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WATER FLOW DIRECTION AND SPATIAL DISTRIBUTION OF Schistosoma CERCARIAE IN PERIPHERAL WATER SITES AROUND NAUJAN LAKE, ORIENTAL MINDORO: A RETROSPECTIVE STUDY

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ABSTRACT

Schistosomiasis remains endemic in Oriental Mindoro despite ongoing control efforts, emphasizing the need to investigate environmental factors like snail habitats. This study **investigated hydrological factors around Naujan Lake on the spatial distribution of Oncomelania** snails and Schistosoma cercariae, crucial for parasite transmission. Utilizing retrospective snail infection records from the Provincial Health Office and hydrological data from multiple government sources, the research examined the relationship between water flow direction and snail populations across four endemic municipalities: Socorro, Victoria, Pola, and Naujan. Results revealed significant variation in snail abundance and infection rates associated with water flow patterns. In Socorro and Victoria, snails and infected cercariae were primarily found in midstream-to-upstream and downstream zones, respectively, with strong statistical correlations (p < 0.05). Pola exhibited minimal snail and cercariae presence, showing no significant link to water flow. Spatial mapping identified clusters of infected snails near river mouths and lake edges in southern and southwestern areas, particularly in Socorro and Victoria, designating these as high-risk transmission zones. These demonstrate that hydrological factors, especially water flow direction, play a critical role in shaping snail habitats and parasite dispersal in Oriental Mindoro. This is vital for guiding targeted interventions to reduce snail populations and disrupt disease transmission; emphasizing the importance of incorporating environmental data into schistosomiasis management programs.

INTRODUCTION

Schistosomiasis remains a major health concern in developing countries. In the Philippines, S. japonicum primarily infects humans, with Oriental Mindoro among the most affected provinces. Water flow direction influences the distribution of Oncomelania snails and parasite spread, shaping transmission dynamics. Yet, studies on environmental determinants of snail survival are either limited or outdated. This study examined the relationship between water flow and the distribution of snails and cercariae in municipalities surrounding Naujan Lake.

OBJECTIVES

This study aimed to identify possible hydrological factors and spatial patterns that contribute to the presence of Oncomelania snails and Schistosoma cercariae. Specifically, it aims:

- 1.To determine the **presence of Oncomelania snails and Schistosoma cercariae** in the different municipalities in Oriental Mindoro.
- 2.To determine the correlation between **Oncomelania snails and Schistosoma cercariae presence with the flow direction of peripheral water bodies** around Naujan Lake.
- 3. To determine comprehensive spatial representations illustrating the distribution patterns of Oncomelania snails and Schistosoma cercariae within the identified municipalities.

METHODOLOGY



Consultation, Formal Application, and Request

For snail mapping data on *Oncomelania* spp. and *Schistosoma* endemic areas of Naujan Lake to the Provincial Health Office and Schistosoma Center.



Utilization of Retrospective Data from Provincial Health Office

To determine positive *Oncomelania* snails and *Schistosoma* cercariae in endemic areas of Naujan Lake (e.g Naujan, Pola, Socorro, and Victoria).



Determination of Water Flow Direction at Snail Sampling Sites

Using Hydrological Data Analysis sourced from Local Government websites and National Agencies (e.g PDPO, DTI, and RSSO).



Identification of Geographic Distribution and Highrisk Schistosomiasis Areas

Through Spatial Analysis and Mapping of verified coordinates of Positive *Oncomelania* Snail and *Schistosoma* cercariae sites using ArcGIS Software.



Establishment of Statistical Relationship

Relationship between Water Flow patterns and the Spatial Distribution of both *Oncomelania* spp. snails and *Schistosoma* cercariae through IBM SPSS using Chi-square test with a threshold of p < 0.05

RESULTS AND DISCUSSION

Table 1. Chi-Square Analysis of the Association Between Water Flow Patterns and the Presence of *Oncomelania* Snails and *Schistosoma* Cercariae in Oriental Mindoro

_		Chi-square Test	Degree of Freedom	P-value
	Socorro	13.440	6	0.037
	Victoria	28.000	6	0.000
	Pola	1.283	2	0.526

Note: A p-value greater than 0.05 indicates no statistically significant correlation, while a p-value less than 0.05 indicates a statistically significant correlation.

Statistical analysis showed **significant association** between **water flow patterns** and **snail and cercariae presence** in Socorro and Victoria, but no correlation in Pola due to their minimal occurrence.

Figure 1. Spatial distribution of *Oncomelania* snails found in different municipalities: Socorro, Victoria, and Pola.





distribution of Oncomelania snails in the southern and southwestern areas of Naujan Lake, particularly near river mouths in Victoria and Socorro, with no snails detected along Pola's shores.

Figure 1 shows the

clustered

Figure 2. Spatial distribution of *Schistosoma* cercariae found in different municipalities: Socorro, Victoria, and Pola







Figure 2 shows that *Schistosoma* cercariae are clustered in the southern and southwestern parts of Naujan Lake, mainly around Victoria and Socorro, with minimal presence in Pola and none along the northern and eastern shores.

CONCLUSION

Water flow direction strongly shapes snail habitats and parasite dispersal in Oriental Mindoro, influencing the persistence and intensity of schistosomiasis transmission. The results emphasize the importance of **targeted**, **site-specific interventions to effectively control snail populations and interrupt parasite transmission**, thereby supporting WHO's elimination goals, protecting at-risk communities, and improving resource allocation for sustainable schistosomiasis control programs.

REFERENCES