Treatment of Schistosomiasis in Pregnancy: A Systematic Review of Maternal Outcomes

Sonia Igboanugo[1], Gregory D. Hawley[1,2,3], Michael Klowak[2,3], Rachel Lau[3], Chelsia Watson[3], Alexandra Atayde[3], Melissa Phuong[3], Swana Kopalakrishnan[3], Leila Makhani[3], Sharmistha Mishra[4], Andrea K. Boggild[1,2,3,5,*]

[1]Department of Medicine, University of Toronto, Toronto, Canada; [2]Institute of Medical Science, University of Toronto, Toronto, Canada; [3]Tropical Disease Unit, Toronto General Hospital, Toronto, Canada; [4]St. Michael's Hospital and University of Toronto, Toronto, Canada; [5]Office of Access and Outreach, Temerty Faculty of Medicine, University of Toronto, Toronto, Canada

*Contact: andrea.boggild@utoronto.ca; boggildlab.ca; @BoggildLab

INTRODUCTION

- Schistosomiasis is a common parasitic infection in the traveling and migrant patient population, many of whom are women of childbearing age
- Yet, few synthesized high-quality data exist around the safety, efficacy, and tolerability of praziquantel during pregnancy and its effects on maternal outcomes such as anemia. Through our knowledge synthesis we aim to fill this knowledge gap.

METHODS

- Five electronic databases were searched and titles, abstracts, and full-texts of included studies and reviews were screened from database inception to August 2025, without language restriction
- Systematic reviews, randomized controlled trials, cohort studies, smaller observational studies, case-control studies, case series, and case reports assessing or reporting the efficacy, safety, or tolerability of praziquantel treatment during pregnancy were screened
- Inclusion criteria: Pregnant + Treated with praziquantel during pregnancy + *Schistosoma* Infection + Maternal Outcome(s) reported
- Two independent reviewers screened and extracted the data and assessed quality using the GRADE approach. Risk of bias for each study was determined
- Data were summarized using qualitative and quantitative measures for schistosomiasis as well as efficacy and safety of praziquantel

RESULTS

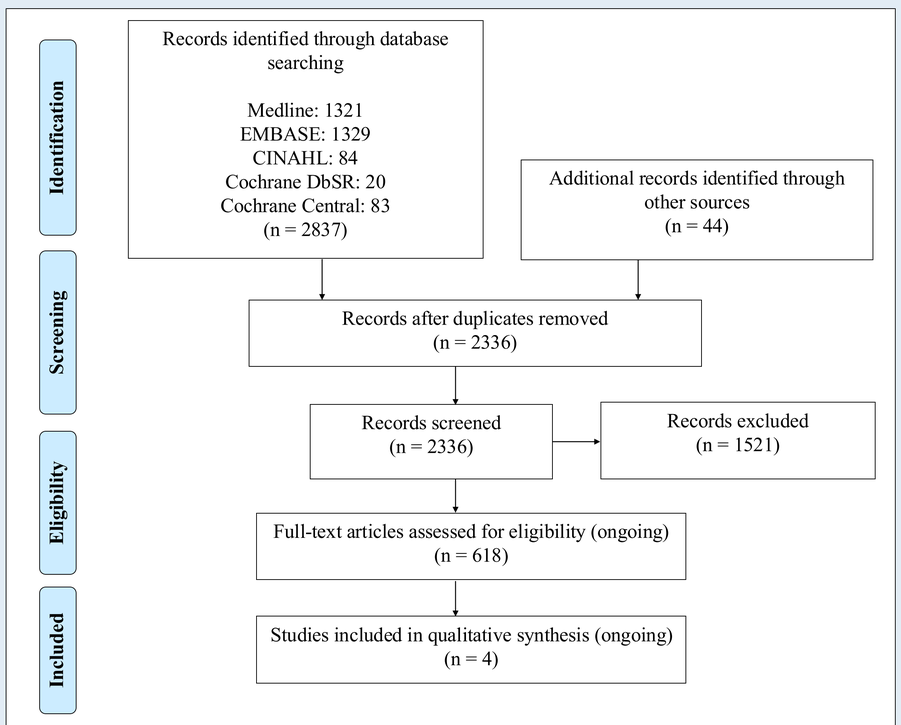

Figure 1. PRISMA Flowchart for Identification of Relevant Articles

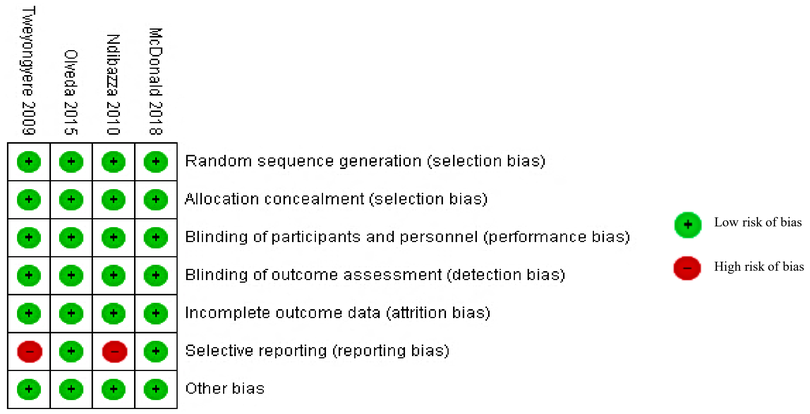

Figure 2. Risk of Bias Assessment for Included Studies

RESULTS

Study and Design	Study Period	Study Setting	Study Population	Name of Drug and Trimester of Drug Treatment	Sample Size
Ndibazza 2010[1] RCT	April 2003-November 2005	Uganda	Healthy pregnant women	Albendazole; Praziquantel 2nd or 3rd	N=2515 Albendazole (400mg, single dose) + Praziquantel (40mg/kg), N= 628. Albendazole + Placebo, N= 629. Praziquantel + Placebo, N= 628. Placebo + Placebo, N= 630. All single dose. All women received month's supply of daily ferrous sulphate (200mg); 60mg elemental iron); and intermittent sulfadoxine-pyrimethamine for malaria twice after 1st trimester.
Olveda 2015[2] RCT	Not reported	Philippines	Pregnant women infected with *S. japonicum* at 12-16 weeks gestation	Praziquantel 2nd	N=370 Over-encapsulated praziquantel, N=186 (30mg/kgx2 as a split dose over 3h Over-encapsulated placebo (dextrose), N=184 (30mg/kgx2 as a split dose over 3h
Tweyongyere 2009[3] (Nested Cohort of Ndibazza 2010[1]) RCT	November 2003-November 2005	Uganda	Pregnant women with *S. mansoni* infection Exclusion: Pregnancy not normal, history of adverse reactions to anthelminthic, evidence of helminth-induced disease requiring immediate treatment, participation in the study during an earlier pregnancy	Praziquantel 2nd or 3rd	N= 387 Praziquantel, N=186 (40mg/kg, single dose) Placebo, N=201 (dose not stated, single dose)
McDonald 2018[4] (Same trial as Olveda 2015[2]) RCT	Not reported	Philippines	Same as Olveda 2015[2]	Praziquantel 2nd	N=370 Over-encapsulated praziquantel, N=186 (30mg/kgx2 as a split dose over 3h) Over-encapsulated placebo (dextrose), N=184 (30mg/kgx2 as a split dose over 3h)

Table 1. Preliminary Characteristics of Studies included in this study

Table 2. Preliminary Summary of Findings Table of Praziquantel Compared to Placebo Treatment for Intestinal Schistosomiasis During Pregnancy

Praziquantel Compared to Placebo during Pregnancy

Patient or population: Pregnant women in their 2nd or 3rd trimester
Setting: Developing Countries - Uganda (Ndibazza 2010[1], Tweyongyere 2009[3]) and Philippines (Olveda 2015[2], McDonald 2018[4])
Intervention: Praziquantel
Comparison: Placebo

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with placebo	Risk with Praziquantel				
Anemia at delivery (hemoglobin <11.2g/dL)[1]	349 per 1,000	**349 per 1,000** (307 to 394)	**RR 1.00** (0.88 to 1.13)	1918 (1 RCT)	⊕⊕⊕◯ MODERATE [a]	No difference in maternal anemia
Schistosoma mansoni prevalence at delivery[1]	213 per 1,000	**47 per 1,000** (36 to 64)	**RR 0.22**# (0.17 to 0.30)	2051 (1 RCT)	⊕⊕⊕⊕ HIGH [a]	Praziquantel decreased the prevalence of Schistosoma mansoni at delivery
Mean hemoglobin levels (g/dL) at delivery[1]	The mean mean hemoglobin levels (g/dL) at delivery (Ndibazza 2010) was **0**	MD **0.2 higher** (0.05 lower to 0.45 higher)	-	930 (1 RCT)	⊕⊕⊕◯ MODERATE [a]	No difference in hemoglobin levels
Mean hemoglobin levels (g/dL) at 3rd trimester[2]	The mean mean hemoglobin levels (g/dL) at 3rd trimester (Olveda 2015) was **0**	MD **0.01 higher** (0.24 lower to 0.26 higher)	-	370 (1 RCT)	⊕⊕⊕⊕ HIGH	No difference in hemoglobin levels
Mean weight gain from 2nd to 3rd trimester (kg/week)[2]	The mean mean weight gain from 2nd to 3rd trimester (kg/week) (Olveda 2015) was **0**	MD **0.01 lower** (0.04 lower to 0.02 higher)	-	370 (1 RCT)	⊕⊕⊕⊕ HIGH	No difference in mean weight gain
Cure rate of Schistosoma japonicum at 6-10 weeks post treatment[2]		83.7% (154/184)	not estimable	(1 RCT)	-	
Cure rate of of Schistosoma mansoni at 6 weeks post treatment[3]		81.9% (104/127)	not estimable	(1 RCT)	-	
Endotoxin levels in peripheral blood, cord blood or maternal-fetal interface[4]			not estimable	(1 RCT)	-	Endotoxin levels not associated with praziquantel (no raw data available)

*The **risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR**: Risk ratio; **MD**: Mean difference

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

a. Ndibazza 2010 had about 20% incomplete report of outcomes in both arms (reporting bias)
^ Strong association, RR <0.5 or >2

CONCLUSION

- **Praziquantel had a high cure rate of >80% for *Schistosoma mansoni* and *Schistosoma japonicum* infection in pregnant women.**
- **No adverse effects on endotoxin levels, or weight gain were observed.**
- **Treatment with praziquantel during pregnancy did not affect maternal anemia or Hb levels.**

REFERENCES