(TSAP) - Antimicrobial pre-treatment and blood culture positivity rates for *S*. Typhi, *i*NTS and other invasive bacterial pathogens

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Background

-Typhoid Fever (TF) is caused by *Salmonella enteric* serovar Typhi and is a vaccine preventable disease

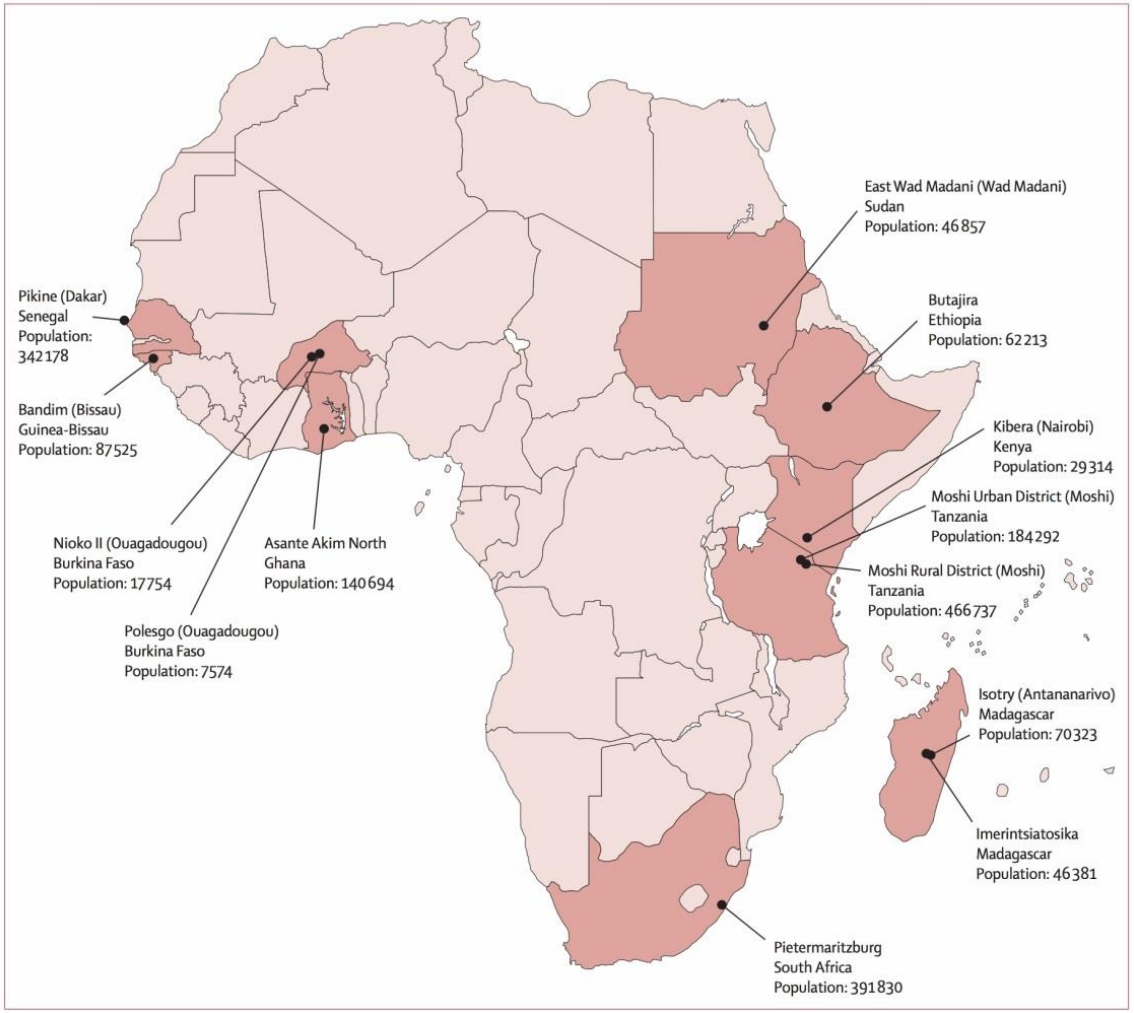
-TF requires the identification of *Salmonella* Typhi (*S*. Typhi) bacteria through blood culture

-Patients commonly treat themselves with antibiotics prior to the establishment of a final diagnosis

-We investigated the effect of pre-usage of antibiotics* on blood culture results from invasive bloodstream infections caused by *S.* Typhi and non-typhoidal *Salmonella* spp(iNTS) compared to other invasive bacterial pathogens

*Defined as patient reporting using antibiotic to treat the current illness prior to visiting the healthcare facility recruiting for TSAP

Methods



-Study period

: March 2010 to January 2014

-Location

: 13 health facilities, 10 countries (Burkina Faso, Ethiopia, Ghana, Guinea-Bissau, Kenya, Madagascar, South Africa, Senegal, Sudan and Tanzania)

-Data preparation

: Used all recruited patients during the study period which is different with published TSAP main paper*

: 20,352 all recruitment patients

: Standardized procedure (Lab, case definition, etc.)

: Data collected on pre-usage of antibiotic

-Data capturing

: 6 countries captured by Foxpro database developed by IVI
4 countries database extract from existing database

-Analysis

: Data on blood culture positivity and pre-usage of antibiotics analyzed by logistic regression with stratification measure (SAS, version 9.4)

* The incidence of invasive *Salmonella* disease in sub-Saharan Africa: a multicenter population-based surveillance study. Manuscript submitted to the *LANCET Global Health* journal on 6Oct16.

Blood culture results by country

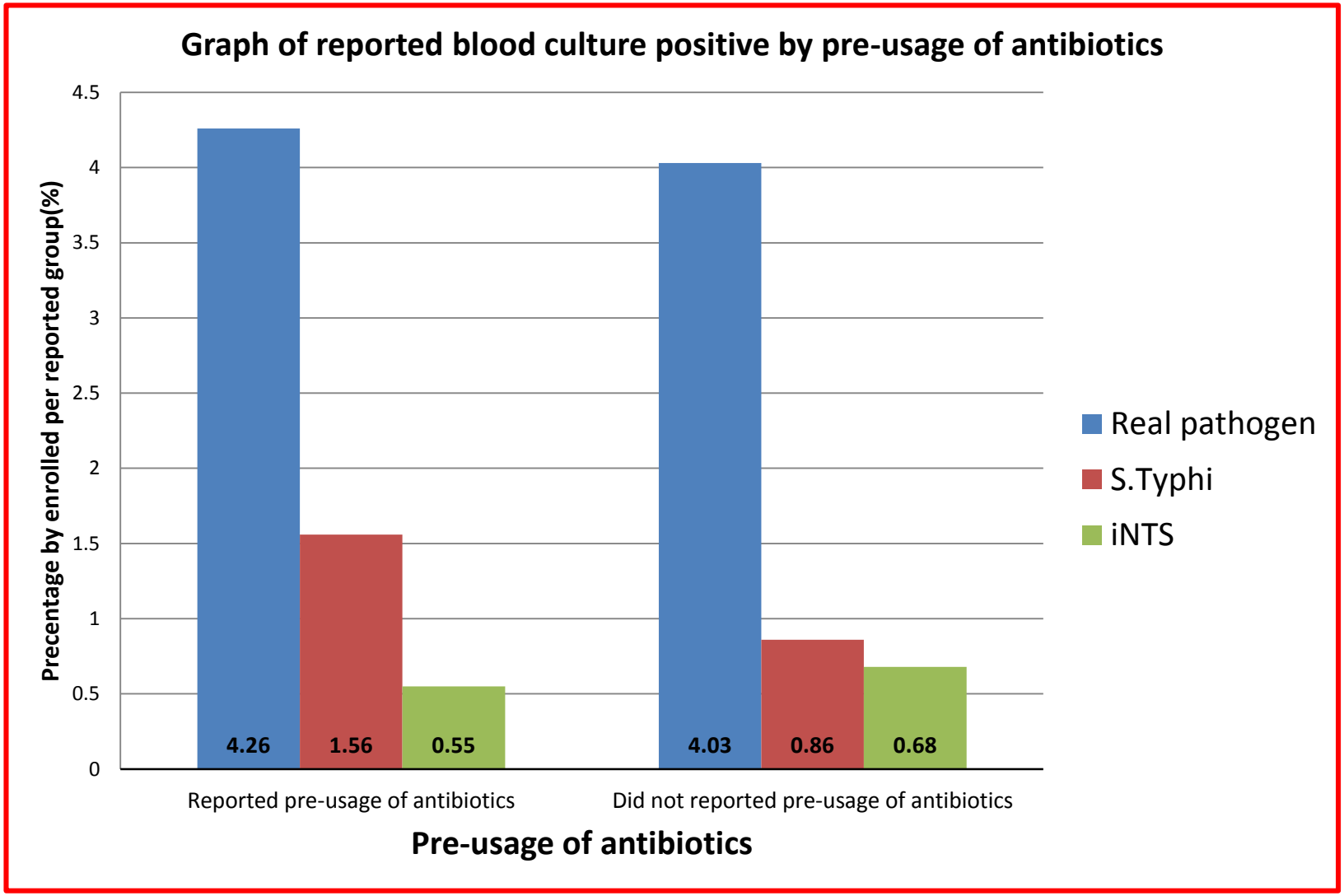
- ✓ 4% of all patients enrolled had a positive blood culture
- ✓ Salmonella – among the main pathogens isolated (39.1%) by blood culture

Country	Enrolled	Real pathogen* (% by Enrolled)	*S.* Typhi (% by real pathogen)	iNTS (% by real pathogen)	Other bacteremia (% by real pathogen)
Burkina Faso	1,721	46 (2.7)	18 (39.1)	14 (30.4)	14 (30.4)
Ethiopia	901	12 (1.3)	3 (25.0)	0	9 (75.0)
Ghana	5,699	359 (6.3)	65 (18.1)	88 (24.5)	206 (57.4)
Guinea Bissau	1,180	24 (2.0)	2 (8.3)	11 (45.8)	11 (45.8)
Kenya	2,457	167 (6.8)	69 (41.3)	9 (5.4)	89 (53.3)
Madagascar	3,579	41 (1.1)	10 (24.4)	1 (2.4)	30 (73.2)
South Africa	1,253	83 (6.6)	3 (3.6)	1 (1.2)	79 (95.2)
Senegal	1,709	41 (2.4)	8 (19.5)	6 (14.6)	27 (65.9)
Sudan	689	10 (1.5)	0	0	10 (100)
Tanzania	1,154	41 (3.6)	11 (26.8)	4 (9.8)	26 (63.4)
Total	20,352	825 (4.1)	189 (22.9)	134 (16.2)	502 (60.8)

*Real pathogen : pathogens isolated by blood culture excluding contaminants

Reported pre-usage of antibiotic in patients with bloodstream infections (Percentage of bacteremia(% by Enrolled))

✓ 10.7% of enrolled patients reported pre-usage of antibiotics



Pre-usage of antibiotics in *S.* Typhi patients compared to patients with other bloodstream infections

✓ *S.* Typhi patients were two times more likely to report pre-usage of antibiotics when compared to patients with other bloodstream infections.

Logistic regression, adjusted for country				
Characteristics	*S.* Typhi (N=189)	Other bloodstream infections (N=636)	OR (95% CI)	P-value
Pre-usage of antibiotics	34/93 (36.6)	59/93 (63.4)	2.11 (1.29-3.34)	0.003
No pre-usage of antibiotics	155/732 (21.2)	577/732 (78.8)		

✓ Similar result was observed when *S.* Typhi patients were compared to all febrile patients:

OR(95%,p)=1.97 (1.33-2.91, 0.001)

Result : Pre-usage of antibiotics in iNTS patients compared to patients with other bloodstream infections

✓ There is no difference in reported pre-usage of antibiotics between iNTS and other bloodstream infections.

Logistic regression, adjusted for country				
Characteristics	iNTS (N=134)	Other bloodstream infections (N=691)	OR (95% CI)*	P-value
Pre-usage of antibiotics	12/93 (12.9)	81/93 (87.1)	0.96 (0.49-1.88)	0.904
No pre-usage of antibiotics	122/732 (16.7)	610/732 (83.3)		

✓ This result was consistent when iNTS patients were compared to all febrile patients:

OR(95%,p)=1.16 (0.63-2.14, 0.630)

Limitations

- Self reporting of antibiotics usage
- Antibiotics taken not documented
- Number of days antibiotics taken before seeking care unknown

Conclusion

- Patients infected with *S*. Typhi were probably exhibiting more severe symptoms than other invasive salmonella.
  - Hence, these patients took antibiotics prior to visiting a healthcare facility.
- Given these clinical considerations, we cannot fully assess whether or to what degree antibiotic pre-usage affected blood culture findings.
- TSAP *S.* Typhi isolates were resistant to commonly used antibiotics may have reduced the impact of antibiotic usage on blood culture isolation

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