Febrile illnesses in mining communities: Are we correctly diagnosing them?

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Introduction

- Hinterland & mining communities characterised by:
  - Lower skilled health workers
  - Poor health and laboratory infrastructure
  - Recent re-emergence of malaria
  - Anecdotal evidence of emergence of other infectious diseases such as typhoid
- Questions surrounding accuracy of diagnosis of febrile conditions in the interior

Methodology

- Study type- Cross sectional
- Objectives:-
  - To describe the social and environmental conditions that may contribute to the emergence & re-emergence of infectious diseases
  - To determine the aetiology of febrile illnesses in interior communities

Methodology

- Several mining communities selected and visited (Mahdia, Kurupung, Eyelash, Tumatumari, Isseneru)
- Residents informed of nature of study and persons with fever invited to participate
- Questionnaires applied to gather risk factor data
- 2 blood samples taken and tested:
  - Dengue (IgM & IgG)
  - Widal test for typhoid fever
  - Blood culture for Salmonella typhi (causative agent of typhoid fever) & other microorganisms
- Water samples taken from reservoirs & tested for indicators of its suitability for consumption

Results

Sanitation

- Excreta disposal
  - Pit latrines 85 %
    - Majority poorly constructed & improperly sited
  - WC 9 %
    - Most lack required quantity of water for proper cleansing
    - Septic tanks poorly constructed &
    - Improperly sited effluent emptied into creeks/rivers/valleys
  - Other 6 %

Results

Conditions of surroundings

- Bush 43 %
- Garbage 15 %
  - Mostly non-biodegradable eg. plastic food wrappers, plastic bags, plastic bottles and food containers
- Clean 12 %
- Waterholes 9 %

- Garbage disposal
  - Dumping 45 %
  - Burning 26 %
  - Burying 18 %
  - Mixed & other 10 %

Results

Water quality

- Kurupung
  - 3 samples
    - Mazaruni River (2)
    - Rubberized tank at health post
  - All microbiologically unsatisfactory (coliforms)
  - All chemically unsatisfactory
    - ↑pH, lead & total iron
- Mahdia
  - 2 samples from 2 creeks
  - ↑ pH, lead, total iron

Results

Water quality

- Eyelash
  - 2 samples (vicinity of Arakaka creek & reservoir filled by spring from Mathews Ridge)
  - All microbiologically unsatisfactory (coliforms)
  - Chemically unsatisfactory
    - ↑pH total dissolved solids, turbidity, lead & aluminium

Results

- Water source and treatment
  - Rain 67 %
  - Natural reservoirs (streams, creeks etc) 19 %
  - Mixed (rain + natural reservoirs) 9 %
  - Other 5 %
- Water treatment
  - Treatment of drinking water 31 %
  - No treatment of drinking water 69 %
- Water treatment method
  - Chlorination 82 %
  - Other 18 %

Results

- Malaria prevention measures
  - Use prevention 59 %
  - No prevention 41 %
- Type of prevention
  - Mosquito nets 76 %
  - Other 24 %

Results

- Dengue
  - 78 tests done
  - 6 positive (seroprevalence 7.7 %)
    - All with IgM antibodies indicative of active infections

Results

Characteristic (n=78)	Dengue seroprevalence
Gender	
Female	17.1 %
Male	2.0 %
Ethnicity	
Amerindian	16.7 %
Mixed	8.7 %
Others	0

Results

Characteristic (n=78)	Dengue seroprevalence
Age group	
20-39	6.5 %
40-59	14.3 %
Other age groups	0
Community	
Kurupung	10 %
Mahdia	6.7 %
Tumatumari	6.7 %
Eyelash	5.6 %

Results

Tab. 1 Clinical manifestations of patients with dengue fever

Manifestation	% of patients
Fever	100
Headache	83.3
Muscle pain	83.3
Joint pain	83.3
Nausea	66.7
Constipation	33.3
Vomiting	16.7
Diarrhoea	0

Methodology

Risk factor behaviour		Dengue prevalence
Use protection against mosquitoes	59 %	6.5 %
No protection	41 %	9.4 %

Results

Typhoid

- 77 Widal tests
- 46 persons negative
- 11 with Widal titre > 1:160 (seroprevalence 14.3 %)
- 4 with titre > 1:320 (seroprevalence 5.1 %)
  - 3 persons with H titre > 1:320 had negative O titres
- 5 persons with H titre > 1:160 had negative O titre

Results

Tab. 2 Widal test results

Widal Titre	O	H
Neg	63	50
1:20	1	0
1:40	2	2
1:80	6	11
1:160	5	10
1:320	0	4

Results

Tab. 3 Clinical manifestation of persons with positive Widal tests

Manifestation	Widal >1:160 (%) n=17	Widal < 1:160 (%) n=67
Fever	93	81
Headache	78	80
Muscle pain	57	61
Joint pain	57	69
Nausea	57	48
Diarrhoea	41	24
Vomiting	28	10
Constipation	7	10

Results

Tab. 4 Clinical manifestations of patients with positive blood cultures

Manifestation	% (n=11)
Joint pain	82
Fever	73
Headache	73
Muscle pain	64
Nausea	45
Diarrhoea	27
Vomiting	9
Constipation	0

- 70 blood cultures done
- 11 positive cultures
  - 7 Klebsiella
  - 4 Staphylococcus
  - 0 Salmonella typhi
- Many multi-resistant to many antibiotics

Results

Tab. 5 Febrile illnesses in interior communities

Manifestation	DF (%)	Widal >1:160 (%)	Pos culture (%)
Fever	100	93	73
Headache	83.3	78	73
Muscle pain	83.3	57	64
Joint pain	83.3	57	82
Nausea	66.7	57	45
Constipation	33.3	7	0
Vomiting	16.7	28	9
Diarrhoea	0	41	27

Conclusion

- Generally poor sanitary and hygienic conditions in mining communities
- These conditions are favourable to the transmission of infectious diseases
- Frequent acute illnesses among miners lead to lost of time from work and may impact adversely on their productivity

Conclusion

- Recent evidence of dengue transmission and the emergence of other diseases (Klebsiella infection)
- Other febrile illnesses had similar manifestations to malaria
- Need for establishment of fever management protocols for health workers of interior locations