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# PREVALENCE AND INTENSITY OF URINARY SCHISTOSOMIASIS IN ASSIUT GOVERNORATE (NAZZA KARAR VILLAGE)

(With 4 Tables)

By

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# معدل انتشار وشدة الاصابه بمرض بلهارسيا المجارى البوليه فى محافظة أسيوط / قرية نزة قرار

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أجريت هذه الدراسه فى قرية نزة قرار بمركز منفلوط - محافظة أسيوط وذلك بهدف التعرف على المحددات الوبائيه لمرض البلهارسيا البوليه .

وفى هذه الدراسه تمت مقابلة ١١٤٦ شخصاً بلغ عدد المصابين بالبلهارسيا البوليه ١٨٢ شخصاً ( ٩ ر١٥٪ ) . وكانت أعلى نسبه للاصابه بين المجموعه السنيه ( ١٠ - ١٤ سنه) حيث بلغت نسبة الاصابه ( ٤ ر٤٨٪ ) . كما كان المتوسط الهندسى لعد البويضات بالبول هو ٨ ر٢٨ بويضه فى كل ١٠ ملليلتر بول ، بينما لوحظ أعلى متوسط لعد للبويضات بين المجموعه السنيه ( ٥ - ٩ سنوات) بمقدار ٥ ر٣٨ بويضه فى كل ١٠ ملليلتر بول .

كانت نسبة الاصابه بين الذكور ( ٩ ر٢٣٪) أعلى بفرق ذى دلاله معنويه من نسبة الاصابه بين الاناث ( ١ ر٨٪ ) ، وكذلك كانت شدة الاصابه بينهم أعلى من تلك بين الاناث حيث كان المتوسط الهندسى لعد البويضات هو ٢ ر٣١ و ٢٣ على الترتيب .

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**SUMMARY**

In this study, 182 participants were found infected and 964 participants were not infected (Prevalence rate of 15.9%). The age-specific prevalence rates of urinary schistosomiasis were observed to be highest at the age group (10 - 14 years, 48.4%) then a rapid decline till the age (25 - 29 years, 3.3) and a relatively stable low prevalence in adult age. However, a tendency to a slight increase in prevalence was observed after the age of 30 years. Age was significantly correlated with egg count (-0.1182; $p < 0.001$). In this study, the geometric mean egg count was 28.8 per 10 ml. urine. Intensity of infection showed a consistent decline by increase in age. Highest geometric mean egg count (38.5 /10 ml urine) was observed with youngest age group (5 - 9 years), while the lowest geometric mean egg count (11.1 / 10 ml urine) was observed in the oldest age group (35 years and over). Males were at a higher risk of being infected than females (23.9% and 8.1% respectively; p=0.00000). Geometric mean egg count was also significantly higher in males than females (31.2, 23.0 respectively; p= 0.02518).

*Keywords:* Prevalence, intensity, Urinary Schistosomiasis, Assiut Governorate.

## INTRODUCTION

Schistosomiasis is endemic in 74 countries. More than 600 million people throughout the tropics are at risk of schistosome infection and of these, about one third are actually infected *(BERGQUIST, 1987)*. In spite knowledge about the disease transmission and different strategies for prevention, the disease still aftects millions of persons every year. It was mentioned in Egyptian Papyri and well correlated with hematuria more than one thouusand years B.C. It is the most dangerous health problem affecting the future of the Egyptian nation due to its marked deleterious effect on the health status and productivity of the population *(ABDALLAH, 1984)*. In its global imporatance, it ranks only scond to malaria amongst the major parasitic diseases of man *(SHER et al., 1989)*.

## SUBJECTS and METHODS

The present study follows a 'cross-section design' in which a village (Nazza Karar, Manfalout District, Assiut Governorate) was randomly chosen to represent the rural population of Assiut Governorate. In this study, 1146 persons were examined during the period from July 1991 till July 1993.

A clean, disposable, numbered, plastic cup was given to every participant and was asked to provide a urine sample in order to be examined microscopically for the presence and count of *S. haematobium* eggs. This was performed by an experienced laboratory technician supervised by the researcher. Urine examination was performed in the rural health unit on Nazza Karan village following the method described *HIGASHI and ABOUL-ENEIN (1982)*. An obtained urine sample was well mixed by withdrawing urine in and out by a plastic disposable syringe without needles. Ten ml. of urine were withdrawn and injected through a holder containing a nuclepore filter 13 mm in diameter with a pore size of 12 $\mu$. The syringe was then disconnected from the filter chamber, filled with air and forced through the filter chamber to evacuate the remaining urine. The chamber was opened and the filter was removed with forceps and placed down on a glass slide. Each filter was examined microscopically where the unstained eggs were easily visible standing out sharply against the clear moist nuclepore filter.

Those with positive urine samples were visited again and notified by the result of their urine examination and were escorted to the ural health unit to be weighed in order to get the necessary oral anti-bilharzial treatment (praziquantel). All inhabitants aged 5 years of age or more (1146 individuals) were examined.

## RESULTS

Prevalence rate of urinary schistosomiasis was observed to have certain pattern according to age. Prevalence sharply rises with age to reach its peak at the age group 10-14 years, after which it declines. On the other hand, geometric mean egg count (GMEC) per 10 ml. of urine showed a consistent decrease with age. The highest intensity was observed in the age group 5-9 years (38.5 eggs) and the lowest in the age group 35 years and over (11.1 eggs) (Tables 1,2).

In addition, the mean age of infected participants was significantly lower than uninfected ones (16.7 $\pm$ 12.8 years and 24.1 $\pm$ 18.6 years respectively; p= 0.000001). Comparing the

mean crowding index of infected participants with those of uninfected participants showed nearly similar mean crowding indices among infected and uninfected ones (1.52 ± 0.75 and 1.49 ± 0.80; p= 0.76151), as shown in Table (3).

Sex was associated with significant differences concerning prevalence and also intensity of infection. Males were significantly higher in prevalence of urinary schistosomiasis than females (23.9% and 8.1% respectively; p=0.001). Intensity of infection showed the same pattern, with significantly higher GMEC per 10 ml. urine in males the than females (31.2 and 23.0 respectively; p= 0.025), as shown in Table (4).

## DISCUSSION

In this study, urinary schistosomiasis among participants was studied both qualitatively (percent of positive cases in a certain group, prevalence rate) and quantitatively (geometric mean egg count, intensity of infection).

In this study, 182 participants were found infected and 964 participants were not infected (prevalence rate of 15.9%). The age-specific prevalence rates of urinary schistosomiasis were found to follow a peculiar fashion of an initial rapid increase to its highest level at the age group (10-14 years) then a rapid decline till the age (25-29 years) and relatively stable low prevalence in adult years. However, a tendency to a slight increase in prevalence was observed after the age of 30 years. In addition, age was significantly correlated with egg count (- 0.1182; p<0.001). Rregression coefficient for age was negatively signed (-0.0178), however this was not statisically significant (p=0.0627).

The characteristically high prevalence among participants aged around 10-14 years was well described by many authors. *MANSOUR et al. (1981)* in their epidemiological study in Qena, Upper Egypt reported that overall prevalence of infection was 28.7%. They observed that age distribution of those infected showed the classical rise in the percent infected, reaching a peak of 57-63% in the 11-15 year age group followed by a rapid decline. Also, In Tanzania, *SARDA et al. (!985)* reported a peak prevalence in the 11-16 year age group. In Ethiopia, *TEKLEHAIMANOT and FLETCHER (1990)* reported the same age peak prevalence. In Niger, *MOUCHET et al. (1990)* reported a peak age-specific prevalence rate in the age group of 5-14 years. In addition, *GHANDOUR et al. (1991)* in Saudi Arabia, described a peak prevalence at the age group (11-15 years). In a study in El-Tawabeya Village, Assiut Governorate, *ABDEL-MEGEED (1993)* reported a peak prevalence of urinary schistosomiasis among children aged 10-14 years (17.5%).

However, some other authors described a slightly higher age group. In *LIBERIA, DENNIS et al. (1983)* reported a peak prevalence of urinary schistosomiasis at the age group 15-19 years. In *TANZANIA, ZUMSTEIN (1983)* reported the same peak age prevalence. In Sudan, *BABIKER et al. (1985)* described a sharp decline after the peak age of 20 years, while *NKYA et al. (1986)* found the prevalence of infection was highest in the age group 17-18 years.

The slight increase in prevalence of urinary schistosomiasis at later age groups may reflect the attiude of most Egyptians, especially farmers, who immediately ask medical advive for the earliest and perhaps the slightest symptoms of their children but conversely, ignore themselves by postponing any necessary medical consultation till it is too late and they can no longer move.

In this study, the geometric mean egg count was 28.8 per 10 ml. urine. Intensity of infection showed a consistent decline by increase in age. Highest geometric mean count (11.1) was observed in the oldest age group.

Similar findings were described by *MANSOUR et al. (1981) and KING et al. (1982)* who performed their studies in Qena Governorate, Upper Egypt. *SCHUTTE et al. (1981),* in south Africa, described a considerable decrease of egg output after an initial distinct peak which occurred at 8 years of age in low prevalence areas and at ages of 10-11 years in the heavily infected areas. Also, *NDAMBA et al. (1991),* who studied schistosomiasis prevalence and intensity among sugar cane cutters of Hippo Valley and Triangle, the two largest irrigated sugar estates in Zimbabwe, found that prevalence and intensity of *S.mansoni increased* with age, while the opposite was tnre for *S.haematobium.*

*DALTON and POLE (1978)* explained the lower average egg output rate in older ages on the basis of variation in water contact, and he excluded role of immunity in determining levels of infection.

The idea that immunity may be a major factor controlling the prevalence of schistosomiasis in advancing age is deep-seated. However, its occurrence in man is not obvious *(ABDEL-WAHAB, 1982).*

*WILKINS et al. (1984)* suggested that protective immunity may be more significant in subjects in the fourth decade of life than it is at the beginning of the second. They added that continuing exposure to cercariae may be important for its maintenacne. This hypothesis dose not preclude the existence of a lasser degree of immunity in children or of considerable difference between individuals of the same age group.

This study showed that males were at a higher risk of being infected than females. Males experienced a significantly higher prevalence rate for urinary schistosomiasis than females (23.9% and 8.1% respectively; p=0.00000). Geometric mean egg count per 10 ml. urine was also significantly higher in males than females (31.2, 23.0 respectively; p=0.02518). Sex had regression coefficient which was significantly high (1.3188, p=0.0001). Differences in sex-specific prevalence rates is perhaps due to difference in exposure.

These findings go with others of almost all studies conducted in Egypt and many studies carried out elsewhere. In Egypt, *MANSOUR et al. (1981),* found that males consistently had higher prevalence rates than females. *MILLER et al. (1981)* also noted that the specific age-sex distributions for both schistosomes species were characteristic with a notable difference in the male-female infection ratio.

In Kenya, *MASABA et al. (1983)* found that males had a prevalence rate for urinary schistosomiasis double that of females (81% and 42% respectively). In Tanzania, *SARDA et al. (1985)* reported that males (23.5%) than females (15.0%) were infected. In Zimbabwe, *TAYLOR and MAKOURA (1985)* reported that females showed a significantly lower prevalence of infection with *S.haematobium* than males in all areas. In addition, *WILKINS et al. (1984)* studied dynamics of *Schistosoma haematobium* infection in a Gambian community. They found that prevalence of infection tended to be higher in adult males than females. However, they also stated that preliminary water contact observations suggest males were less exposed to infection. *CHIPPAUX et al. (1990)* conducted parasitological and malacological surveys round a fresh water lake in the south of Benin to measure prevalence of schistosomiasis haematobium. They consistently found that males were significantly more infected than females. In addition, *UDONSI (1990),* in Nigeria, reported statistically significant differences in prevalence rates of urinary schistosomiasis between both sexes with higher rates among males. *GHANDOUR et al. (1991),* in Saudi Arabia, also reported significantly higher prevalence rates of schistosomiasis among males.

*KLUMPP and WEBBE (1987),* who studied behvioral pattern and transmission of *S.haematobium* infection in Ghana, explained sex differences on exposure grounds. They reported that water countact for males was of longer duration than for females and included more time playing and washing. These activities probably accounted for the mutch higher incidence and prevalence rates recorded for males over females in the village.

In Assiut, *ABDEL-MEGEED (1993)* reported that the prevalence of schistosomiasis among males was nearly double that among females (10.2% in contrast to 5.6%0 and the difference is highly significant ($p<0.001$).

However, *SCHUTTE et al. (1981)* in South Africa found that differences in sex did not show any differences in prevalence rates. Moreover, *ETARD and BOREL (1987)*, in Mauritania, found no significant difference in prevalence or mean density between males and females after age adjustment.

Conversely, In Zimbabwe, *HUSTING (1983)* recorded a higher prevalence of infection among females. This was explained by that females perform most water contact activities and also the duration and frequency of water contact were higher for females.

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Table (1): Age-specific prevalence rate of urinary schistosomiasis

| Age Groups (in years) | Urine Samples Examined | | | Prevalence rate |
|---|---|---|---|---|
| | Positive | Negative | Total | |
| 5 - 9 | 24 | 286 | 310 | 7.7 % |
| 10 - 14 | 106 | 113 | 219 | 48.4 % |
| 15 - 19 | 22 | 103 | 125 | 17.6 % |
| 20 - 24 | 7 | 71 | 78 | 8.9 % |
| 25 - 29 | 2 | 59 | 61 | 3.3 % |
| 30 - 34 | 4 | 53 | 57 | 7.0 % |
| 35 + | 17 | 279 | 296 | 5.7 % |
| Total | 182 | 964 | 1146 | 15.9 % |

Chi square = 225.18 P-value = 0.000000

Table (2): Age-specific geometric mean egg count (GMEC) per 10 ml urine

| Age Group (in years) | No. | G M E C |
|---|---|---|
| 5 - 9 | 24 | 38.5 |
| 10 - 14 | 106 | 36.5 |
| 15 - 19 | 22 | 21.0 |
| 20 - 24 | 7 | 19.7 |
| 25 - 29 | 2 | 19.4 |
| 30 - 34 | 4 | 15.8 |
| 35 + | 17 | 11.1 |
| Total | 182 | 28.8 |

Table (3): Comparison between mean age of participants with positive and those with negative urine samples

| Group | No. | Mean age (in years) | p-value |
|---|---|---|---|
| Infected | 182 | 16.7 ± 12.8 | 0.00001 |
| Uninfected | 964 | 24.1 ± 18.6 | |

Table (4): Prevalence and intensity of urinary schistosomiasis (geometric mean egg count per 10 mL urine) among study samples

| Variable | Males (n=135) | Females (n=47) | P-value |
|---|---|---|---|
| Prevalence of schistosomiasis | 23.9% | 8.1% | 0.001 |
| Geometric mean egg count | 31.2 | 23.0 | 0.025 |