

Supplementary documents

Supplemental Text 1. Systematic Review Protocol

Title: Risk factors of perioperative mortality from complicated peptic ulcer disease in Africa: a systematic review and meta-analysis

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Background

Peptic ulcer disease (PUD) is a common affliction across the globe. According to the Global Burden of Disease estimates, PUD was responsible for over 300,000 deaths in 2013 globally.¹ Its sequelae are variable but can be deadly when PUD is complicated by bleeding, obstruction, or perforation.² Until recently, surgery was the dominant method of treatment. Currently, medical therapies provide effective treatment, thereby decreasing complications and the need for surgery.^{2,3}

Overall, the success of medical therapy has led to a decreased incidence of complicated PUD. This evolution has occurred over the past century by three likely mechanisms: the improved socioeconomic conditions of patients, recognition and subsequent treatment of the pathogen *Helicobacter pylori* (*H. pylori*), and the advent of proton-pump inhibitors.² Additionally, diagnostic and therapeutic endoscopy has become a prominent component of PUD management. The benefits of these advances can be substantial, though they are not universally available.⁴

Despite these advances, the burden of this disease persists in low to middle-income countries (LMICs). Previous studies have found that countries with fewer resources exhibit higher rates of death from PUD.² In fact, PUD has been identified as the leading cause of death among emergent surgical conditions with a rate of 3.5 per 100,000 deaths, 85% of which occur in LMICs. No systematic review has investigated perioperative mortality rates following PUD surgery in all of Africa. Factors responsible for the variations in mortality rates have not been explored. To fill in the gap in knowledge, we aimed to systematically describe the literature on the profile of PUD requiring surgical intervention and the associated mortality in Africa and to explore sources of variations.

Objectives

The main objective of this review is to ascertain the perioperative mortality rates of complicated peptic ulcer disease in Africa. The specific aims of the systematic review are:

- (i) To provide an overview of perioperative mortality rates of complicated peptic ulcer disease across Africa;
- (ii) To identify and investigate the extent and sources of variations in perioperative mortality rates of complicated peptic ulcer disease across Africa and over time;
- (iii) To identify trends in indications for peptic ulcer disease surgery and operative techniques across Africa and over time.

Search Strategy

The search strategy will aim to identify all published studies conducted in Africa on perioperative mortality rates of complicated peptic ulcer disease.

Inclusion criteria

Studies will be included if they met the following inclusion criteria:

- Reported on the perioperative mortality rates among patients that underwent surgical treatment of complicated peptic ulcer disease in any African country;
- Conducted and published before February 8, 2019;
- Published in any language (no language restrictions will be imposed).

Exclusion criteria

Studies will be excluded if they were:

- Not conducted in humans;
- Regarding the epidemiology or nonoperative (medical or endoscopic) treatment of peptic ulcer disease;
- Case reports or sample size <5;
- Meeting abstracts, review papers, reports, and commentaries.

Database searches

The databases to be searched will include:

- EMBASE
- Medline
- Cochrane Library

Only these 3 databases will be searched as it is expected that saturation will be reached with the majority of studies appearing in all databases.

Search Terms

Keywords and Medical Subject Headings (MeSH) will be used to search the databases listed above. Broad search terms such as “peptic ulcer disease*”, “gastric ulcer*”, “duodenal ulcer*”, AND “mortality”, AND “Africa” OR specific African country names will be used. A complete list of search terms will be developed and used across all four databases. Hand-searching of references from retrieved articles, meeting abstracts, review papers, reports, and commentaries will also be performed to identify any additional papers not captured by the electronic searches.

Title and abstract screening

The databases listed above will be searched and the citations retrieved will be downloaded into the Endnote software. Any duplicate articles identified by more than one data will be removed. The titles and abstracts will be screened by two reviewers independently and who will then compare results. Any study excluded from the review will be documented and the reason(s) for exclusion noted in a systematic way.

Full-text screening and data extraction

The full text of all the papers identified during the abstract screening step will be retrieved for full-text screening to confirm eligibility and, if eligible, to extract relevant data. For each eligible paper, data will be abstracted on the number of patients that underwent surgical treatment for peptic ulcer disease. Information on the following variables will be extracted: country of study, region of study, year of publication, study design, sample size, mean age, gender, history of PUD and duration of chronic symptoms, risk factors (Nonsteroidal Anti-Inflammatory Drugs (NSAIDs), smoking, alcohol, *H. pylori*), ASA status, presence of shock on admission, duration of acute symptoms, presence of free air on X-ray, ulcer location, type of PUD complication (bleeding, perforation, obstruction, or other), type of surgical procedure, and mortality rate. The full-text of any eligible studies identified through hand searches will also be reviewed using the methodology described above. The full-text review and data extraction will be done independently by three reviewers. Any discrepancies will be resolved by discussion among the reviewers and consensus will be reached by majority rule.

Assessment of Methodological Quality of the Papers

The quality of the papers included in the review will be assessed using the Oxford Center for Evidence-Based Medicine’s Levels of Evidence Guidelines (March 2009).

Data Analysis

The extracted data will be analyzed using the R Statistical Software. An initial descriptive analysis will be done to provide information about the study population, study design, the region of Africa (sub-Saharan vs. Northern), sub-region of Africa (western, eastern, central, southern and northern), and patient clinical characteristics. These results will be presented in both narrative and tabular form. The overall probability of perioperative mortality will be the primary outcome of interest in this review. This will be defined as the proportion of patients with complicated PUD that die preoperatively. The R package will be used to graphically display estimated pooled probabilities using random effect models. Between-study heterogeneity will be examined using the I^2 -statistics and the P-value for heterogeneity (Cochrane’s Q statistic) test. Meta-regression analysis will be performed to identify independent sources of heterogeneity such as country/region, gender, age and year of publication. Ascertainment/ Publication bias will be assessed using funnel plots and the Egger’s test. To investigate the trend of mortality rate in Africa we will investigate mortality rates as a function of publication date (a proxy for secular trend).

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	5
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	6
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	Supplemental Table 2
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Supplemental Table 2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	7-8
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	7-8
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	8 and 10, Supplemental Figure 1
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	7
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	7

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	7
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	8 and 12 and Table 2 and Figure 8
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	S1Table
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Figure 4
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	10
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Supplemental Figure 1
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	11
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	11-14
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	15-16
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	11-14
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	8

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: www.prisma-statement.org.

Page 2 of 2

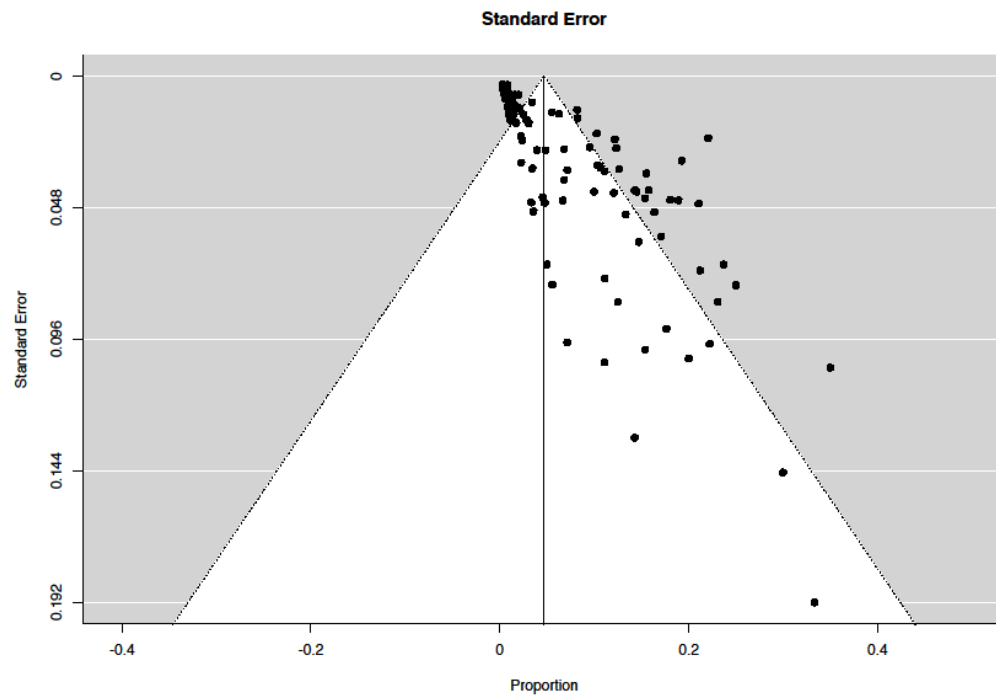
Supplemental Table 1: 2009 PRISMA Checklist

Database	Search Terms
Medline	<ol style="list-style-type: none"> 1. (Mortality OR mortality [Subheading]) OR Hospital Mortality OR Death OR Surgical Procedures, Operative OR surgery [Subheading]) OR Perioperative Period OR Postoperative Period) 2. (Stomach Ulcer OR Peptic Ulcer OR Peptic Ulcer Perforation OR Peptic Ulcer Hemorrhage OR Duodenal Ulcer) 3. (Africa OR Africa South of the Sahara OR Angola OR Benin OR Botswana OR Burkina Faso OR Burundi OR Cameroun OR Cameroon OR Cape Verde OR Chad OR Central African Republic of Comoros OR Congo OR Cote d'Ivoire OR Democratic Republic of the Congo OR Equatorial Guinea OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea OR Guinea Bissau OR Kenya OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mozambique OR Namibia OR Niger OR Nigeria OR Rwanda OR Sao Tome OR Senegal OR Seychelles OR Sierra Leone OR Somalia OR South Africa OR Swaziland OR Togo OR Uganda OR Tanzania OR Zambia OR Zimbabwe OR Africa, Northern, OR Algeria OR Egypt OR Libya OR Morocco OR Tunisia OR western Sahara OR South Africa OR Africa, Western OR Africa, Southern OR Africa, Northern OR Africa, Eastern OR Africa, Central) 4. 1 AND 2 AND 3
EMBASE	<ol style="list-style-type: none"> 1. (Mortality OR mortality [Subheading]) OR Hospital Mortality OR Surgical Procedures, Operative OR surgery [Subheading]) OR Perioperative Period OR Postoperative Period) 2. (Stomach Ulcer OR Peptic Ulcer OR Peptic Ulcer Perforation OR Peptic Ulcer Hemorrhage OR Duodenal Ulcer) 3. (Africa OR Africa South of the Sahara OR Angola OR Benin OR Botswana OR Burkina Faso OR Burundi OR Cameroun OR Cameroon OR Cape Verde OR Chad OR Central African Republic of Comoros OR Congo OR Cote d'Ivoire OR Democratic Republic of the Congo OR Equatorial Guinea OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea OR Guinea Bissau OR Kenya OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mozambique OR Namibia OR Niger OR Nigeria OR Rwanda OR Sao Tome OR Senegal OR Seychelles OR Sierra Leone OR Somalia OR South Africa OR Swaziland OR Togo OR Uganda OR Tanzania OR Zambia OR Zimbabwe OR Africa, Northern, OR Algeria OR Egypt OR Libya OR Morocco OR Tunisia OR western Sahara OR South Africa OR Africa, Western OR Africa, Southern OR Africa, Northern OR Africa, Eastern OR Africa, Central) 4. 1 AND 2 AND 3
Cochrane Library	<ol style="list-style-type: none"> 1. (Mortality OR mortality [Subheading]) OR Hospital Mortality OR Surgical Procedures, Operative OR surgery [Subheading]) OR Perioperative Period OR Postoperative Period) 2. (Stomach Ulcer OR Peptic Ulcer OR Peptic Ulcer Perforation OR Peptic Ulcer Hemorrhage OR Duodenal Ulcer) 3. (Africa OR Africa South of the Sahara OR Angola OR Benin OR Botswana OR Burkina Faso OR Burundi OR Cameroun OR Cameroon OR Cape Verde OR Chad OR Central African Republic of Comoros OR Congo OR Cote d'Ivoire OR Democratic Republic of the Congo OR Equatorial Guinea OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea OR Guinea Bissau OR Kenya OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mozambique OR Namibia OR Niger OR Nigeria OR Rwanda OR Sao Tome OR Senegal OR Seychelles OR Sierra Leone OR Somalia OR South Africa OR Swaziland OR Togo OR Uganda OR Tanzania OR Zambia OR Zimbabwe OR Africa, Northern, OR Algeria OR Egypt OR Libya OR Morocco OR Tunisia OR western Sahara OR South Africa OR Africa, Western OR Africa, Southern OR Africa, Northern OR Africa, Eastern OR Africa, Central) 4. 1 AND 2 AND 3

Supplemental Table 2: Literature search strategy

Decade	Surgeries by Indication					Total Surgeries	Percent Complicated
	Perforation	Bleeding	Obstruction	Complicated Total (P+B+O)	Other /Uncomplicated		
2010-2019	1122	62	341	1525	0	1525	100.00%
2000-2010	1286	31	335	1652	32	1684	98.11%
1990-2000	304	95	392	791	386	1177	67.18%
1980-1990	882	442	678	2002	983	2985	67.08%
1970-1980	225	96	199	520	631	1151	45.19%
1955-1970	296	149	249	694	818	1512	45.90%

Supplemental Table 3: Temporal distribution of indication for complicated PUD. Recent surgeries were predominantly for perforations.



Supplemental Figure 1: Funnel plot to assess publication bias. Note the asymmetry of the plot indicating the presence of publication bias. Egger's test was significant ($p < 0.0001$).

Summary Table

Author (Year)	Region	Country	Type of Study	Level of Evidence	Sample Size	Mean Age	Male (%)	Mortality, n (%)	Indication				Procedure				
									Perforation (%)	Bleeding (%)	Obstruction (%)	Other Indication (%)	Primary Repair (%)	Vagotomy & Drainage (%)	Resection & Repair (%)	Drainage (%)	Other/Unknown (%)
Reihmer (1955)	Central	Cameroon	Re, Co	2b	319	41	66	5 (1.6)	-	-	-	100	-	-	3	97	-
Parodi (1961)	Central	Cameroon	Re, Co	2b	57	32	91	1 (1.7)	30	14	28	28	-	-	100	-	-
Yates (1964)	Central	Congo	Re,Co	2b	29			1 (3.4)	-	-	-	100	-	17	17	66	-
Snyder (1963)	East	Burundi	Re,Co	2b	30	20-40	93	2 (6.7)	20	-	77	3	13	-	3	84	-
Hamber (1971)	East	Burundi	Re,Co	2b	404		75	8 (2.0)	2	-	15	83	2	82	3	13	-
Hamber (1972)	East	Burundi	Re,Co	2b	17		100	3 (17.6)	12	30	-	58	6	59	29	-	6
Hamber (1973)	East	Burundi	Re,Co	2b	62	51	70	3 (4.8)	-	8	11	81	-	47	35	18	-
Makuria (1985)	East	Ethiopia	Re,Co	2b	725	35	81	6 (0.8)	2	4	58	36	-	89	10	1	-
Ali (1991)	East	Ethiopia	Re,Co	2b	230	37	83	2 (0.9)	3	25	70	3	2	84	5	2	7
Ersumo (2004)	East	Ethiopia	Re,Co	2b	351	37	85	12 (3.4)	21	4	68	7	20	78	1	1	-
Ersumo (2005)	East	Ethiopia	Re,Co	2b	74	33	88	14 (18.9)	100	-	-	-	96	3	-	-	1
Asefa (2012)	East	Ethiopia	Re,Co	2b	76	32	87	12 (15.8)	100	-	-	-	96	4	-	-	-
Bekele (2017)	East	Ethiopia	Re,Co	2b	87	33	86	9 (1.0)	100	-	-	-	100	-	-	-	-
Khan (1958)	East	Kenya	Re,Co	2b	9	31	71	1 (11.1)	78	-	-	22	-	-	-	100	-
Miller (1966)	East	Kenya	Re,Co	2b	98	38	80	3 (3.1)	31	18	51	-	-	60	-	17	22
Jani (1987)	East	Kenya	Re,Co	2b	65	35		10 (15.4)	100	-	-	-	94	-	-	-	6
Kakanda (1991)	East	Kenya	Re,Co	2b	157	38	73	2 (1.3)	5	5	36	54	4	84	8	4	-
Kuremu (2002)	East	Kenya	Re,Co	2b	53	47	63	0 (0)	57	4	34	6	47	49	4	-	-
Khan (1958)	East	Rwanda	Re,Co	2b	130			2 (1.7)	8	-	-	92	-	-	92	-	8
Stone (1981)	East	Tanzania	Re,Co	2b	42	40	64	0 (0)	7	2	-	90	7	88	2	-	3
Chalya (2011)	East	Tanzania	R/P,Co	2b	84	32	57	9 (10.7)	100	-	-	-	83	1	1	-	14
Hancock (1971)	East	Uganda	Re,Co	2b	8		75	0 (0)	25	-	13	62	12	50	-	38	-
Nzarubara (2005)	East	Uganda	Re,Co	2b	7	37	71	1 (14.3)	100	-	-	-	71	14	15	-	-
Gillot (1960)	North	Algeria	Re,Co	2b	9	14	56	0 (0)	33	-	67	-	33	11	33	23	-
Leutenegger (1967)	North	Algeria	Re,Co	2b	26	46	100	6 (23.1)	-	100	-	-	-	-	-	-	100
El-Wakil (1964)	North	Egypt	Re,Co	2b	85	9	96	1 (1.2)	100	-	-	-	89	-	11	-	-
Anwar (1996)	North	Egypt	Re,Co	2b	32	43	78	8 (25.0)	16	9	47	28	16	78	6	-	-
Kafih (2000)	North	Morocco	Re,Co	2b	44	36	95	0 (0)	100	-	-	-	2	68	-	-	30
Elnagib (2008)	North	Sudan	Pr,Co	2b	58		90	7 (12.1)	100	-	-	-	95	-	-	-	5
Kehila (1988)	North	Tunisia	Re,Co	2b	62			0 (0)	8	16	11	65	-	5	85	-	10
Sakhri (2000)	North	Tunisia	Re,Co	2b	107	35	96	3 (2.7)	100	-	-	-	2	97	1	-	-
Abid (2009)	North	Tunisia	Re,Co	2b	84	28	96	0 (0)	100	-	-	-	100	-	-	-	-
Ben Chaabane (2010)	North	Tunisia	Re,Co	2b	44	54	63	3 (6.8)	-	100	-	-	70	-	30	-	-
Ayadi (2014)	North	Tunisia	Re,Co	2b	138	48	85	0 (0)	-	-	100	-	-	84	-	1	15
Abid (2014)	North	Tunisia	Re,Co	2b	290	34	97	2 (0.6)	100	-	-	-	100	-	-	-	-
Hamzaoui (2015)	North	Tunisia	Re,Co	2b	13	52	92	0 (0)	-	-	100	-	-	100	-	-	-
Gouta (2018)	North	Tunisia	Re,Co	2b	81	45	86	9 (11.1)	100	-	-	-	100	-	-	-	-
Kark (1961)	South	South Africa	Re,Co	2b	291	35	89	16 (5.5)	18	17	-	65	45	-	55	-	-
Du Plessis (1965)	South	South Africa	Re,Co	2b	126		57	12 (9.5)	29	18	17	36	27	45	28	-	-

Bremner (1972)	South	South Africa	Re,Co	2b	51	36	93	2 (3.9)	47	9	22	22	-	63	4	-	33
Cooke (1977)	South	South Africa	Re,Co	2b	71	33	93	1 (1.4)	100	-	-	-	75	25	-	-	-
Brozin (1977)	South	South Africa	Re,Co	2b	14	31	94	0 (0)	100	-	-	-	100	-	-	-	-
Bank (1980)	South	South Africa	Re,Co	2b	311			1 (0.3)	-	-	-	100	-	39	-	-	61
Schein (1986)	South	South Africa	Re,Co	2b	95	55	66	12 (12.6)	100	-	-	-	66	8	24	-	1
Schein (1986)	South	South Africa	Re,Co	2b	33	59	44	21.9	100	-	-	-	33	-	61	-	6
Decker (1987)	South	South Africa	Re,Co	2b	38	>50	67	9 (23.7)	-	100	-	-	-	42	13	-	45
Schein (1989)	South	South Africa	Re,Co	2b	489	54	60	40 (8.2)	33	31	7	29	21	3	36	16	24
Schein (1989)	South	South Africa	Pr,Co	2b	154	60	65	19 (12.3)	-	100	-	-	5	26	67	-	3
Schein (1990)	South	South Africa	R/P,Co	2b	197	52	59	24 (12.2)	100	-	-	-	49	14	19	-	18
Schein (1991)	South	South Africa	Pr,Co	2b	72			13 (18.1)	67	33	-	-	-	-	-	-	100
Levin (2012)	South	South Africa	Re,Co	2b	18	57	60	4 (22.0)	-	100	-	-	-	-	-	-	100
Makhadi (2017)	South	South Africa	Re,Co	2b	132			1 (0.8)	100	-	-	-	100	-	-	-	-
Doctor (1970)	South	Zambia	Pr,Co	2b	80	34	94	1 (1.3)	28	15	-	58	26	26	3	-	45
Kiire (1987)	South	Zimbabwe	Pr,Co	2b	13	39	76	2 (15.4)	8	92	-	-	-	62	38	-	-
Tournier-Lasserve (1961)	West	Benin	Re,Co	2b	121	39	92	3 (2.5)	15	19	64	2	-	-	100	-	-
Robert (1964)	West	Benin	Re,Co	2b	115	35	83	2 (1.7)	13	1	23	62	9	60	30	-	1
Nuhu (2008)	West	Gambia	Re,Co	2b	41	45	83	7 (17.1)	100	-	-	-	71	-	7	2	20
Nyame (1973)	West	Ghana	Re,Co	2b	10	38	90	3 (30)	25	75	-	-	20	60	-	20	-
Ohene-Yeboah (2006)	West	Ghana	Pr,Co	2b	331	52	71	73 (22.1)	100	-	-	-	94	-	-	-	6
Dakubo (2009)	West	Ghana	R/P,Co	2b	316	41	82	26 (8.2)	100	-	-	-	95	3	2	-	-
Yangni-Angate (1980)	West	Ivory Coast	Re,Co	2b	69	34	99	10 (12.5)	100	-	-	-	83	10	1	6	-
Gona (2016)	West	Ivory Coast	Re,Co	2b	161	34	91	31 (19.3)	100	-	-	-	99	-	1	-	-
Moses (2014)	West	Liberia	Pr,Co	2b	20	33	85	7 (35.0)	100	-	-	-	100	-	-	-	-
Davey (1964)	West	Nigeria	Re,Co	2b	6	40		0 (0)	-	-	-	100	-	50	50	-	-
Solanke (1970)	West	Nigeria	Pr,Co	2b	144		72	3 (2.1)	-	7	30	63	-	98	-	-	2
Solanke (1971)	West	Nigeria	Pr,Co	2b	48	39	63	0 (0)	0	0	40	60	-	100	-	-	-
Kolawole (1974)	West	Nigeria	Pr,Co	2b	51	32	84	0 (0)	2	4	24	71	-	100	-	-	-
Mabogunje (1979)	West	Nigeria	Re,Co	2b	34		77	5 (14.7)	35	27	32	6	26	50	18	6	-
Ajao (1979)	West	Nigeria	Re,Co	2b	16	39	88	2 (12.5)	100	-	-	-	100	-	-	-	-
Adekunle (1983)	West	Nigeria	Pr,Co	2b	200	36	75	2 (1.0)	-	16	52	32	-	99	1	-	-
Mabogunje (1985)	West	Nigeria	Re,Co	2b	302	37	77	19 (6.3)	25	16	35	24	16	77	2	5	-
Mabogunje (1985)	West	Nigeria	Re,Co	2b	103	35	89	16 (15.5)	100	-	-	-	68	11	6	5	11
Arigbabu (1986)	West	Nigeria	Re,Co	2b	102			0 (0)	-	-	-	100	-	100	-	-	-
Iwatt (1988)	West	Nigeria	Pr,Co	2b	6	24	100	2 (33.3)	100	-	-	-	100	-	-	-	-
Otu (1990)	West	Nigeria	Pr,Co	2b	205	35	75	21 (10.2)	100	-	-	-	100	-	-	-	-
Ofili (1991)	West	Nigeria	Pr,Co	2b	21	39	71	0 (0)	-	-	100	-	-	100	-	-	-
Lawal (1998)	West	Nigeria	Re,Co	2b	15	41	93	3 (20.0)	100	-	-	-	53	40	-	7	-
Ameh (1998)	West	Nigeria	Re,Co	2b	88	37	78	6 (6.8)	17	1	41	41	13	86	1	-	-
Sabo (1999)	West	Nigeria	Re,Co	2b	58	37	78	1 (1.7)	-	-	100	-	-	98	2	-	-
Ameh (1999)	West	Nigeria	Re,Co	2b	6	12	83	0 (0)	16	16	33	35	17	83	-	-	-
Dogo (1999)	West	Nigeria	Re,Co	2b	42	35	87	1 (2.4)	-	-	100	-	-	100	-	-	-
Adesunkanmi (2003)	West	Nigeria	Pr,Co	2b	18	42	75	2 (11.1)	100	-	-	-	-	-	-	-	100
Irabor (2005)	West	Nigeria	Re,Co	2b	122	45	74	0 (0)	30	10	57	3	32	64	4	-	-
Mbah (2008)	West	Nigeria	Re,Co	2b	21	41	86	1 (4.8)	43	19	33	5	48	48	4	-	-

Nuhu (2009)	West	Nigeria	Re,Co	2b	55	40	80	9 (16.4)	100	-	-	-	87	2	-	-	11
Etonyeaku (2013)	West	Nigeria	Re,Co	2b	45	40	82	6 (13.3)	100	-	-	-	98	-	-	2	-
Ugochukwu (2013)	West	Nigeria	Re,Co	2b	76	40	76	16 (21.1)	100	-	-	-	100	-	-	-	-
Nwashilli (2015)	West	Nigeria	Re,Co	2b	70	45	84	10 (14.3)	100	-	-	-	97	-	-	-	3
Bezes (1958)	West	Senegal	Re,Co	2b	44	30 to 40		0 (0)	35	-	65	-	-	-	100	-	-
Vovor (1972)	West	Senegal	Re,Co	2b	50	32	100	5 (8.6)	100	-	-	-	84	14	2	-	-
Sow (1981)	West	Senegal	Re,Co	2b	56	31	94	4 (7.5)	100	-	-	-	64	32	4	-	-
Andreu (1999)	West	Senegal	Pr,Co	2b	250	28	70	2 (0.8)	-	-	-	100	-	-	-	-	100
Konate (2010)	West	Senegal	Re,Co	2b	160	43	79	0 (0)	-	-	100	-	-	99	1	-	-
Gogler (1974)	West	Togo	Re,Co	2b	45	36	100	1 (2.2)	-	4	76	20	-	96	4	-	-
Kassegne (2016)	West	Togo	Re,Co	2b	22	38	83	1 (4.5)	-	-	100	-	-	77	23	-	-

Re,Co: Retrospective cohort study; Pr,Co: Prospective cohort study; R/P,Co: Retrospective/Prospective cohort study.

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