METHANOL POISONING OUTBREAK IN RIVERS STATE

An Outbreak Investigation Report

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11/12/2016

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ACRONYMS

CFR	Case fatality Rate
DSNO	Disease Surveillance and Notification Officer
EPR	Epidemic Preparedness and Response
KII	Key Informant Interview
LGA	Local Government Area
NAFDAC	National Food and Drug Administration cooperation
NFELTP	Nigerian Field Epidemiology and Laboratory Training Programme
PHALGA	Port-Harcourt City Local Government Area
RRT	Rapid Response Team
SMOH	State Ministry of Health
UNICEF	United Nations Children's Fund
USA	United States of America
WHO	World Health Organization

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EXECUTIVE SUMMARY

BACKGROUND: Methanol is a mildly inebriating substance with highly reactive metabolites such as formaldehyde, which are mainly responsible for its effect. Methanol poisoning is usually a consequence of deliberate or inadvertent ingestion of the chemical. In May 2015, there were repeated deaths in Rivers state after consumption of illicit gin. We investigated to identify the source and associated risk factors, implement control measures and provide recommendations to intensify surveillance.

METHODOLOGY: Case series report and retrospective cohort were employed to identify the source of the outbreak. We defined a case as history of blindness and vomiting, with or without breathlessness after consumption of local gin in any person of any age, residing in Ahaoda-west, Bonny,Obio-Akpor, Gokana and Port-Harcourt LGAs in the 1 week prior to the study. Active case search was employed to identify cases and exposed persons. Information on socio-demographic, socio-economic, history of alcohol consumption and lifestyle was collected from cases using semi-structured questionnaire.

RESULT: Among the cases, 85.75% were males. More than 80% of victims were chronic alcoholics from low socio-economic classes. Among the survivors, 28.5% lost their sight. Case fatality rate ranged from 66.7% to 100%. Relative risk of methanol poisoning among the exposed was 6 (C.I, 1.0-38.5). Risk Difference was 62.5% and attributable risk percent was 83.3%. Laboratory result was positive for methanol poisoning. The trace back pointed to a common source at Nembe waterside. Initial disbelief in illicit gin as cause of death contributed to high fatality. Consumption of palm oil was associated with survival among the exposed.

CONCLUSION: Inadequate regulation of illicit gin trade, ignorance and poverty were predisposing factors to methanol poisoning in Rivers State. Prevention of methanol poisoning should be a priority by enforcing ban on illicit gin trade as well as massive campaign against its consumption.

INTRODUCTION

Methanol is the simplest alcohol, a volatile liquid with a weak odour, slightly sweeter than ethanol, clear, colourless, soluble in water and often added to ethanol to make denatured spirits. It is cheaper and gives better' kick'(euphoria)but unsuitable for consumption.[1] Consequent to its low cost, consumers tend to be attracted to these drinks compared to taxed alcohol, particularly people from lower socioeconomic classes and who are alcohol dependent.[2] It is a widely available chemical and also known as methyl alcohol, wood alcohol, wood spirits and many different common names as, hooch/moonshine in USA, tonto/waragi in Uganda, chang'aa/kumi in Kenya and ogogoro/kaikai in Nigeria. Because of its similarities in appearance and odour to ethanol, it is difficult to differentiate between the two. In different settings, it is often sold in unlabelled bottles and containers in markets, shops and in illegal bars or made to appear legitimate in well labeled bottle designs, misleading consumers into believing they are purchasing the real alcohol brand.[3]

While methanol itself is nontoxic, it is mildly inebriating with toxicity attributed to formaldehyde, one of it metabolites, with formic acid appearing likely more responsible for its effect.[4] These metabolites are highly reactive and are known to interfere with oxidative metabolism by readily binding to tissue proteins, inhibiting the mitochondrial cytochrome oxidase system.[5]Methanol can be absorbed into the body by inhalation, skin contact, eye contact, rapidly after oral administration and depending on the presence or absence of food, peak absorption occurs within 30-60 minutes. Co-ingestion of ethanol further delays the metabolism and toxicity of methanol for many hours.[5] There is typically a variable lag period of about 12-24 hours, due to the slow metabolism of methanol to formaldehyde, following methanol ingestion before toxic manifestations occur, however, lack of symptoms does not indicate insignificant intoxication particularly if the patient presents promptly.[6] The toxic dose of methanol varies depending on the individual and treatment provision. One hundred mls has been set as the minimal lethal dose which varies over a wide range from 30 – 240ml but Bennett and colleagues in 1953 reported lethal poisoning subsequent to ingestion of only 15ml of 40% methanol. Similarly, cases of blindness have been claimed by Bryson[7] following consumption of 4ml. Conversely the work of Tong[8] reported ingestion of more than 500ml without causing death or blindness.

Signs and symptoms include drowsiness, headache, dizziness, malaise, agitation, generalized weakness, parasthesia, vomiting, abdominal pain, vertigo, coma, convulsions and death from respiratory arrest may ensue. Visual disturbances are common, and are the most specific physical diagnostic findings and ranges from dimming or blurring vision, scintillation, photophobia, visual field defects to total loss of light perception and survivors may suffer visual impairment.[9]

Poisoning with methanol may be as a consequence of deliberate or inadvertent ingestion of the chemical. There has been reports of outbreaks of methanol poisoning in recent years in various parts of the world such as September 2001 large outbreak in the Parnu county, Estonia where more than 100 patients were hospitalized over the course of nine days and more than 60 deaths recorded[5]; In 2012 there were 318 people hospitalized and 49 died in Cambodia from home-made rice wine,[10] and 23 deaths recorded between April 14 and April 26, 2015 in Ayadi and Ode-Irele towns of Irele Local Government Area in Ondo State, Nigeria from consumption of adulterated or illegally produced alcoholic drinks.[11] The size of these outbreaks range from 20 to over 800 victims, with case fatality rates of over 30% in some instances.[2]

On 31st May, 2015, cases of deaths suspected of methanol poisoning from consumption of local gin popularly known as ogogoro or kaikai by a group of people were confirmed and reported by the Director of Public Health of the Rivers State Ministry of Health. The cases were said to have participated in a celebration in a bar which they often patronize and which is known for preparation of dog meat every Sundays in Woji town of Obio-Akpor Local Government Area of Rivers State. Similar incidences were also reported at Bonny town in Bonny LGA, Bodo city in Gokana LGA, Idu-Ekpeye community in Ahoada-West LGA and Abuloma community in Port Harcourt LGA. Consequently, the public was alerted and requested to desist from consuming locally brewed alcohol while samples of the alcohol were sent to National Agency for Food and Drug Administration and Control (NAFDAC) for laboratory analysis.

On the 5th June, 2015, following the public concern and the panic imposed by the mysterious and unprecedented deaths on the public, residents of the Nigeria Field Epidemiology and Laboratory Training Programme (NFELTP) were informed and directed by the administration to collaborate with the Rivers State Ministry of Health, Epidemiology Unit and other Stakeholders

to investigate the suspected methanol poisoning in the affected Local Government Areas in Rivers State. On the 6th June, 2015 we initiated the investigation with the following objectives.

Objectives

1. To determine the chemical substance incriminated in the suspected methanol poisoning in Rivers State
2. To establish the source of supply of the putative chemical poison
3. To determine the risk factors associated with the poisoning
4. To implement control measures and recommend sustainable surveillance to prevent future outbreaks

METHODOLOGY

Study Area

The investigation was done in five Local Government Areas in Rivers State namely Ahoada-West, Bonny, Gokana, Obio-Akpor and Port Harcourt. The 2006 population census[12] of these LGAs are 285,116; 237,299; 261,570; 535,800 and 618,456 respectively. Rivers state is a densely populated riverine area of the country that attracts people from all over the nation and beyond due to its oil and gas industry.

Study Population

The study population was alcohol sellers and drinkers in bars or shops where people were known to have drunk Ogogoro and died or come down with symptoms.

Study Design

Case series and Retrospective cohort studies were employed during the investigation depending on the scenario and the accessibility of cases.

A retrospective cohort study was carried out in Gokana LGA while Case series report was done in the other 4 LGAs.

Case Definition

For the Case Series, we defined a case as history of visual impairment or sudden blindness and vomiting, with or without breathlessness, within 48 hours of consumption of local gin in any person of any age, residing in Ahaoda-west, Bonny, Obio-Akpor, Gokana or Port-Harcourt LGAs in the 1 week prior to the study.

For the Retrospective Cohort, we defined an exposed as any person who drank ogogoro in bars or places where people were known to have drunk Ogogoro and died. While the outcome was any symptom of methanol poisoning (visual impairment or sudden blindness, abdominal pain, vomiting, breathlessness).

Eligibility Criteria

Inclusion Criteria

1. Persons who consumed local gin in the same place and at the same time with cases (For the retrospective study)

Exclusion Criteria

1. Severely ill patients who are unable to respond to questions
2. Persons who declined to participate in the study

Case Finding/Subject Recruitment

We carried out investigation in five towns (Woji, Borokiri, Bonny-Island, Edeoha and Bera towns) in the 5 LGAs affected. Active case search was carried out to find persons who had consumed local gin with the cases or had symptoms or had died after consuming local gin. A retrospective cohort study was performed using persons who met the eligibility criteria.

Data collection tools/technique

Participants and cases were gotten through key informant interviews and active case search. Information for the investigation was gotten using structured interviewer administered questionnaires. The questionnaires contained information on demographic and socio-economic characteristics, history of alcohol consumption, symptoms experienced, outcome of illness, lifestyle and other risk factors to methanol poisoning.

Data Management

Data was entered, cleaned and analyzed in Epi-info version 7. Descriptive analysis of outbreak was done in person, place and time. Univariate analysis was expressed as frequency distribution, percentages, mean, standard deviation and rates (attack rate and case-fatality rate). For the attack rate calculation, the population at risk was determined for each of the affected LGAs by applying the prevalence of alcohol use in Nigeria (26.4%)[12] to their respective total population. Bivariate analysis was done using chi-square test at 95% confidence level. Relative risk, Risk difference and Attributable risk fraction were computed.

Laboratory Investigations

Samples of the local gin were taken from various sites where the suspected outbreak occurred and sent to the NAFDAC office for analysis. Blood samples were also taken from some of the patients who were admitted in hospitals.

Ethical Considerations

The investigation was done with the permission of the Rivers State Government through the Rivers State Ministry of Health. Participants were assured of confidentiality and anonymity.

RESULTS

Descriptive Epidemiology

The outbreak of methanol poisoning in Rivers State had a total of 84 cases, arising from the five affected Local Government Areas (Ahoada-West, Bonny, Gokana, Obio-Akpor and Port Harcourt) between the period of May 30th 2015 and June 19th 2015.

Description of Outbreak in Person

Seventy two out of the 84 cases (85.7%) were males. The age range was from 20 to 73 years. The mean age (Standard deviation) of the cases was 45.6(±11.1) years. The mean age of males and females were 45.6±11.1 years and 45.5±12.7 years respectively. The median was 45.0 years while the mode was 45.7 years. Table 1 shows the age and sex distribution of the cases.

Table 1: Age and Sex Distribution of Cases (N=84)

Variables	N	Relative frequency (%)
Age (years)		
20-29	4	4.8
30-39	18	21.4
40-49	26	31.0
50-59	18	21.4
60-69	6	7.1
70-79	3	3.6
NS	9	10.7
Sex		
Male	72	85.7
Female	12	14.3

*NS-ages not specified

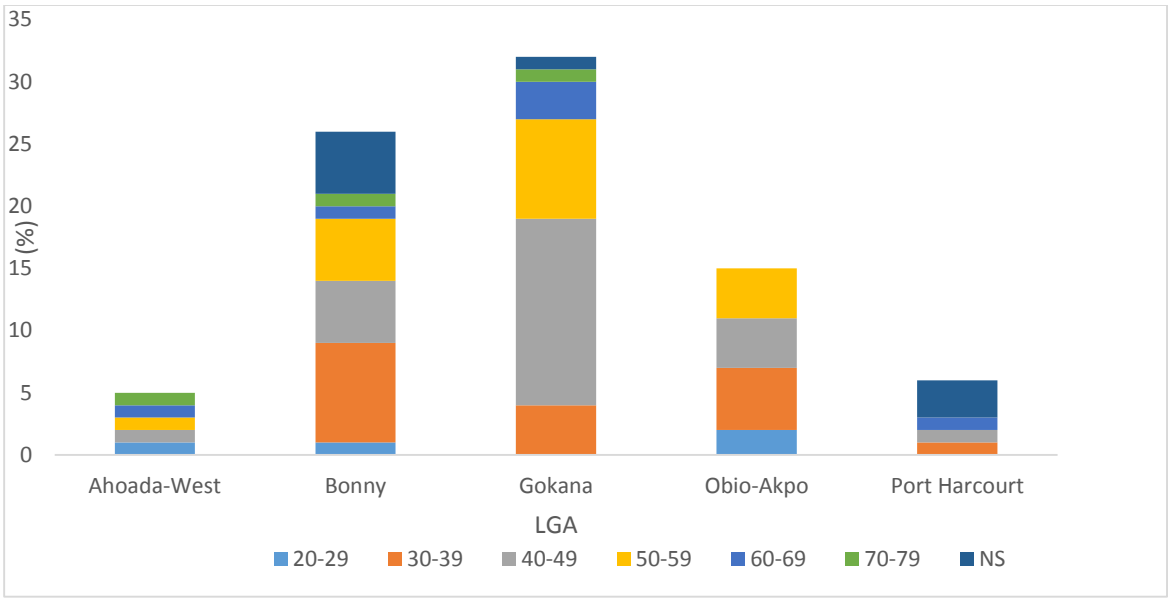


Figure 1(a): Age distribution of cases by LGA

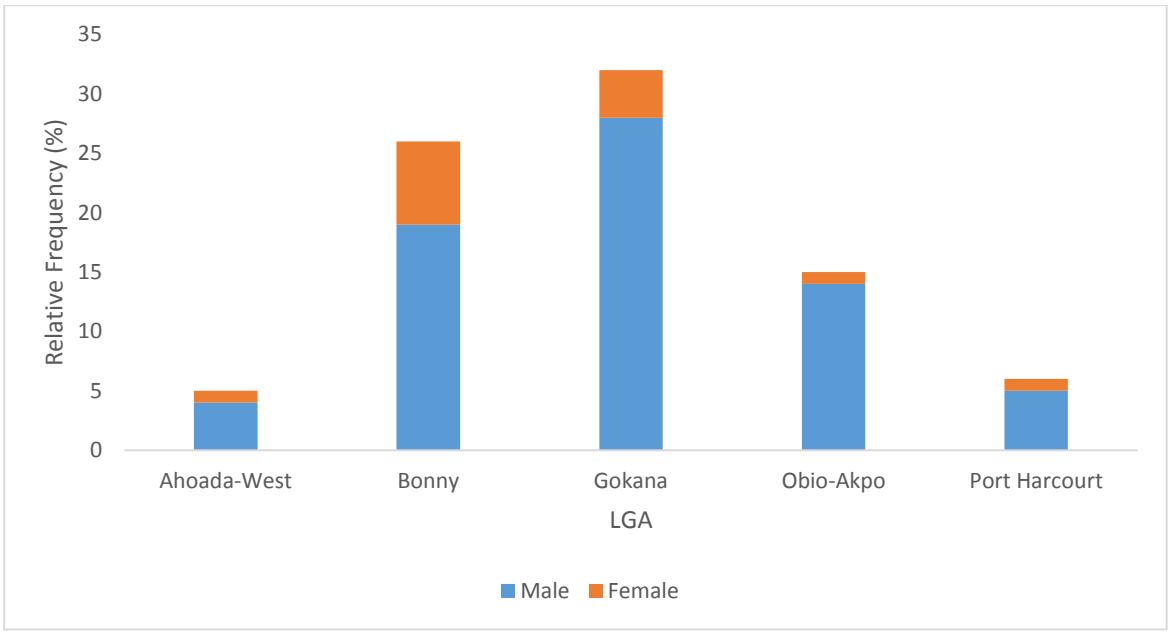


Figure 1(b): Sex distribution of cases by LGA

Other Socio-demographic Characteristics of the Cases

Socio-demographic characteristics on marital status, level of education and occupation was retrieved from 55 of the 84 cases. Table 2 below shows these socio-demographic characteristics across the five affected LGAs.

Most of the cases were married (74.6%) and had primary level as the highest education level attained (41.8%). The two common occupations among the cases were fishing (30.9%) and farming (20%).

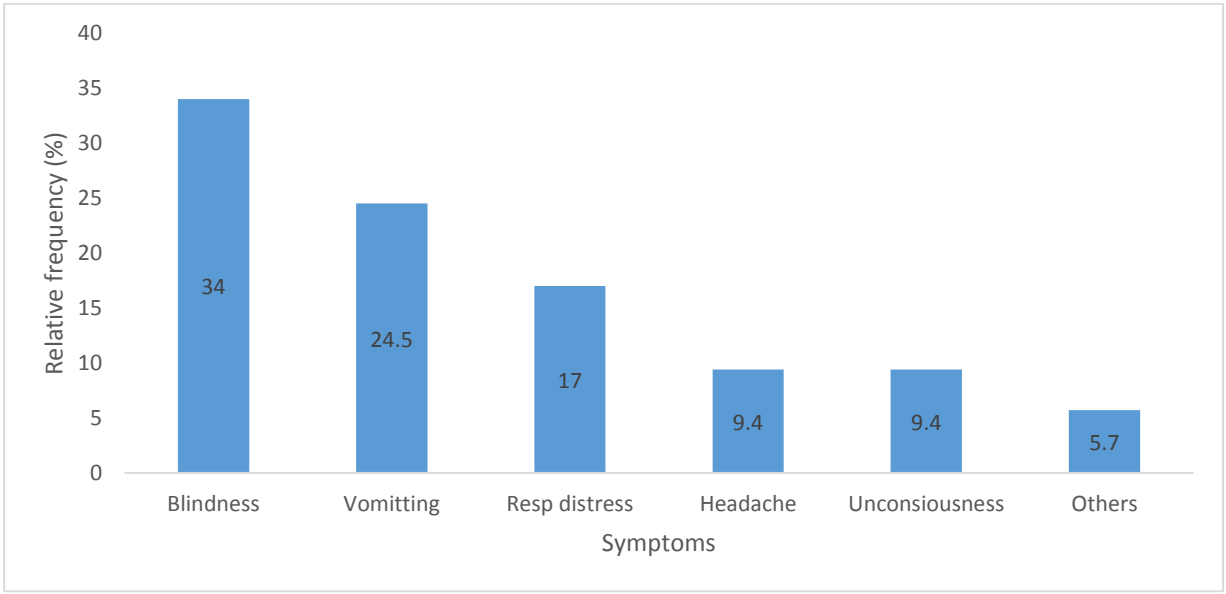
In all the affected LGAs except Port Harcourt, most of the cases were married. None of the LGAs reported a case who had attained tertiary level of education except in Obio-Akpor. Farming was the dominant occupation in Ahoada- West, while it was fishing for both Bonny and Gokana LGAs and business for the Obio-Akpor cases as shown in Table 2 below.

Table 2: Other Socio-demographic Characteristics of the Cases across the five affected LGAs in River State, 2015

	Five Affected LGAs					
	Ahoada - West (N=4) n (%)	**Bonny** (N=11) n (%)	**Gokana** (N=23) n (%)	**Obio-Akpo** (N=15) n (%)	**Port Harcourt** (N=2) n (%)	**Total** (N=55) n (%)
Marital Status						
Single	0 (0)	2 (22.2)	3 (13.0)	5(33.3)	2 (100)	12 (21.8)
Married	3 (75)	9 (97.8)	20(87.0)	9(60.0)	0 (0)	41 (74.6)
Separated/Divorced	1 (25)	0 (0)	0 (0)	1 (6.7)	0 (0)	2 (3.6)
Educational Level						
None	2 (50)	3 (27.2)	4 (17.4)	0 (0)	2 (100)	11 (20)
Primary	1 (50)	6 (54.6)	11(47.8)	5 (33.3)	0 (0)	23 (41.8)
Secondary	1 (50)	2 (18.2)	8 (34.8)	8 (53.3)	0 (0)	19 (34.6)

Tertiary	0 (0)	0 (0)	0 (0)	2 (13.4)	0 (0)	2 (3.6)
Occupation						
Fishing	0 (0)	7 (63.6)	10 (43.5)	0 (0)	0 (0)	17 (30.9)
Farming	3 (75)	0 (0)	8 (34.8)	0 (0)	0 (0)	11 (20)
Business	0 (0)	0 (0)	0 (0)	6 (40)	0 (0)	6 (10.9)
Petty trading	0 (0)	3 (27.3)	5 (21.7)	0 (0)	0 (0)	8 (14.6)
Security	0 (0)	1 (0.1)	0 (0)	4 (26.7)	1 (50)	6 (10.9)
Manual labourer	0 (0)	0 (0)	0 (0)	0 (0)	1 (50)	1 (1.8)
Native doctor	1 (25)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1.8)
None	0 (0)	0 (0)	0 (0)	5 (33.3)	0 (0)	5 (9.1)

The predominant symptoms were blindness (34%), vomiting (24.5%), and respiratory distress (17%) as shown in Figure 2 below. Most of the cases presented with more than one symptom. Of the 84 cases, 14 (16.7%) were survivors. Out of the survivors, a little above one quarter of them (28.5%) are now living with blindness as shown in Figure 3.



*Others include malaise, dizziness and non-specific symptoms

Figure 2: Frequency of symptoms among cases of Methanol Poisoning in Rivers State, 2015.

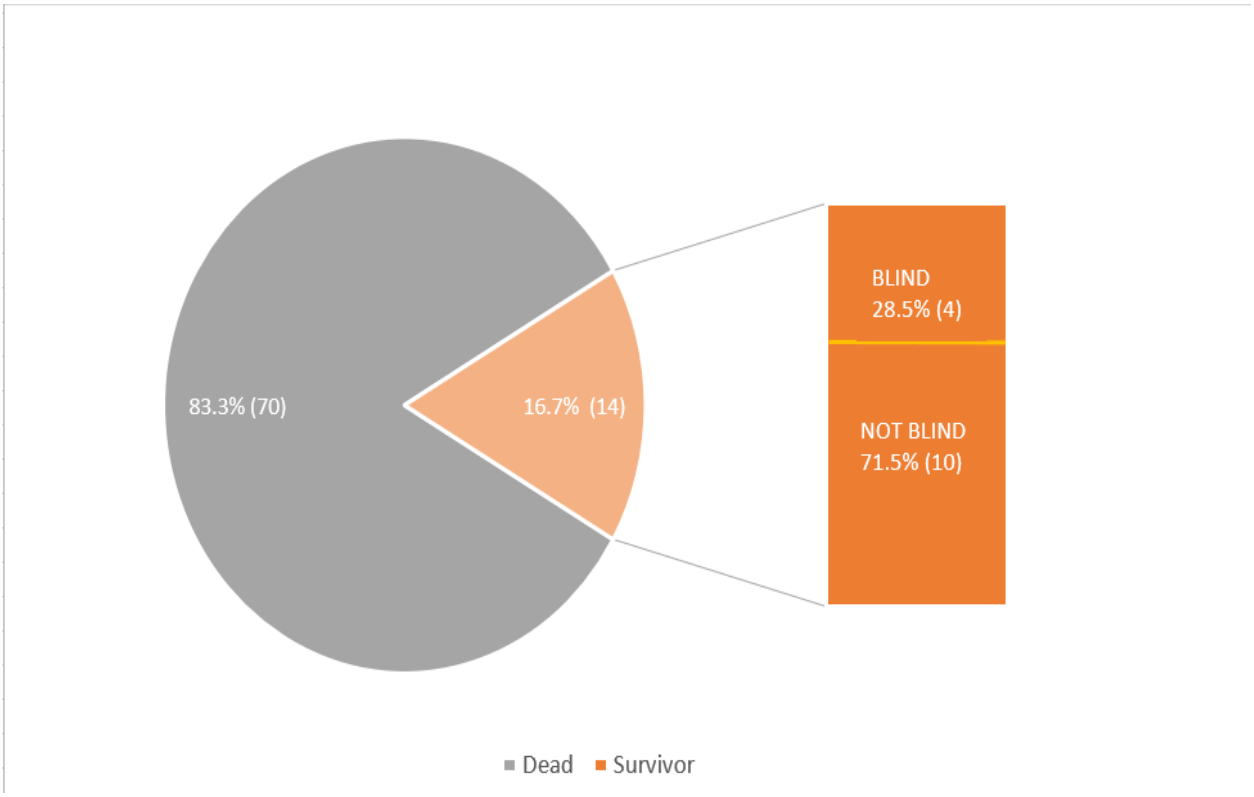


Figure 3: Proportion of dead and survival cases and the proportion of blindness among the survivors of the methanol poisoning outbreak in Rivers State, 2015

A summary of the number of cases, deaths, attack rates and case fatality rates for each of the affected Local Government Area of the State is presented in Table 3 below. The highest number of cases and deaths were reported in Gokana LGA but Bonny LGA had the highest attack rate (40/100,000) as shown in table 3. The case fatality rates across the LGAs ranged from 66.7% - 100%.

Table 3: Attack Rates and Case Fatality Rates of the Methanol Outbreak in the Five Affected LGAs of Rivers State, May- June 2015

	The Five Affected LGAs of Rivers State				
	Ahoada-West	Bonny	Gokana	Obio-Akpor	Port Harcourt
Total number of cases	5	26	32	15	6
Total number of deaths	5	25	23	11	6
Total population (2006 census)	285,116	237,299	261,570	535,800	618,456
Population at risk (Prevalence rate of lifetime alcohol use is 26.4% in Nigeria)	75,270	62,647	69,054	141,451	163,272
Attack rate(per100,000)	7	40	12	11	4
Case fatality rate (%)	100	96.2	66.7	73.3	100

Description of Outbreak in Place

Bonny and Gokana LGAs had higher number of cases than the other LGAs as shown in the spot map below.

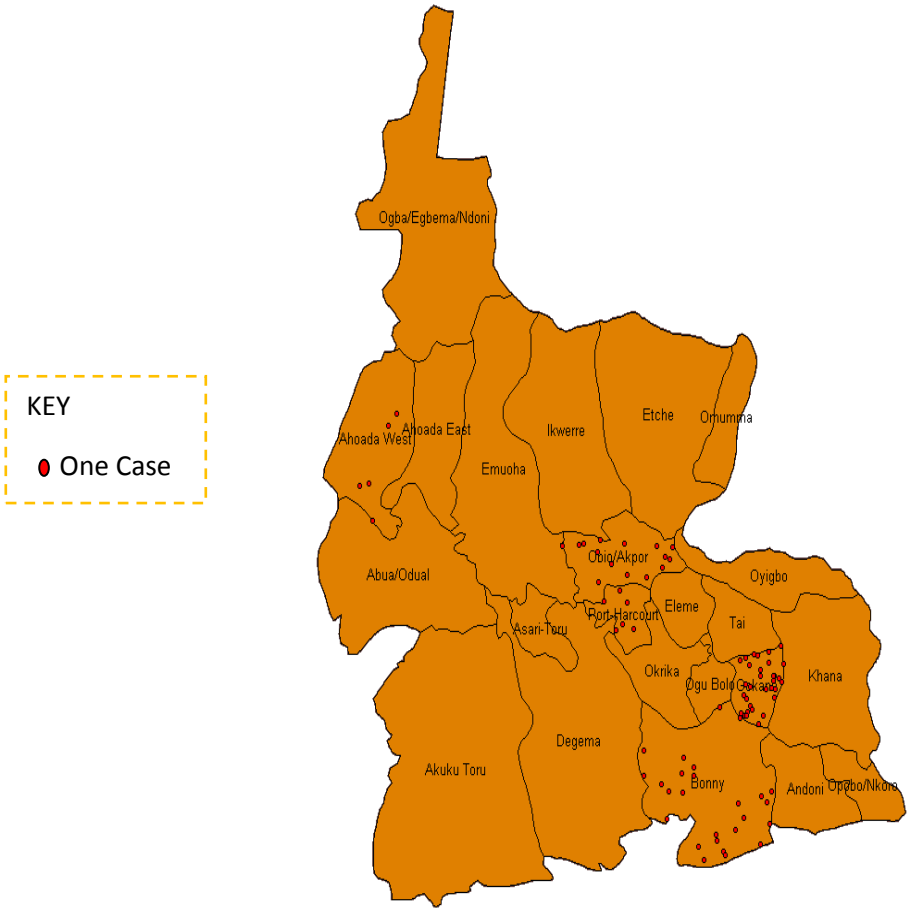


Figure 4: Spot Map showing cases of methanol poisoning outbreak in the affected Local Government Areas of Rivers State

Description of Outbreak in Time

The epidemic curve in Figure 5 shows a common source epidemic which had few survivors. The cases were exposed to suspected adulterated gin at different points in time but experienced symptoms within 24 hours of exposure. This common source epidemic peaked on the 3nd of June 2015 (6 days after the first case).

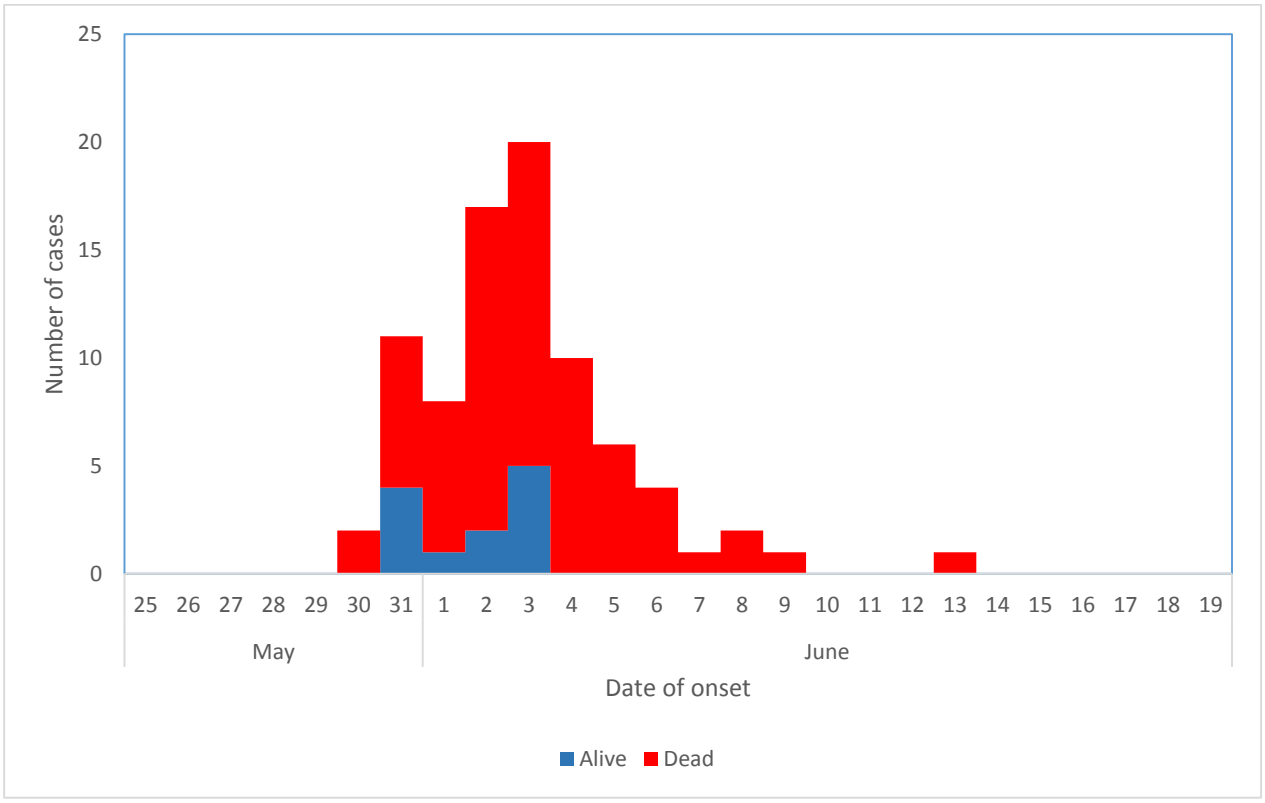


Figure 5: Epidemic Curve of the Methanol Poisoning Outbreak in Rivers State May-June 2015

Analytic Epidemiology

Following the findings of the descriptive epidemiology, a hypothesis that those exposed to suspected adulterated gin were more likely to develop methanol poisoning was formulated. This hypothesis was tested via a retrospective cohort study carried out in Gokana Local Government Area of Rivers State. A retrospective cohort consisting of 24 subjects were enrolled in the study. The contingency table below (Table 4), showing exposure to local gin (exposure variable) and development of features of methanol poisoning (outcome variable) revealed that the exposed group were six times more likely to have the outcome than the non-exposed group.

Table 4: Exposure to Local Gin and Development of Illness in Gokana LGA of Rivers State, June 2015

	Outcome Status		Total	Risk	p value
Exposure Status	Ill	Not Ill			
Exposed to Local Gin	12	4	16	75%	0.0078*
Not Exposed to Local Gin	1	7	8	12.5%	
Total	13	11	24		

*Statistically significant

Relative Risk: 6; 95% C.I: 1.0-38.5; Risk Difference: 62.5%; Attributable Risk Percentage: 83.3% .

The exposure group was further categorized into two groups based on the quantity of local gin consumed. Tables 5 and 6 below shows the relationship between the quantity of local gin consumed and the outcomes of methanol poisoning and death.

The study noted that 88.9% of those who consumed more than 60mls (3 shots) of local gin developed methanol poisoning while the survival among this group was 33.3%. These differences in the proportions were not statistically significant ($p>0.05$) as shown in the tables below.

Table 5: Bivariate Analysis of quantity of local gin consumed and development of methanol poisoning among the exposed subjects

Quantity of local gin	Methanol Poisoning		Total	p value
	Yes (%)	No (%)	N (%)	
≥60 mls (≥ 3 shots)	8 (88.9)	1 (11.1)	9 (100)	0.2615[a]
<60mls (<3 shots)	4 (57.1)	3 (42.9)	7 (100)	
Total	12 (75)	4 (25)	16 (100)	

[a]Fishers Exact test

Table 6: Bivariate Analysis of quantity of local gin consumed and outcome of death/survival among the exposed subjects

Quantity of local gin	Outcome		Total	p value
	Death (%)	Survival (%)	N (%)	
≥60 mls (≥ 3 shots)	6 (66.7)	3 (33.3)	9 (100)	0.3146[a]
<60mls (<3 shots)	2 (28.6)	5 (71.4)	7 (100)	
Total	8 (50)	8 (50)	16 (100)	

[a]Fishers Exact

Qualitative Analysis

Key Informant Interview (KII) sessions across the five affected LGAs revealed that more than 80% of the cases with methanol poisoning were known chronic alcoholics and almost all cases of deaths following exposure occurred among groups of individuals who are known to belong to a 'drinking club' and spend majority of man-hours in the bar. Key informants interview sessions in Gokana and Bonny LGAs also uncovered that the high number of deaths was also attributed to the disbelief of the people that the local gin, commonly called 'Ogogoro' can lead to death. An intriguing scenario was that of a man who in an attempt to prove his strong disbelief to the community, publicly took a large quantity of the suspected local gin and consequently became unconscious few seconds after the intake.

Unlike the other LGAs, key informant interview session in Obio-Akpor LGA showed that intake of dog meat was a common practice among the inhabitants and local gin was used in its preparation. There was no known record of methanol poisoning following intake of dog meat only. The Key informant interview sessions also revealed that the belief in palm oil as the antidote to methanol poisoning was widespread.

Trace Back Findings

Figure 6 below shows the trace back findings from the local gin consumers, to the retailers, then to the distributors and the brewers/alcohol source. The findings revealed that 83.3% (5 out of the 6 identified local gin retailers) was traced back to the common source of Nembe Water side in Port Harcourt.

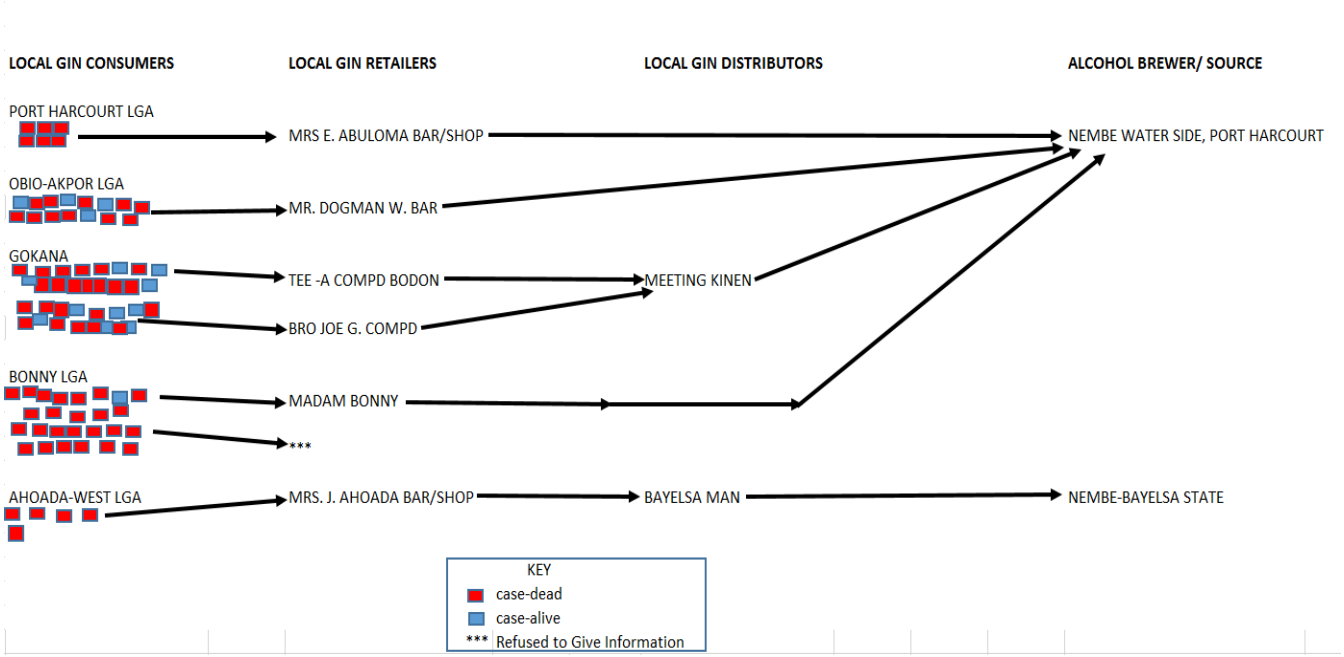


Figure 6: Trace Back Diagram from Local Gin Consumers to Alcohol Source

Laboratory Analysis

The results of the samples of local gin collected from the various retailers and sent to National Food and Drug Administration and Control (NAFDAC) for analysis were positive for methanol poisoning.

DISCUSSION

Methanol poisoning is a rare occurrence in Nigeria and a single case of the disease can be considered an outbreak. The outbreak of methanol poisoning in 5 LGAs of Rivers state was caused by consumption of adulterated and locally made alcoholic drink popularly known as "ogogoro". Laboratory investigations of local gin specimen reveal positive results for methanol poisoning. The peculiarity of the disease is the latent period between the ingestion of the alcohol and the appearance of manifestations. Among the cases, symptoms occurred within 1day of consumption of local gin while a few of the exposed had no symptoms. This difference may be related to the concomitant ingestion of ethanol which affects the metabolism of methanol.[6] Our findings indicate that the quantity of methanol consumed seems to be directly related to the manifestations of signs and symptoms, however our data was insufficient to describe this dose-response relationship or to quantify the lethal dose. The potentially lethal dose of methanol from other studies is variable. The lowest reported is 15 mls.[6] Majority of the cases in this outbreak consumed more than 20mls in a single bout.

The Case fatality witnessed is close to a similar outbreak in Ondo state Nigeria but much lower than that reported in other developed countries such as Czech Republic[13] which reported a fatality rate of 34%,Norway[14](17.6%) and Korea[15](16.7%). This difference can be attributed to ignorance of the disease, delay in assessing health care and limited diagnostic resources in developing world. The sex preponderance highlights the vulnerability of men in the development of the disease as they are more likely to be habitual alcohol consumers. This finding is useful for designing focused and targeted interventions to control the menace. The most frequent clinical features of blindness, abdominal pain and dizziness are consistent with findings in Norway[14], Saudi Arabia[16], Iran[17] and in Ondo state Nigeria[11]. Majority of the cases experienced blindness and/or visual disturbances and studies have revealed that ocular changes correlate to the degree of acidosis[18]. Retinal damage is believed to be due to the inhibition of retinal hexokinase by formaldehyde, an intermediate metabolite of methanol.[16] In the United States[19] and Czech Republic[13], metabolic acidosis and coma were identified as significant parameters associated with mortality. Our investigations reveal that symptoms of toxicity presented quickly and progressed rapidly, finally resulting to respiratory distress and coma in majority of the fatal cases.

The trace back of the source of the local gin to an open market is an indicator that unregulated alcohol production and sale is among the factors behind this outbreak. This is in agreement with similar outbreaks in Libya,[20] where a combination of unregulated and thriving black market in alcohol was responsible for the country's tragedy. Our findings also suggest that the ingestion of palm oil was protective of the development of symptoms. We were acquainted with survivors' account in Gokana LGA where progression of symptoms was said to have been reversed in two survivors after they consumed about 50cl of palm oil. Other studies[13, 21-23] have also identified fomepizole and ethanol as potent antidotes to methanol poisoning.

Further studies are needed to determine the lethal dose of methanol poisoning, identify other risk and protective factors, as well as develop effective treatment modality. There is need to review our local and national alcohol policy, with emphasis on the issue of illegally produced and home-made alcohol. Critical health and policy reforms in collaboration with other countries in the region, and with emphasis on public health preparedness, can dramatically decrease morbidity and mortality associated with outbreaks of methanol poisoning.

LIMITATION

Due to peculiarity of outbreak setting it was difficult to adopt a single study design uniform to all the affected LGA in the State. Most of the line listed cases do not have relatives to volunteer information on the deceased as we had to rely on friends and observers for descriptions. In some cases where relatives were reachable we observed that people are not pleased to identify their relatives as having died from local illicit gin and as such refused to volunteer necessary information needed in this investigation. We could not go to Nembe waterside where all our trace back in all the outbreak setting pointed to due to security challenge. This area is known to be prone to violence and arm groups activities despite a key informants acknowledgement that methanol is traded in this location.

We could not get the relevant authorities to have autopsy confirmation of any of the deaths due to refusal by relatives. The beurecratic process associated in interviewing bar owner where victims at one of the setting drank from before manifesting with symptoms and whom the police had detained delayed the course of the investigation because this party was essential in epidemiologic investigation cascade.

CONCLUSION

The investigation of suspected illicit gin poisoning in Rivers state revealed Relative Risk of 6, Risk difference of 62.5% and Attributable risk percent of 83.3%. The diagnosis of methanol poisoning was confirmed by NAFDAC. A total of 84 cases was identified, of which 70 persons died and of the 14 survivors, 4 are presently blind. Palm oil and alcohol were protective as all the survivors without sequel had palm oil or other internationally brewed gin.

RECOMMENDATION

Sustained awareness campaign

The Social Mobilization Unit of the State, media agencies(electronic and print) should provide continuous awareness as this is key to preventing people from taking illicit gin as having the good understanding of the public is most effective means of controlling this problem

Ban on trade of illicit gin and its enforcement

The State government should ban the trade of illicit gin in the state and follow up with its enforcement. Illicit gin trade at Nembe waterside where the state supply is dependent should be stopped. State government should encourage the destruction of stored illicit gin by compensating dealers so as to have them sincerely cooperate in discarding their stock.

WHO/SMOH should devise a means by which local gin sellers and brewers should easily detect/measure methanol in their products.

Welfare

The SMOH should rehabilitate the survivors. Most of the people who consume illicit gin do so because of social difficulties and economic challenges, therefore victims with disability should be supported financially to improve their quality of life.

Sensitization of health workers

Orientation of health workers/doctors on treatment protocol and surveillance. Social mobilization, health education and long term behaviour communication change programmes should be an ongoing affair in this state and other states where local gin brewing is predominant.

PUBLIC HEALTH ACTION TAKEN

Upon notification of the FMOH, the state Epidemic Response Team (EPR) committee and Rapid Response Team (RRT) instituted a number of interventions which included:

1. Public health enlightenment through mass media: radio jingles, interviews.
2. A helpline was made open and available to the public for information sharing and enlightenment
3. Conveyance of victims to health facilities for case management
4. Development and sharing of case management protocols
5. A pledge to provide some compensation to the families of the victims, and rehabilitation of those who had lost their sight.
6. A task force was set up to investigate source of supply of gin and confiscation of such within the period of the health emergency is ongoing.
7. We counselled the dealers on the need not to sell their product in public interest.

We shared our findings with relevant authorities- State Ministry of Health, WHO etc, for necessary actions.

ACKNOWLEDGEMENT

We sincerely acknowledge the support and contributions of all those who helped to make this investigation a success. In no order of importance, we thank the Director of Public Health in the state Ministry of Health, Dr Onyekwere N., the State Epidemiologist; Dr Nwadiuto I., the state DSNO; Dr Numbere W., WHO State Coordinator, Dr Sylvester, NFELTP Coordinator; Dr Nguku, Patrick. We also thank our teachers at NFELTP for their guidance and above all return all glory to God almighty.

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