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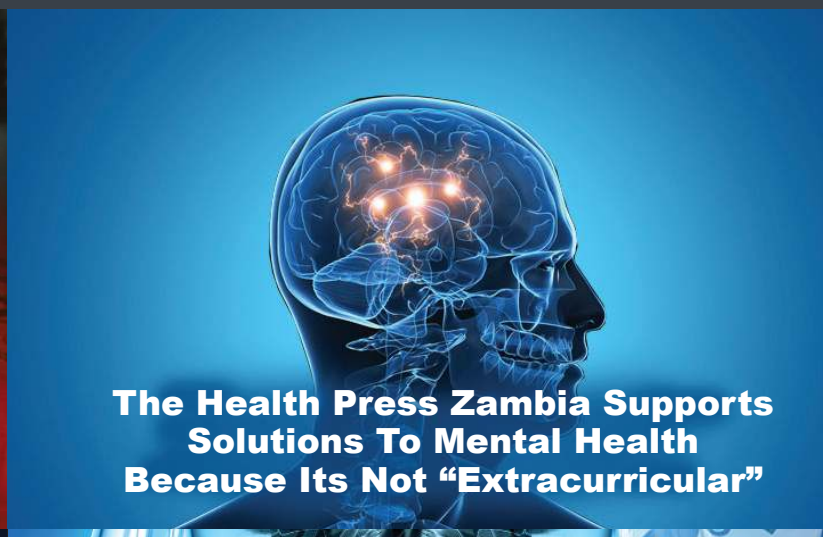

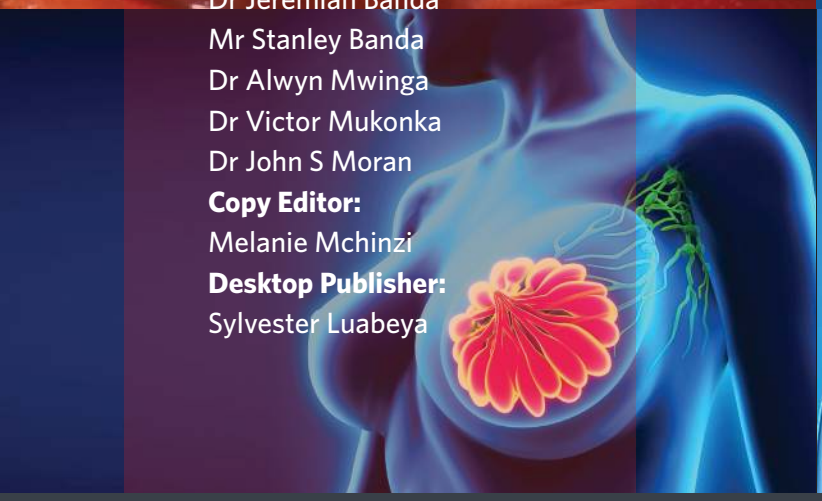

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PREVENTION AND CONTROL IS THE WAY TO GO – A FOCUS ON FOUR CONDITIONS

Editorial

By ML Mazaba

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Welcome to our combined October-November 2018 issue. Our editorial focuses on prevention and control measures for four diseases/conditions highlighted for awareness in October and November 2018: breast cancer, diabetes, mental health, and eye diseases (trachoma).

Breast Cancer

Breast cancer is the most common malignancy in women around the world, accounting for about 25% of all cancers, and there are means to reduce the risk. The global cancer project revealed that in 2015 an estimated 1.7 million new cases of breast cancer were identified and over 500,000 deaths were caused by breast cancer globally in 2012 [1]. Although 100 times more likely to happen in women, men can also get breast cancer. The WHO notes an increase in the incidence of breast cancer "in the developing world due to increase life expectancy, increase urbanization and adoption of western lifestyles" [2].

So how can we prevent and control breast cancer? Studies have been done and various recommendations have been made to prevent and control breast cancer including the following: Women should get screened for breast cancer risk as early detection has been known to improve breast cancer outcome and survival. Limiting alcohol intake reduces the risk of breast cancer as it has been proven that the more alcohol one drinks, the greater the risk of developing breast cancer. Avoiding smoking, as there is accumulating evidence that suggests a link between smoking and breast cancer risk, particularly in premenopausal women. Controlling one's weight, as being overweight or obese increases the risk of breast cancer. Being physically active has been linked to improved well-being, including prevention of breast cancer. Breastfeeding might play a role in breast cancer prevention, and getting early access to treatment has improved outcomes in breast cancer [2,3].

Diabetes

The burden of diabetes has increased globally because of the rise in the prevalence of obesity and unhealthy lifestyles. The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014 [4]. By 2035, up to 592 million people are expected to be affected by diabetes, including both type 1 and type 2 diabetes, with type 2 diabetes accounting for more than 85% of all diabetes cases [5].

According to the WHO, diabetes can be treated, prevented and controlled with the following measures: Correct diet avoiding sugars and saturated fats; increased physical activity with at least 30 minutes of regular, moderate intensity activity daily; medication; and regular screening and treatment for complications [4].

Mental Health

It is anticipated that one adult in four and one child in ten will have a mental health issue exacerbated by human rights violations, wars and violence in the home, schools and businesses each year [6]. Millions of lives are affected around the world, with the sufferers incapable of making it through the day, failing to sustain relationships and to maintain work, especially in the medium to low income countries which account for 80% of the global burden [7].

With 50% or more of mental illness starting around the age of 14, many cases can be prevented by seeking professional help, this following recognition and understanding of the early warning signs and symptoms of mental illness. Psychosocial support can be provided in schools and other community settings and health workers can be trained to detect and manage mental health disorders.

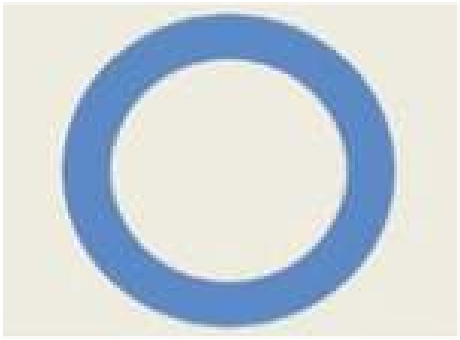
Trachoma

Trachoma, the leading cause of preventable blindness, is caused by a bacterium, Chlamydia trachomatis [8]. Endemic in 49 countries, mostly in Africa, trachoma causes an estimated 5.6 million people to be blind, visually impaired or at immediate risk of blindness and a further 146 million people have active trachoma in need of treatment. This high burden of eye disease is associated with deprivation of basic needs in housing, health, water and sanitation [9].

As countries strategise for elimination of trachoma, prevention and control strategies include: surgery to treat the blinding stage of the disease (trachomatous trichiasis); mass drug administration of antibiotics to clear infection; facial cleanliness; and environmental improvement, especially in areas of water and sanitation [10].

This year's awareness themes relating to the diseases/conditions articulated above were:

For breast cancer with various national and organisational themes such as 'Wear it pink'; 'Defect it, Treat it, Defeat it'; 'Her fight is my Fight'; celebrated in the month of October and highlighted on 19th October to raise awareness, increase attention and support for the awareness, early detection and treatment as well as palliative care of breast cancer.



For diabetes, the theme, 'The Family and Diabetes', to highlight how diabetes affects not just an individual, but spouses and children, was celebrated in the month of November and highlighted on 14th November 2018.

For mental health, the theme was, 'Young people and mental health in a changing world', celebrated globally on 10th October 2018 and aimed at raising awareness surrounding mental health issues around the world and mobilizing efforts in support of mental health.

World Sight Day, which is celebrated on the second Thursday of October, is an annual awareness day aimed at bringing global attention to blindness and vision impairment. World Sight Day 2018 was celebrated on 11 October 2018 with the theme 'Eye Care Everywhere'. THP-Z focuses on trachoma in this issue.

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FEASIBILITY OF INDUCED SPUTUM FOR DIAGNOSIS OF RESPIRATORY DISEASE AMONG HOSPITALISED CHILDREN AT UNIVERSITY TEACHING HOSPITAL IN LUSAKA, ZAMBIA

Original Article

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The use of Induced Sputum (IS) for diagnosis of lower respiratory tract infection has the potential to produce diagnostic samples that are micro-biologically representative of the site of infection among children who cannot expectorate sputum. While IS has become an accepted technique for collecting pediatric respiratory samples in some settings (ref: PMID:28575360 – Murdoch, Morpeth, et al., 2017), this procedure is not routine at the University Teaching Hospital (UTH) in Lusaka, Zambia.

Introduction

Induced Sputum is a technique that plays an important role today in the diagnosis and management of a wide range of respiratory diseases, including tuberculosis,4 lung cancer,1 asthma, 5 COPD,6 and pneumonia,7. It can produce samples for culture, TB smear, and PCR amplification to detect pathogens in the lower airway,8 or for cytology to identify abnormalities of the airway itself. 1,5 The procedure produces these samples by mobilising typically viscous mucus in the lower airway, facilitating its movement up and out of the lungs to be expelled as sputum.

In children, IS is preferred over other techniques for sampling the microbiology of the airway because it is low risk, 6, 15 non-invasive, 10 and produces samples of consistent quality, even in patients as young as 1 month of age,3. IS is also of particular utility in low-resource settings 3 because it is easily performed with minimal training, 3, 10 and at low cost. 13, 14 Thus, in low-resource settings where childhood respiratory diseases are a major concern, we should expect IS to be embraced and widely utilised. To the best of our knowledge, induced sputum is not a routine procedure anywhere in the government healthcare system. Even at the Ministry of Health's flagship institution, UTH in Lusaka, IS was not a procedure that staff were trained or equipped to perform until it was introduced as part of the standard operating procedures for the PERCH project11 in 2011.

Our data show that despite their lack of prior experience with the IS procedure, healthcare workers at UTH were able to safely collect samples with a high standard of quality for PERCH, as evidenced by consistently high Bartlett scores. Thus, introducing IS testing in Zambia would be practical as well as useful.

We feel that IS is an important diagnostic procedure that can and should become routine in health facilities throughout Zambia.

Methods

UTH is one of seven sites of the Pneumonia Etiology Research for Child Heath (PERCH), a multi-country study designed to determine the causes of pneumonia in children under five. Children admitted to UTH with WHO-defined severe or very severe pneumonia were enrolled from October 2011 through October 2013. Children with no contraindications (i.e. hypoxia or bronchospasm) had IS performed within 24 hours of admission. Oxygen saturation and vital signs were monitored throughout and for 4 hours after the procedure. Aerosolized salbutamol was administered for bronchodilation and nebulized hypertonic saline pretreatment along with gentle chest physical therapy (PT) was used to improve mobilisation of sputum. Pulmonary excretions were suctioned out of the nasopharynx using a foot pump and samples were collected into a sterile trap and sent immediately to the microbiology lab for processing.

Methodology

Over a period of 24 months beginning in October 2011, the Zambian PERCH site enrolled children at UTH between the ages of 1 and 59 months who presented with severe or very severe pneumonia, as defined by the WHO.19

IS testing was required for all pneumonia cases in the PERCH project, unless contraindicated because: 1) the patient had oxygen saturation less than 92% on oxygen; 2) the patient was unable to protect their airway; or 3) the patient presented with severe bronchospasm. Clinicians had discretion to exclude patients for other reasons as well. IS was performed within 24 hours of admission in a well-ventilated area under strict droplet infection control, and O2 saturation was monitored by pulse oximetry throughout the procedure and for 4 hours afterwards.

Initially, the clinician cleared the anterior nasal secretions using a tissue or suction device that was then discarded.

With the nose cleared of mucus, subjects were administered salbutamol to prevent bronchospasm during the procedure. This was administered using a spacer device in two 100µg puffs of a metered dose inhaler, ten seconds apart.

After waiting for five minutes for the bronchodilator to take effect, the clinician nebulised the patient with 5mL of 5% saline solution, sometimes in conjunction with oxygen at a flow rate of 5 to 8L/min as appropriate. Nebulisation continued for 10 minutes or until the 5mL of saline was exhausted. Gentle chest percussion aided in the mobilisation of sputum.

Once the child began to cough, a sterile mucus extractor cannula was inserted through the nose into the nasopharynx to aspirate the expectorated sputum.

Once a minimum of 1mL of sputum was collected, the clinician removed the extractor (with suction off to avoid anterior nasal contamination), then aspirated an additional 5mL of sterile, isotonic saline to flush the tube, finishing the procedure.

For the next four hours, patients were monitored for SAEs, which were defined by: 1) a 5% drop in oxygen saturation for 15 minutes; 2) new onset of unconsciousness; 3) a new or increased requirement for bronchodilation; 4) a clinically significant increase in respiratory rate, work of breathing, or oxygen demand, sustained for 15 minutes; or 5) death. In cases of suspected TB, IS was performed a second time, 4 to 32 hours after the initial procedure.

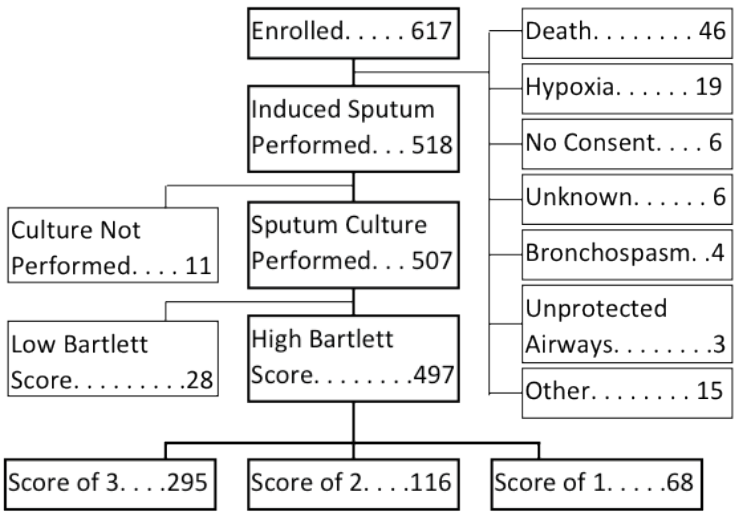
Samples were sent immediately to the lab for processing, where they were subjected to TB testing (via culture and microscopy), bacterial culture and susceptibility testing, and multiplex PCR for 30 respiratory pathogens. To assess the quality of the specimens, Bartlett scores20 were assigned during routine gram stain microscopy based on the number of neutrophils and epithelial cells per field, and the presence or absence of mucus. Samples with more than 25 neutrophils per field, fewer than 10 epithelial cells per field, and mucus were assigned perfect Bartlett scores of 3, while those with fewer than 10 neutrophils per field, more than 25 epithelial cells per field, and no mucus were assigned the lowest score of -2. Specimens with Bartlett scores greater than 0 were considered of high quality, while those with scores less than or equal to 0 were considered of low quality.

Results

617 children were enrolled over a 24-month period. 518/617 (84%) had IS procedures performed, and 507/518 (98%) samples were cultured. 479/507 (94%) of cultured samples were of good quality as determined by a Bartlett score greater than 0. Only 2/518 (0.4%) patients had a serious adverse event (SAE) reported within 4 hours
as a routine procedure in Zambia.

As summarized in Figure 1, 617 pneumonia patients between 1 and 59 months of age were enrolled in the PERCH study over a

Figure 1. Induced Sputum Patient Flow Chart



24-month period in 2011-2013. Of these, 518 (84%) underwent sputum induction. Of the 99 patients that did not undergo sputum induction, 46 (46%) died before the procedure, 19 (19%) were hypoxic, 6 (6%) refused consent, 6 (6%) declined for unknown reasons, 4 (4%) presented with bronchospasm, 3 (3%) had unprotected airways, and 15 (15%) were excluded for other reasons. After the procedure, only 2 of 518 patients (0.4%) recorded an SAE that was possibly related to the sputum induction. Both of these patients had oxygen saturations that dropped below 92%.2/518 (0.4%) patients had a serious adverse event (SAE) reported within 4 hours
as a routine procedure in Zambia.

As summarized in Figure 1, 617 pneumonia patients between 1 and 59 months of age were enrolled in the PERCH study over a 24-month period in 2011-2013. Of these, 518 (84%) underwent sputum induction. Of the 99 patients that did not undergo sputum induction, 46 (46%) died before the procedure, 19 (19%) were hypoxic, 6 (6%) refused consent, 6 (6%) declined for unknown reasons, 4 (4%) presented with bronchospasm, 3 (3%) had unprotected airways, and 15 (15%) were excluded for other reasons. After the procedure, only 2 of 518 patients (0.4%) recorded an SAE that was possibly related to the sputum induction. Both of these patients had oxygen saturations that dropped below 92%.

Table 1. Breakdown of Induced Sputum samples by Bartlett score quality rating

Bartlett Score		n	%	Subtotal (n)	Subtotal (%)
Low Quality	-2 -1 0	2 4 22	0.4% 0.8% 4.3%	28	5.5%
High Quality	1 2 3	68 116 295	13.4% 22.9% 58.2%	479	94.5%
Total		507	100.0%	507	100.0%

Results

As presented in Figure 1, 507 of the 518 IS samples (98%) were cultured, of which 383 (76%) produced at least one bacterial isolate. There were 537 bacterial isolates in total.

All of the samples that were cultured were also evaluated for quality by assigning them Bartlett scores. Of the 507, 479 (94%) were of high quality as indicated by a Bartlett score of 1 to 3, and 28 (6%) were of low quality as indicated by a Bartlett score of 0 to -2. Results are summarized in Table 1.

Conclusion

Induced sputum is a safe procedure that can easily be employed in a low income setting with minimal training. IS could be valuable in the diagnosis and management of community acquired pneumonia, pulmonary TB, asthma, COPD, lung cancers, and opportunistic infections, in Zambian children. IS should be introduced.

We were able to safely and successfully perform IS in a challenging pediatric population. Few patients were unable to undergo sputum induction. Of the 617 in our study, all of whom were challenging subjects for the procedure, given that they presented with severe or very severe pneumonia, only 99 (16%) were excluded. If we set aside the patients that died before their sputum induction time, only 53 of 571 patients (9%) met the exclusion criteria for sputum induction.

Sputum induction in our trial was extremely safe. Even fewer patients had adverse reactions to the procedure: 2 of the 518 that underwent sputum induction (0.4%) met the criteria for a SAE. Both of these patients recorded temporary drops in their oxygen saturation within the 4 hour timeframe, and both eventually recovered.

The IS samples produced in our study were also of very high quality. Bartlett scoring indicated that 94% of samples were high quality, and 58% were of the highest quality. 0.4% of samples were of the lowest quality. IS is an important, low-cost diagnostic technique for pediatric respiratory disease, and yet it has been overlooked in Zambia's respiratory-disease-burdened government hospitals. Our results show that Zambian healthcare workers are capable of learning and executing sputum induction safely, and with high standards of quality specimen collection, it isuseful in pediatric pulmonary tuberculosis and pneumonia aetiology diagnosis, even in a challenging pediatric population. In light of this new information, we recommend the introduction of IS as a routine procedure in the Zambian healthcare system, especially for the treatment of pediatric respiratory disease.

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EFFECTIVENESS OF OPTION B+ IN REDUCING MOTHER-TO-CHILD TRANSMISSION OF HIV: A RETROSPECTIVE COHORT STUDY OF PREGNANT WOMEN IN 6 PUBLIC HEALTH FACILITIES IN LUSAKA, ZAMBIA

Original Article

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Most countries in sub-Saharan Africa were encouraged to adopt WHO recommended Option B+ as a solution to ending mother to child transmission of HIV, but there is a general fear that the evidence for its effectiveness has not fully been demonstrated in different settings. Option B+ was recommended over the other options (A and B) because it would offer long life protection to women even after birth. This would result in suppressed viral load and thus making women live a normal life free of opportunistic infections. Option B+ is an intervention that ensures administering of life-long HIV treatment to HIV infected pregnant women regardless of their CD4 count. Zambia has a generalized HIV epidemic and thus programs that focus on reducing mother to child transmission of HIV ought to have clear evidence of the effectiveness of new interventions so as to correctly focus interventions.

Option A

Under option A, long life anti-retro therapy (ART) provided when CD4 count is ≤350 or WHO stage 3 or 4. In cases where CD4 >350, and WHO stages 1 and 2, antenatal and intrapartum prophylaxis (AZT, NVP, TDF/FTC) provided and this would be extended to infants using NVP syrup for breast feeding infants.

Option B

Under option B, all HIV-infected pregnant women to be initiated on ART regardless of CD4 count. Those with CD4 ≤350, or WHO stage 3 or 4, would be initiated on life-long ART and those with CD4 >350 and WHO stages 1 and 2 to stop ART after delivery if not breast feeding, or after cessation of breast feeding.

Option B+

Option B+ implies administering of life-long ART for all HIV infected pregnant women regardless of CD4 count.

The objective of the study was to compare the incidence of mother-to-child transmissions of HIV infant infections between options A, B and B+ cohorts at six (6) weeks after birth in selected facilities of Lusaka District in Zambia.

Using a retrospective cohort research design, clinical records of HIV+ positive women and their infants drawn from 6 public health facilities of Lusaka were analysed. A two-step analysis was used. The first step involved a bivariate analysis to determine the relationship between the infant's HIV status at 6 weeks and the mother's demographic characteristics. In addition, the relationship between lost to follow up and (prevention of mother to child transmission (PMTCT) options (i.e., options A, B and B+) was analysed. In the second approach, logistic and multinomial regression were used to measure the likelihood of the infant being HIV positive as a function of independent variables options A, B and B+.

The study findings were that options A and B+ recorded 6% infant infections whereas option B at 13%, yielded the highest rate of HIV infection. Attrition measures the rate at which people are lost from the continuum of care due to death, refusals, transfer outs and in assessing attrition levels, Option A recorded the least deaths at 21% compared to 39% in option B and 37% in option B+. Option B+ recorded 39.6% transfer outs (HIV positive pregnant women who move from one facility to another) compared to 24.7% in option B and 30.9% in option A. The results also show that Option A was just as effective as that of option B+.

Conclusion: Antiretroviral treatment (ART) and other effective interventions for the PMTCT can reduce this risk of HIV infection to below 5%. Therefore, option B+ results from the study at 6% infant infections show that the initiative has potential of reducing the HIV burden in Zambia and thereby contributing favourably to the HIV free generation dream. Support activities that ensure less attrition are critical in ensuring successful implementation of prevention interventions so as to reduce transmission of HIV in the target population.

Introduction

With the HIV prevalence rising among adolescents and youth, there is a corresponding increase in the number of children under 5 years of age infected with HIV [2]. Mother-to-child transmission (MTCT) of HIV accounts for over 90% of these cases. The risk of HIV transmission from mother to child, without preventive interventions, ranges from 15% to 40%

[1]. Fasawe, O., et al, in their analysis suggested that Option B+ can be a cost-effective strategy especially with integration of HIV prevention and treatment efforts towards the sole aim of achieving Millennium Development Goals 4, 5 & 6 as well as ensuring universal access to ART [3]. In the case of Malawi, Option B+ was considered a cost-effective strategy for ensuring universal access to ART for PMTCT. This led to significant increases in women who initiated ART during pregnancy [4]. There are studies that demonstrated the lowest risk of transmission among women who initiate ART before conception in comparison with those who initiate ART during pregnancy [5].

Exploring the performance of the option B+ initiative in comparison with the previous interventions, presents a great opportunity to review and strengthen current and future programs. A clear understanding of both infant and maternal outcomes is helpful to ensure the realization of an AIDS free generation. In PMTCT, one of the major goals is to ensure that children born from HIV+ mothers are free of infections. Success of PMTCT programs is measured by exploring the rate of infant survival owing to being born without infection. In a country like Malawi, successful implementation of Option B+ brought about increased availability, accessibility and utilisation of PMTCT services. The main driver of the success was the rapid expansion of integrated PMTCT/ART services to all Maternal, Neonatal and Child Health (MNCH) sites [2].

Methods

Study design

A retrospective cohort study was adopted. Routinely collected health facility cohort reports and medical records that are validated for quarterly reporting were used to review the incidence of mother to child transmission (MTCT) among three cohorts that were formed based on treatment options (Options A, B and B+) prescribed. Live infants born from HIV+ pregnant women from the selected cohorts were also included in the study.

Data were collected from medical records for Option A and Option B cohorts that received services at the health facility during the period of 1st January 2012 to 31 December 2012 and the Option B+ Cohort that received services at the health facility during the period of 1st January 2014 to 31st December 2014. The differences in time periods arises from the fact that the PMTCT initiatives were not administered at the same time. Loss to follow-up (LTFU) was defined as HIV positive pregnant women who upon initiating ART did not return for continued services for over a period of three (3) months or 90 days.

Study setting

The study was conducted in predominantly low-income, high-population density urban clinic settings of Lusaka, Zambia. Lusaka is comprised of multilingual ethnic groups, with Bemba and Nyanja being the most widely spoken local languages. [6].

Sampling method

A /list of the f pregnant women in the clinical catchment areas was subsequently narrowed down to those that were HIV positive. Drawing from a total number of 23 government owned health facilities that reported their PMTCT 2014 annual program results (APR) to PEPFAR Zambia, five health facilities, which implemented prior to the commencement of option B+, and started the new initiative were selected using systematic sampling.

Sample size and selection procedure

A two-stage sample design was adopted where the first stage health facilities were selected from a frame of 23 facilities. At the second stage persons/medical records were selected from each of the selected health facilities randomly.

In this regard, sampling started by selecting an element (health facility) from the list at random. The random start was the number randomly selected between 1 and thereafter every kth element in the frame was selected until the required sample size was reached, where k, is the sampling interval: This was calculated as =N/n; where n is the sample size, and N is the population size. Therefore, with 23 facilities k was every 5th healthy facility until a sample size of 5 was reached.

The level of significance ($p<0.05$), Power of 80%, the standard deviation and understanding of underlying event rate in the population were considered during sample calculation. The formula used for calculating the sample size of individual medical records is shown below:

$$n = [(z^2 * p * q) + ME^2] / [ME2 + z^2 * p * q / N]$$

Where:

n= sample size

z= standard score

ME= Margin of error

P= proportion of sample elements that have a particular attribute.

q= proportion of sample elements that do not have a particular attribute, so q = 1 - p.

N=Total population

Statistical Analysis

Data were analyzed using STATA version 12 (12.0 Copyright 1985-2011 StataCorp LP Statistics/Data Analysis, StataCorp, 4905 Lake ay Drive, College Station, Texas 77845 USA). The analysis was done in two steps. The first step involved a bi-variate analysis in order to generate the average percentages of children who tested positive at 6 weeks. This analysis also helped to highlight the relationship between attrition levels and elimination of mother to child transmission (emtct) options (Options A, B and B+). In addition, multivariate logistic regression was used to measure the effect of independent variables on the HIV status of children at 6 weeeks.

Variables

We abstracted the following outcome variables one year after ART initiation for all women: 1) alive and on ART; 2) died for any reason; 3) defaulted (defined in the national guidelines as not seen in the ART clinic and off ART for more than 90 days, and not known to have died or transferred out); 4) Infants alive and their HIV status. Other treatment variables recorded included switching (one or more medication changes) of ART to another regimen due to toxicity.

Ethical Considerations

This research was reviewed and approved by the University of Zambia Biomedical Research and Ethics Committee (UNZABREC). Administrative approval to access clinical records was also obtained from the Ministry of Health, at national and district levels. To ensure confidentiality, medical records were reviewed at the sites without moving them to other locations. Names and other personal identifiable information were not collected during the study.

FINDINGS

The objectives of the study were to: assess the association of incidence of mother-to-child-transmission of HIV and ART treatment options A, B and B+ cohorts at six (6) weeks of age; and 2) analyze the attrition levels at 3 months after giving birth (?) among HIV+ pregnant women under options A, B and B+.

Description of the study population

This section presents the age distribution of the mothers included in the study as well as analysing the baby mother pair HIV status by age category.

Table 1: Independent variables relative to the outcome variable (Infant HIV status)

Variables	Coef.	OIM	Z	P>z	[95% Conf. Interval]	
		Std.Err.				
Option	0.025	0.005	-4.61	<0.001	-0.035	-0.014
Age	0.084	0.008	-10.46	<0.001	-0.1	-0.068
Education	0.026	0.006	-4.26	<0.001	-0.038	-0.014
Toxicity	0.467	0.015	-31.22	<0.001	-0.496	-0.44
Attrition	0.012	0.004	-2.97	0.003	-0.020	-0.004
Marital status	0.063	0.007	8.82	<0.001	0.049	0.076
Defaulted	0.039	0.014	-2.74	0.006	-0.067	-0.011
Adherence	0.089	0.015	-6.07	<0.001	-0.118	-0.061

Table 2: Distribution of Respondents age (mothers)

Age	Count	Percentage
<15	213	8.6
15-24	1013	41.1
25-34	1063	43.2
35+	174	7.1
Total	2463	100.0

Table 2 highlighted the age distribution of women that met the inclusion criteria and results showed that the highest number belonged to the age group 25-34 years at 43.2 percent. The lowest age group was that of above 35 years at 7.1percent.

Mother's age and HIV test results of the infants at 6 weeks

Table 3 showed a higher infant positivity rate of 71.4 among infants of mothers who were below the age of 15 years. This shows that age is an important factor in determining the influence of disease and designing appropriate interventions. Mothers who are below the age 15 are adolescents who may have limited understanding of the importance of PMTCT and thus this may explain the reason behind having high infant positivity in this age category.

Table 3: Mothers age and HIV test results of infants at 6 weeks

Childs HIV Status at 6 weeks	Child's HIV Status at 6 Weeks				
	Positive		Negative		
	Count	%	Count	%	Total
Mother's Age					
<15 Years	152	71.4	61	28.6	100%
15-24 years	49	4.8	964	95.2	100%
25-34 Years	6	0.6	1057	99.4	100%
35+ years	7	4	167	96	100%
Total	214		2249 P <0.001		

P <0.001

It is also prudent to realize that some of the adolescent mothers may have been born with HIV themselves and at reproductive age have a greater chance of transmitting the virus to their babies. Programs and initiatives that are aimed at providing support in a PMTCT setting need to be strategic in targeting to ensure more focus on this important age group.

Figure 1: Mother's age against infant HIV test results

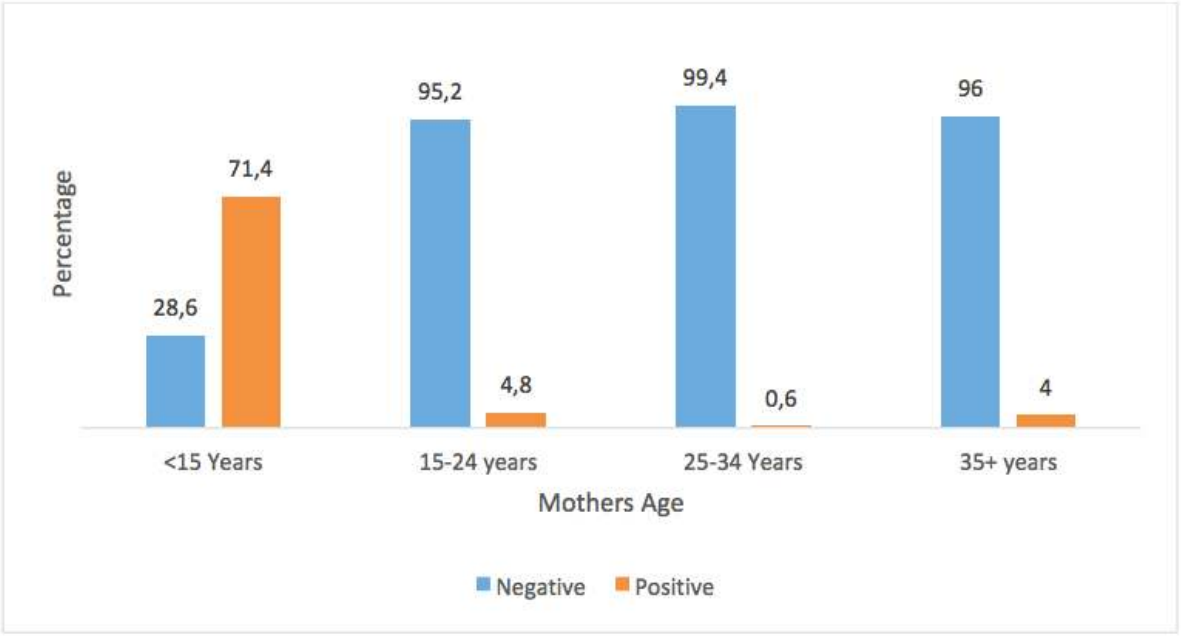


Figure 1 highlights the need to conduct cohort monitoring in HIV/AIDS programs so as to ensure that prevention initiatives produce results that contribute to epidemic control. Therefore, the number of women tested in a PMTCT setting is important, but it is now crucial to also measure the positivity yield by age and location for effective epidemic control. For example, the age group of women above 35 may be neglected in prevention education and activities but further analysis may help to understand the disease burden and aid in developing age appropriate initiatives.

Education of mother and their infant HIV test results

Table 4 helps to evaluate the influence of the education of a mother on the HIV results of their infants at 6 weeks. Women with no education recorded the highest rate of 43.6% infant positivity rate across all the cohorts. The findings have shown association between the mother's level of education and the Child's HIV status at 6 weeks of survival (p<0.001).
ts born from HIV+ pregnant

Figure 1: Mother's age against infant HIV test results

Childs HIV Status at 6 weeks	Child's Status at 6 Weeks				
	Positive		Negative		
	Count	%	Count	%	Total
Mother's Education Level					
No Education	199	43.6	257	56.4	100%
Primary	5	0.6	813	99.4	100%
Secondary	10	1	1014	99	100%
Total	214		2084		

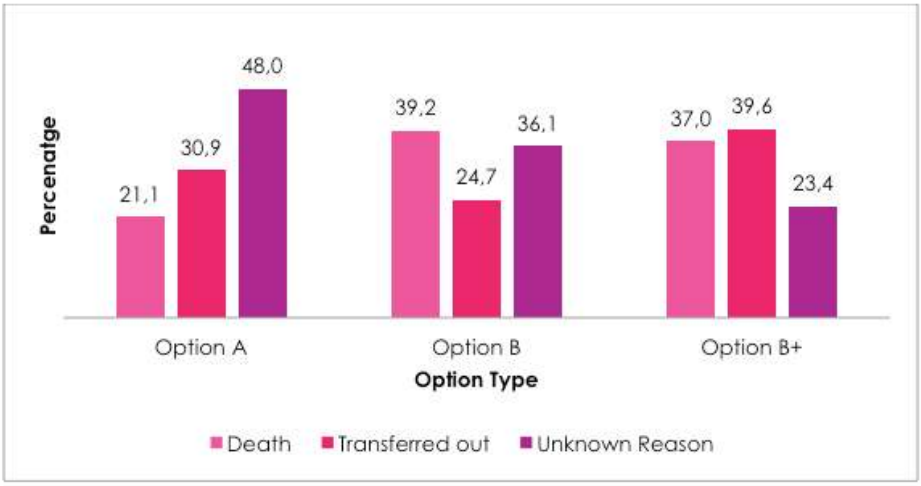
P <0.001

The results from Table 4 above clearly bring out the importance of an educated population in understanding the importance of prevention initiatives. Further, this evidence implies that women who are not educated are more likely to transmit HIV to the infants compared to their educated counterparts.

Attrition levels

The results from figure 2 show that Option A recorded the least deaths of mothers at 21% compared to 39% in option B and 37% in option B+. Option B+ recorded 39.6% transfer outs compared to 24.7% in option B and 30.9% in option A. This shows that option B+ does not show superior results in reducing death among HIV positive pregnant.

Figure 2: PMTCT Options and attrition



HIV status of Infants

In exploring whether we can confidently rank Option B+ as the most effective method of preventing infant HIV infections from HIV positive mothers, the results in table 5 show that Option A was just as effective as that of option B+, because both options A and B+ had a 6% infant positivity rate with option B yielding a 13% infant positivity at 6 weeks.

Table 5: PMTCT Options and corresponding infant HIV status

Results/Status	OPTIONS						
	Option A		Option B		Option B+		Total
Negative	766	94%	741	87%	742	94%	2249
Positive	48	6%	115	13%	51	6%	214
Total	814	100%	856	100%	793	100%	2463

P<0.001

Discussion

The main drive behind the research was to explore the effectiveness of option B+ in comparison to options A and B. Option B+ would ensure long life treatment of HIV regardless of CD4 count. The research aimed at examining HIV infant infections among the options as well as exploring attrition levels. Kieffer, M.P., et al, in their analysis indicated that with Option B+, the total proportion of HIV+ pregnant women in ANC accessing ART across selected countries increased to 80%–95%,with a proportion of pregnant women already on ART at entry into ANC lingering around 30% as of December 2013in most countries.[7]

Some of the documented benefits of option B+ include:

- Protection from Mother To Child Transmission of HIV in current and subsequent pregnancies
- Protection for negative partners in sero-discordant couples
- Reduction in HIV-related maternal mortality [8]

Is cardinal to be borne in mind that both options A and B have not been directly tested in a trial to ascertain efficacy but the general studies demonstrate that the lowest rates of transmission occur among women on ART at the time of conception. In addition, there are modeling studies that predict improved maternal health outcomes with the use of B+. For example, Ahmed, S indicated a prediction of an increased undiscounted maternal life expectancy of 1.16 and 1.12 years as compared to A and B, respectively. In the circumstances,

it is still important to remind ourselves that we have no randomized clinical trials that can help to determine whether starting lifelong ART at higher CD4 results in measurable health benefits in comparison to delaying initiation until CD4 declines to 350 or less [9].

The results from the research clearly show that option B+ was closer to the WHO findings in averting infant infections. On the contrary, there are some studies that used focused group discussions and the participant's expression on Option B+ was negative because of the fear of drug side and challenges of lifelong daily medication [11]. It is therefore, important to also note that on its own, option B+ is not a panacea to the global strategy of an HIV free generation. Other prevention and education strategies are required to ensure effectiveness such as adherence to medication, good nutrition, use of condoms in prevention and best practices that help in averting infant infections are implemented in a PMTCT setting.

Some of the research conducted in some parts of the world show partial benefits of option B+ but this also came with concerns such as the risk of long-life ART to fetuses and infants, as well as adherence challenges for pregnant and breastfeeding mothers.[9]. The foregoing statement is in line with the current research findings which highlighted very high levels of attrition even in option B+. A comprehensive approach to implementation of option B+ as well as other HIV prevention strategies should be adopted so as to bring about more gains in achieving the desired goals. One of the documented strategies highlights the need to employ counselling on people affected and infected with HIV on the side effects of ARV drugs. This does not eliminate the problem because women who experience side effects of ARV drugs are in most cases less likely to develop trust in the treatment and adhere to it [12].

From the research findings, it was clear that education and age levels were critical in influencing the results of initiatives such as PMTCT. A country like Zambia with high illiteracy levels requires a comprehensive approach to combating the spread of HIV from mothers to their un-born infants. Education of mothers in their local languages on the importance of ensuring an HIV free generation should be stepped up to ensure reduction of infant infections in the population with low education levels. Age-appropriate techniques are also required to ensure that the most at risk populations of adolescent girls are reached with suitable prevention messages. Other countries have adopted the safe space technique that ensures environments where young women can freely express themselves and thereby helping to break the stigma and low uptake of services.

The Zambian context requires the availability of ongoing adherence and retention tracking systems that can help to better inform program implementers and stakeholders of possible challenges so as to bring about quick interventions. Some studies agree by suggesting the need to invest in data systems, the development of more sensitive indicators to follow each mother–baby pair through the risk period for MTCT, and the enhancement of training and mentoring in order to accurately collect, analyze, and interpret such data [7].

The results from the study also highlighted the need to reduce on attrition levels to acceptable levels so as to ensure effectiveness of interventions such as option B+. Some schools of thought ague that attrition from ART care is influenced by an interplay of personal, social and health systems status. It is further argued that long waiting times for medical care and time lost seeking health services actually force individuals to balance physical health with social integrity, and thus may decide to opt for faith healing and traditional medicine [6].

The results from figure 5 clearly show that option B+ had attrition levels that were over 10% and as such this had a bearing on the acceptable aversion levels of infant HIV infections. The results give emphasis on the importance of managing attrition to very low levels so as to bring about success of a program. The predominant factors enabling uptake of HIV testing are deterioration of physical health and/or death of sexual partner or child [13]. The administering, therefore, of medications without considering factors such as attrition levels and their management thereof may result in poor achievements even from initiatives that may have been proven to be successful in other settings. Some studies however still encourage the scale up of option B+ in countries with the highest rates of loss to follow up and mortality [14]. However, others argue that more patient-level research may be required to adequately guide policy recommendations and implementation [15].

In responding to the research questions and objectives that aimed at finding out whether option B+ had superior results in averting infant HIV infection, the results in table 3 indicated that at 6% positivity rate, option B+ was a very effective method in preventing mother to child transmission of HIV. The risk of HIV transmission from mother to child, without preventive interventions, ranges from 15% to 40% [1]. Countries like Malawi consider option B+ as the only choice for the country because of option A and B's dependency on accessible, functional, and efficient laboratory services for CD4 count testing, which are not universally available in Malawi [16].

Option B+ results from this study produced results that were below the WHO estimates and thus was effective in helping to reduce infant infections of HIV from positive mothers. Other options in the study (A and B), were also below the WHO estimates at 6% and 13% infant infections respectively. Option B+, therefore, had results that were good enough to prove that it is a very effective initiative.

Estimates indicate that, in all four countries, transmissions from mother to child are lower in Option B+ compared with Option B because of lower risks of transmission when the mother is on ART before the initiation of pregnancy. In Kenya and Zambia, because of high fertility rates and short birth intervals, the additional time on maternal ART prophylaxis in Option B+ compared with Option B is very short. These additional costs of ART are outweighed by its benefits in averting infant infections and future costs.[17].

Option B+ was conceived with the vision of eliminating new cases of HIV infection among children. Early results show adequate uptake and retention of pregnant and breastfeeding women in Option B+,8,9 and this study shows good results for programme retention among HIV-exposed infants. It is likely that HIV infections in infants will decrease and that follow-up of exposed infants will improve over time, as, by removing the gating CD4 step from the HIV care cascade, more mothers will receive ART.[18]

Conclusion

The aim of the study was to evaluate the effectiveness of options A, B and B+ in eliminating mother to child infection of HIV. Further, the analysis brought out the comparisons between options B+ and the prior options so as to help the understanding of the shifts in averting infant HIV infections from their HIV positive mothers at 6 weeks. Attrition was also an important consideration in the objectives which would help to ascertain effectiveness. Results from the study showed that option B+ was very effective in reducing infant infections despite not being more superior to option A.

Notwithstanding the benefits of Option B+, this medical approach had very high attrition levels of 37% deaths, 40% transferred out and 23% unknown reasons which were above acceptable limits of 5-10%. The results show that to ensure effectiveness of option B+, a more comprehensive approach to PMTCT initiatives is required that focuses on promoting adherence to treatment and addressing attrition levels. This entails more intensified and personalized counseling to identify potential defaulters and promote the benefits of uptake of treatment regardless of one's physical condition.

This means a cascade approach that ensures that programs in PMTCT cover all the key aspects of treatment, breast feeding and messaging. In addition, general prevention monitoring is needed for effective management and prevention of new infections. Without treatment, the likelihood of HIV passing from mother-to-child is 15 to 45%. However, antiretroviral treatment (ART) and other effective interventions for the prevention of mother-to-child transmission (PMTCT) can reduce this risk to below 5%.[19] Therefore, option B+ results from the study at 6% infant infections show that the initiative has potential of reducing the HIV burden in Zambia and thereby contributing favorably to the HIV free generation dream.

Declarations

I hereby declare that this research paper has not been submitted for publication in any other journal.

Ethical approval and consent to participate

The study was approved by the University of Zambia Biomedical Ethics Committee. Administrative approval was also obtained from the Zambian Ministry of Health.

Availability of data and materials

The authors declare that the data supporting the findings of this study are available within the article.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

BH conceptualised the study, conducted data collection and analysis, and wrote the draft manuscript. MM, LN, JB contributed towards the conceptualisation of the study, providing input in the analysis, interpretation of findings and drafting of the manuscript. All authors have given final approval of the version to be published

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TRACHOMA IN ZAMBIA

Short Communication

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Trachoma is a neglected tropical disease caused by the intracellular bacterium Chlamydia trachomatis. It is common in populations that have inadequate access to safe and clean water and where sanitation and hygiene is poor. In Zambia, as elsewhere, such populations tend to live in remote and rural areas, and to be very poor. The prevalence of active trachoma is Zambia ranges between 5% and 29%.

Chlamydia Trachomatis is transmitted in eye and nose secretions via fingers, fomites (such as face towels and clothing) and eye-seeking house flies particularly between members of the same household. Infection may be associated with active (inflammatory) trachoma, which often meets the criteria for trachomatous inflammation—follicular (TF) and/or trachomatous inflammation—intense (TI), signs defined within the WHO simplified trachoma grading scheme. Active trachoma is common and more intense in children up to the age of 9 years and the prevalence is lower in older individuals. Repeated episodes of infection and associated inflammation are needed for the development of significant conjunctival scarring (TS) and for the trachomatous trichiasis (TT).

Blindness from trachoma is prevented using the SAFE strategy, which includes Surgery for TT, Antibiotics to treat infection, and Facial cleanliness and Environmental improvement to reduce transmission. The S component of SAFE should be offered to anyone with TT. The A, F and E components of SAFE are administered to whole populations in which the TF prevalence in 1–9-year-olds is more than 5%. Programmatic planning for public-health-level approaches for reducing both the prevalence of TT and TF relies on prevalence estimates of these signs, which are generated through population-based surveys. The surveys conducted in Zambia between 2016 and 2017 showed 16 districts, total population 1,473,707) had TF prevalence estimates in children of ≥5%. This shows that trachoma is a disease of public health significance in the country.

Having conducted the above surveys and established the magnitude of the trachoma problem, Zambia has embarked on programme to eliminate trachoma by the year 2025. The government and the cooperating partners are strongly focused on implementing the SAFE strategy through a comprehensive and multi-sectoral strategy. This can catalyze development partnerships whilst offering primary, secondary and tertiary prevention against trachoma blindness.

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SOME FACTS ABOUT BREAST CANCER

Short Communication

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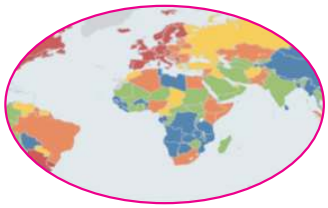
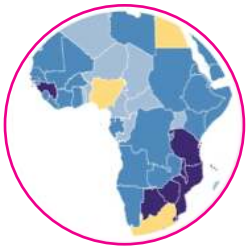
- Cancer is one of the world's leading causes of morbidity and mortality
- It is estimated that by 2030 cancer will kill one million Africans each year.
- Breast and cervical cancer are the most common malignancies and cause of cancer-related death among women
- 1 in 8 WOMEN will be diagnosed with Breast Cancer in their lifetime



GLOBAL SCALE

Globally the majority of new breast cancer diagnoses and deaths occur in developing countries as opposed to Western countries. The higher number of cases in developing countries is partly due to their larger portion of the world's population.



BREAST CANCER BURDEN IN AFRICA

In Africa, breast cancer is responsible for 28% of all cancers and 20% all cancer deaths in women. The average age of diagnosis of breast cancer among African women tends to be women 50 years or younger.

BREAST CANCER IN ZAMBIA

Specific data has indicated that breast cancer incidence in Zambia has been rising over the years. Between 1990 and 2009 the most reported cancers in females were cervical cancer (48.5%) and breast cancer (11.4%). Breast cancer in Zambia in 2012 had over 20% incidence and 10% mortality.

Controlling Cancer In Zambia

The Cancer Diseases Hospital (CDH) in Lusaka is the first and only cancer treatment center offering radiation therapy in this country of over 14 million people.The CDH is mandated to ensure that all Zambians have equity of access to not only radiotherapy treatment for Cancer, but all modalities of cancer treatment including chemotherapy and surgery.

Breast cancer can be stopped from spreading if identified in time!

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YOUNG PEOPLE AND MENTAL HEALTH IN A CHANGING WORLD

Short Communication

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Young people aged 10-24 years old represent 27% of the world's population [1] and a large percentage of them are vulnerable to mental health problems. Mental health problems begin to manifest by age 14 years with 10-20% of children and adolescents experiencing mental disorders according to the WHO. Mental health disorders are a leading cause of health disability in 10-24 years age group [2].

According to the WHO Mental Health, the top three mental disorders among children and adolescents which can be generalized in all regions of the world are: Alcohol and Substance Misuse Disorders, Suicide; and Depression [2].

Various factors have been linked to mental health problems among children and adolescents including and not limited to: sexual abuse, internet addiction, bullying, divorce of parents, death of a parent, exposure to violence, physical and emotional abuse, neglect, substance misuse, early sexual activity and risk taking behaviour [2,3,4]. Chainama Hill College Hospital, a tertiary institution specialized in mental health in Zambia recorded 39.7% patients with Alcohol induced disorders, increasing from 37.3% in 2015.

Cannabis use amongst teenage girls has been linked to depression and anxiety with daily users having a higher risk. It has been documented that use of cannabis in adolescents increases the risk of experiencing symptoms of schizophrenia in adulthood [5,6].

A mixture of codeine cough syrup referred to as "purple drink" commonly taken among high school and college students and featured prominently in rap music videos has been linked to mental disorders [7].

Despite being of major public health concern, there are many challenges surrounding mental health among young people including shortages of mental health facilities and professionals especially in the developing countries, stigma associated with the illness, lack of adequate policies , inadequate resources, easy access to alcohol and dangerous substances leading to road accidents among others [2].

Outcomes of mental disorders include disruption of normal lifestyle, suicidal ideation and actualization and death. It is important that the policy and law makers put in place laws and strategies that will contain alcohol, cannabis and drug access by adolescents; set up rehabilitation centers; and strengthen child and adolescent mental health services.

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INFLUENZA SURVEILLANCE MONTHLY BULLETIN

Surveillance Report

Ministry Of Health (Virology Laboratory – Zambia)

Updated: 23/11/2018

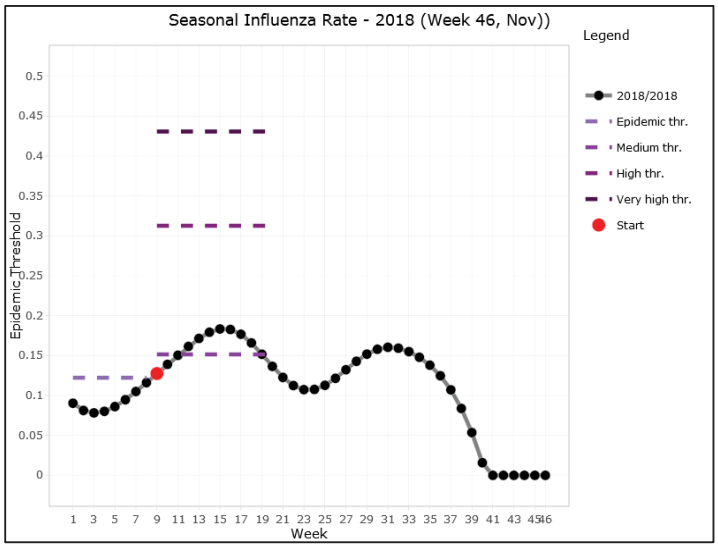

Fig 1: Rate of Influenza (Week 46 Surveillance in 2018)

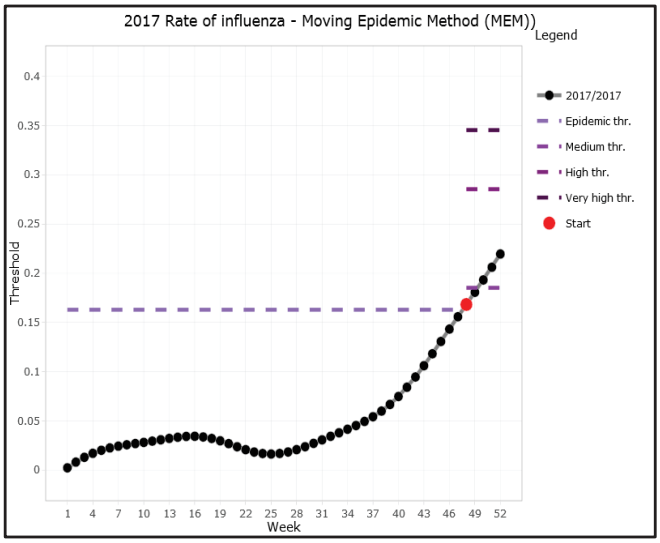

Fig 2: Rate of Influenza (Surveillance in 2017)

The graphs are extracts of a web based Moving Epidemic Method application for determining the Influenza threshold in weeks. In 2018 week 46, surveillance shows that the start of the influenza Epidemic was in **week 8**, through to **week 36**. The epidemic **week 8** recorded **10** positive influenza cases from a total of **86,** PCR processed samples thereby attaining a **Medium Epidemic threshold** in **week 11**, with an epidemic peak being identified in **week 16 (medium threshold)**. The peak recorded a total of **22** positives from 77 PCR processed samples and that occurred in the first epidemic cycle. A second epidemic cycle in 2018 started in week 26 through to week 36 and it recorded a peak number of **12 positives** from a total of 53 PCR processed samples in week 30. In contrast, the 2017 (as @ Week 41) surveillance showed no epidemic start and had single Epidemic cycle. However, the start of the influenza epidemic was in week 48, which recorded a total of 12 positive influenza cases from a total of **51,** PCR processed samples. While the epidemic peak was identified in **week 52**; with a total of **15** positives out of **63**, PCR processed samples.

Note: The information can be correlated to the influenza data file in Excel for weekly reports.

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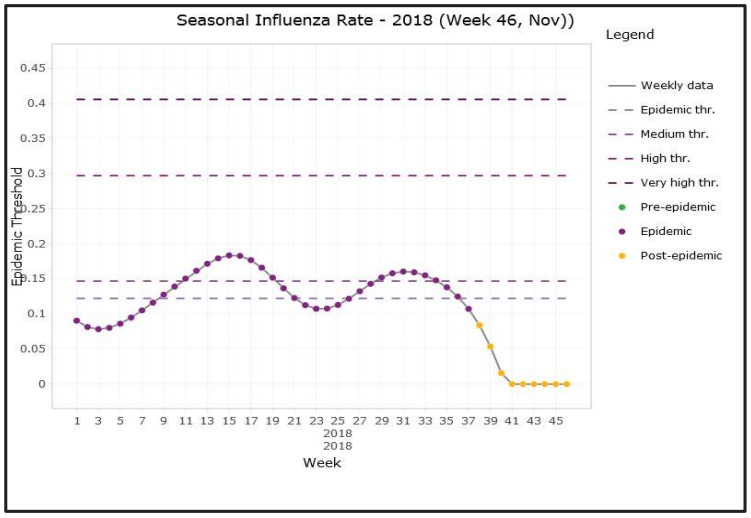

Fig 3: A seasonal Influenza rates as @ week 46 in 2018, shows a steady influenza epidemic which started in week 7 and reached a Medium threshold in week 21 with its peak being in week 16. The flu epidemic period lasted for 10 weeks and the period showed two (2) cycles; a first in week 9 while a second cycle of the flu epidemic started in Week 25.

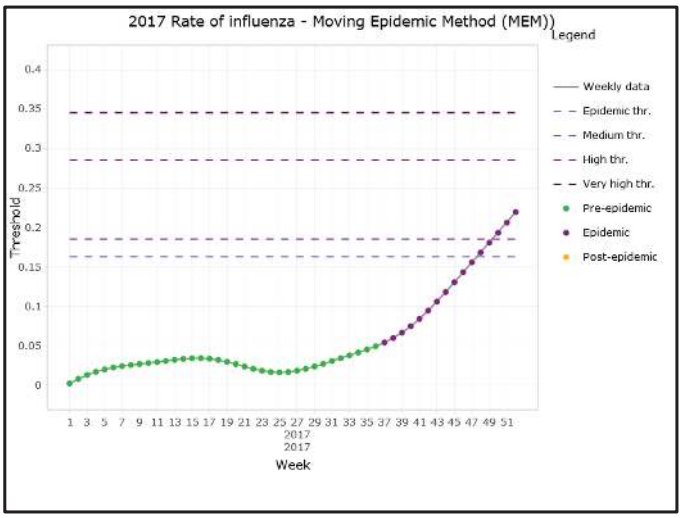

Fig 4: The 2017 seasonal Influenza rate as @ week 52 showed a steady flu epidemic which started in week 37 and reached a Medium threshold in week 49 with its peak being week 52. The flu epidemic period lasted for 9 weeks. This flu period showed only single flu cycle.

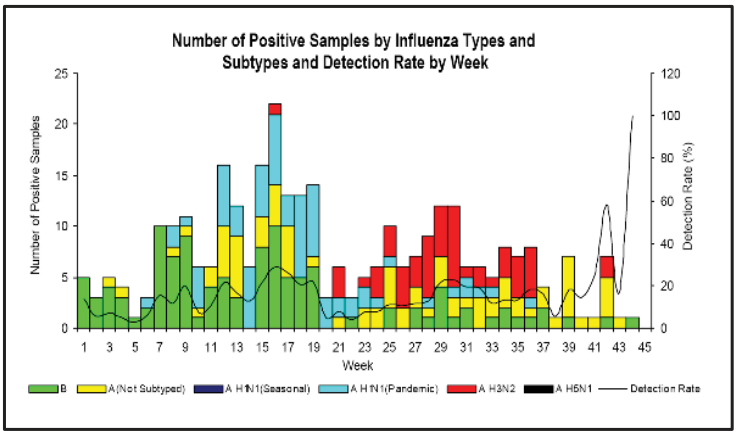

Fig 5: Positive influenza samples by subtypes (October in 2018). A random spread of influenza subtypes was seen throughout weeks, 1 – 43. A high number of subtypes B and H1N1 were detected at the beginning of the year [week 1 -19] while, the current prevalence shows a steady increase of positive flu subtype H3N2 [Week 21- 36] with a few flu b subtypes.

Cumulative Number of Identified Influenza Types and Subtypes and Total Number of Samples Collected by Case and Hospital/Clinic

Case	B	A (Not Subtyped)	A H1N1 (Seasonal)	A H1N1 (Pandemic)	A H3N2	A H5N1	Total Samples Tested
ILI	64	33	0	42	23	0	918
SARI	32	34	0	20	21	0	1043
Unknown	18	11	0	9	11	0	353
Total:	*114*	*78*	*0*	*71*	*55*	*0*	*2314*

Hospital/Clinic	B	A (Not Subtyped)	A H1N1 (Seasonal)	A H1N1 (Pandemic)	A H3N2	A H5N1	Total Samples Tested
Arthur Davison	8	8	0	10	4	0	179
Chipata Clinic	19	24	0	34	9	0	365
Ndola Central	15	10	0	2	16	0	436
New Masala	45	10	0	9	14	0	575
UTH Filter	8	10	0	1	5	0	337
UTH Pediatric	19	16	0	15	7	0	422
Total:	*114*	*78*	*0*	*71*	*55*	*0*	*2314*

Fig 6: The Total samples Processed as of 23rd November 2018, is 2314. 318 (14%), are positives and 1996 (86%) negative samples. Flu Case Identification included a total of 918 (40%) ILI and 1043 (45%) SARI Cases classified.