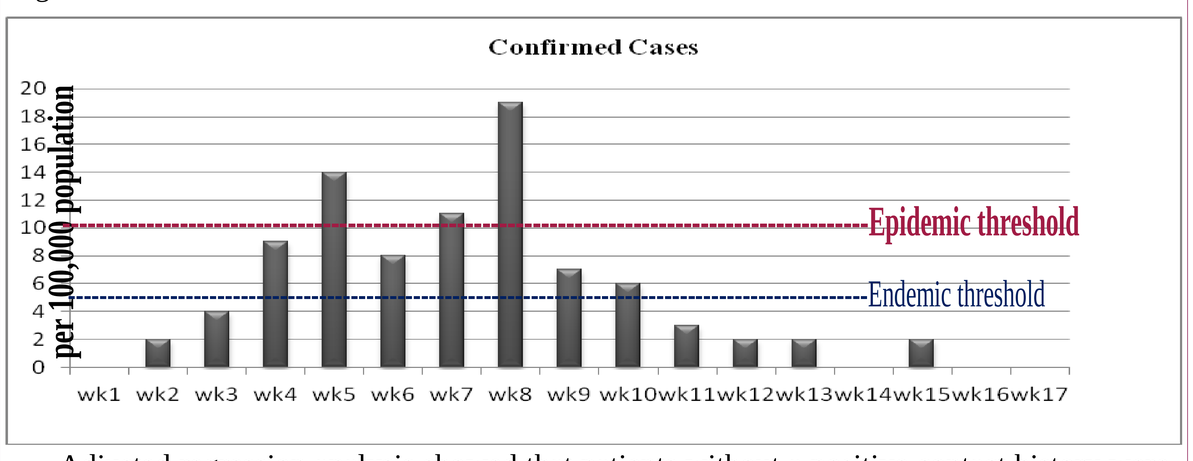


Figure 3- Characteristics of outbreak



- Adjusted regression analysis showed that patients without a positive contact history were 0.13 times less likely to acquire *N. Meningitides* compared to those with a positive contact history (RR 0.13, CI 0.06-0.30). In other words contact with a case increase the odd of acquiring the disease 7.7 times
- Joint swelling, neck stiffness and conjunctivitis were significantly seen in in cases than controls
- The outbreak had a double peak period in weeks 5 and 8 during which the epidemic threshold of 10 cases/100,000 per week[15] was exceeded
- There was a sharp decline in the 9th week and decline continued gradually until the 12th week when incidence rate became constant all through to the 15th week. No new cases were seen on week 16 and 17 during which the epidemic was declared over[15]
- The overall incidence rate was 47.9 per 100,000 populations in CRR
- The average stay in hospital was 7 days (due lack of bed space) and mortality among patient with confirmed meningitis was 7.9% (7/89) compared to 12.1% (13/108) for controls (p=0.669).

Limitation

- A Hospital based study this will not reflect the true incidence and mortality of the epidemic in the region- the so called Berkesonian Bias

Conclusions

•:Contact with cases is a strong risk factor for disease dissemination thus there is need for early case identification and isolation in resource poor setting where vaccine uptake is poor
•There is also need to set up an effective surveillance system and strengthen this by organized collaboration with organizations like MRC to enhance surveillance
•Gambia ministry of health as a yearly routine in outbreak season should prepare communities by way of radio announcement and public health campaigns on the need for vaccine uptake and prompt presentation to the hospital of suspected cases.

Acknowledgements

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References

1. Gambia Ministry of Health and Social welfare. Epidemiology and disease control unit Banjul, 2012.
2. World Health Organization. Control of epidemic meningococcal disease. In: Practical guidelines. 2nd ed. Geneva: World Health Organization, 1998. Retrieved from http://www.who.int/emc.
3. World Health Organization. Standard Operating Procedures for Enhanced Meningitis Surveillance in Africa Version August 2009, PG 10.

Other countries affected by the Feb-June Meningitis outbreak

Country*	Suspected cases	Deaths	Case fatality ratio (%)	Pathogen that caused the epidemic	Number of districts that experienced epidemic
Benin	758	71	9.4	Nm W 135	6
Burkina Faso	5,300	553	10.4	Nm W135	13
Chad	2,828	135		NmA	12
Côte d'Ivoire	399	49	12.3	Nm W135	1
Ghana	569	56	9.8	Nm W135	4
Sudan	275	13	4.7	Nm A	1
Gambia†	469	36	8	W135	2

†Community and hospital based survey by MRC and Ministry of Health in CRR and URR (Upper river region) of the Gambia

Some Pictures of cases seen during the outbreak

Pictures taken after permission and consent was obtained from parents/ care giver of study subjects