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Seroprevalence of Infectious Markers among Pre-Departure Migrants: Public Health Implications for Screening Policies

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Abstract

Background: With the increasing global movement of labor migrants, the risk of cross-border transmission of infectious diseases remains a public health concern. Pre-departure medical screening plays a vital role in identifying asymptomatic carriers and preventing disease spread. This study aimed to evaluate the seroprevalence of key infectious markers among pre-departure migrant workers and highlight implications for public health screening policies. ***Methods:*** This cross-sectional study was conducted at the Department of Biochemistry, Muscat Medical Center, Dhaka, Bangladesh, from January to December 2024. A total of 450 migrant workers undergoing routine pre-employment medical screening were enrolled. Blood samples were analyzed for HIV I/II, Hepatitis B surface antigen (HBsAg), Hepatitis C virus (HCV) and syphilis (VDRL and TPHA). Data were analyzed using SPSS version 25. ***Results*:** Among the 450 participants, the majority were male (92%) and aged between 20–39 years (82%). Most had completed at least primary (30%) or secondary education (42%). Regarding medical fitness, 93.8% were declared fit, 5.1% held up and 1.1% unfit. Only HBsAg showed seropositivity: 5 individuals (1.1%) tested positive, of whom 2 were unfit and 3 held up for confirmation. All participants tested negative for HIV, HCV, TPHA and VDRL. A detailed review showed 442 (98.2%) were HBsAg negative, 2 (0.4%) positive and 6 (1.3%) required retesting. ***Conclusion*:** The overall seroprevalence of infectious markers was low, with Hepatitis B being the only positive finding. These results support the importance of maintaining comprehensive pre-departure infectious disease screening to ensure public health safety and early intervention.

Keywords: Pre-departure migrants, seroprevalence, infectious markers, HBsAg, public health screening, medical fitness.

INTRODUCTION

Labour migration is a significant socio-economic phenomenon in many developing countries, including Bangladesh, where a substantial number of individuals travel abroad each year for employment opportunities, particularly to Middle Eastern and Southeast Asian countries [1]. As part of the mandatory medical clearance before international deployment, pre-departure migrants undergo comprehensive health screenings to detect infectious diseases and other medical conditions [2]. These screenings serve not only to protect host country populations but also `to ensure the fitness and safety of migrants themselves during overseas employment [3].

Among the most critical components of pre-departure screening are serological tests for infectious markers such as Human Immunodeficiency Virus (HIV), Hepatitis B surface antigen (HBsAg), Hepatitis C virus (HCV) and syphilis, commonly evaluated through the Treponema pallidum hemagglutination assay (TPHA) and Venereal Disease Research Laboratory (VDRL) test [4]. In many countries, detection of these markers can result in disqualification or delay of departure, affecting the individual's livelihood and the national economy [5, 6]. Moreover, the presence of such infections in apparently healthy individuals highlights the need for early diagnosis and integration of prevention strategies within national health systems [7].

While global health agencies emphasize the importance of communicable disease control, there remains a scarcity of data on the actual seroprevalence of these markers among pre-departure migrants in Bangladesh [8]. This gap hinders the development of evidence-based policies and targeted interventions. Most available studies either focus on general populations or on symptomatic individuals, leaving a blind spot in the understanding of disease burden among outward-bound migrant workers—a population that often lacks regular access to healthcare prior to screening [9, 10].

In this context, the present study was undertaken to determine the seroprevalence of key infectious markers among pre-departure migrants at Muscat Medical Center, Dhaka. By categorizing individuals as fit, held up, or unfit based on serological and biochemical findings, this study also aims to explore the practical implications of these results on public health policies, especially in relation to international employment screening protocols. Findings from this study may contribute to improving the efficiency and sensitivity of migrant screening programs, identifying potential public health risks and guiding policymakers in formulating preventive strategies, including vaccination and education campaigns.

METHODOLOGY & MATERIALS

This cross-sectional study was conducted at the Department of Biochemistry, Muscat Medical Center, Dhaka, Bangladesh, over a period of one year from January to December 2024. A total of 450 pre-departure migrant individuals were included following informed consent and standard pre-employment medical evaluation protocols. The study aimed to assess the seroprevalence of infectious markers among these individuals to evaluate the need for enhanced public health screening policies.

Inclusion criteria were male and female migrant workers aged 18 years and above who were undergoing mandatory pre-departure medical screening and consented to participate. Individuals with incomplete laboratory records or known history of chronic infectious diseases prior to screening were excluded from the study.

Venous blood samples were collected and analyzed for serological markers including HIV I and II, Hepatitis B surface antigen (HBsAg), Hepatitis C virus (HCV), Treponema pallidum hemagglutination assay (TPHA) and Venereal Disease Research Laboratory (VDRL) test. Additional biochemical parameters such as serum glutamate-pyruvate transaminase (SGPT), serum glutamate-oxaloacetate transaminase (SGOT), total bilirubin, serum creatinine and fasting glucose were also measured. Malaria parasite (MP) screening, hemoglobin levels and blood grouping were performed as part of routine investigations. Pregnancy tests were done for female participants of reproductive age.

Based on the screening results, individuals were categorized as “fit,” “held up” (requiring further investigation or repeat testing), or “unfit” (due to confirmed infectious marker positivity or critical abnormal biochemical findings). Data were entered into Microsoft Excel and analyzed using SPSS version 25. Descriptive statistics such as frequencies and percentages were calculated to determine the seroprevalence of each infectious marker.

RESULTS

Table 1: Demographic Characteristics of Study Participants (N = 450)

Characteristic	Category	Number (n)	Percentage (%)
Age (years)	<20	18	4.00%
	20–29	171	38.00%
	30–39	198	44.00%
	≥40	63	14.00%
Gender	Male	414	92.00%
	Female	36	8.00%
Education Level	No formal education	54	12.00%
	Primary	135	30.00%
	Secondary	189	42.00%
	Higher secondary+	72	16.00%
Blood Group	A Positive	126	28.00%
	B Positive	153	34.00%
	O Positive	108	24.00%
	AB Positive	45	10.00%
	Other (e.g., negative types)	18	4.00%

Table 1 presents the demographic characteristics of the 450 pre-departure migrants included in the study. The majority of participants (44%) were between 30 and 39 years of age, followed by 38% in the 20–29 age group. A smaller proportion were aged ≥40 years (14%) and <20 years (4%). The study population was predominantly male, accounting for 92% (n = 414) of the participants, while females constituted

only 8% (n = 36). In terms of educational background, 42% had completed secondary education, 30% had primary education and 16% had attained higher secondary or above. A minority (12%) had no formal education. Regarding blood group distribution, B Positive was the most common (34%), followed by A Positive (28%) and O Positive (24%). AB Positive accounted for 10% of the population and 4% had other or Rh-negative blood types.

Table 2: Distribution of Participants by Fitness Status

Fitness Category	Number (n)	Percentage (%)
Fit	422	93.80%
Held Up	23	5.10%
Unfit	5	1.10%
Total	**450**	**100%**

Table 2 shows the distribution of study participants based on their fitness status following pre-departure medical screening. Out of 450 individuals, the majority (93.8%) were declared fit for overseas employment. A total of 23 participants (5.1%) were placed on held up status due to abnormal biochemical or borderline serological findings that required further investigation or repeat testing. Additionally, 5 participants (1.1%) were categorized as unfit due to confirmed infectious marker positivity or critical laboratory abnormalities.

Table 3: Seroprevalence of Infectious Markers (N = 450)

Infectious Marker	Positive Cases (n)	Prevalence (%)	Status Breakdown
HIV I and II	0	0%	All negative in all categories
HBsAg	5	1.10%	2 Unfit, 3 Held Up (repeat)
HCV	0	0%	All negative
TPHA (Syphilis)	0	0%	All negative
VDRL (Syphilis)	0	0%	All non-reactive

Table 3 outlines the seroprevalence of key infectious markers among the 450 pre-departure migrants screened in the study. The overall prevalence of infectious diseases was low. Hepatitis B surface antigen (HBsAg) was the only marker with positive results, found in 5 participants, representing a prevalence of 1.10%. Among these cases, 2 individuals were deemed unfit for migration, while 3 were held up for confirmatory testing or further evaluation. No positive cases were detected for HIV I and II, Hepatitis C virus (HCV), or syphilis, as indicated by non-reactive results in both TPHA and VDRL tests. These findings suggest a relatively low burden of detectable infectious diseases in this cohort, though the presence of hepatitis B highlights the need for continued screening and appropriate follow-up to prevent transmission.

Table 4: Summary of HBsAg Status among Participants (N = 450)

HBsAg Result	Number of Participants	Percentage (%)
Negative	442	98.20%
Positive	2	0.40%
Suspected/Repeat	6	1.30%
Total	**450**	**100%**

Table 4 presents a detailed breakdown of HBsAg (Hepatitis B surface antigen) screening results among the 450 study participants. A vast majority, 442 individuals (98.2%), tested negative for HBsAg, indicating no active hepatitis B infection. Two participants (0.4%) were found to be definitively positive, resulting in their classification as unfit for migration. Additionally, six participants (1.3%) had borderline or suspected positive results, warranting repeat testing or confirmatory evaluation. These individuals were temporarily held up pending further assessment.

DISCUSSION

This study assessed the seroprevalence of infectious markers among 450 pre-departure migrant workers screened at the Department of Biochemistry, Muscat Medical Center, Dhaka, Bangladesh, during 2024. The findings provide critical insights into the infectious disease burden among migrants and reinforce the importance of systematic screening prior to international travel.

Among the screened individuals, the prevalence of hepatitis B (HBsAg positive) was found to be 1.1%, while no cases of HIV I/II, HCV, syphilis (TPHA and VDRL) were detected. These results align with earlier studies conducted in similar contexts. For instance,

Afroz *et al.,* reported a 1.17% prevalence of HBsAg among aspirant migrant workers from Bangladesh, suggesting that hepatitis B remains a consistent health concern in this group [4]. Likewise, Mixson-Hayden et al., found a comparable rate of hepatitis B and C among U.S.-bound refugees from Asia and Africa, emphasizing the global relevance of such screening protocols [11].

In the current study, 5 participants were confirmed HBsAg positive, among whom 2 were declared unfit for migration and 3 were held up for further testing. An additional 1.3% had borderline or suspected HBsAg results, reinforcing the necessity of repeat or confirmatory testing. The role of suspected or borderline HBsAg cases is well-documented in similar research. Buonfrate *et al.,* emphasized the importance of confirmatory testing for infectious markers in migrants to prevent misclassification and unnecessary exclusion or clearance delays [12].

The absence of HIV, HCV and syphilis among our cohort is a noteworthy and encouraging finding. Studies such as those by Greenaway *et al.,* and Corbacho-Loarte *et al.,* have observed varying degrees of seroprevalence for these infections in migrant populations, often depending on the origin, transit conditions and host country [1, 13]. In our population—predominantly young males (92%) aged 20–39 (82%)—the lack of seropositivity may be attributed to lower exposure risks, early-stage migration status and possibly prior community-level health interventions.

Globally, hepatitis B remains a major health concern among migrants. Monge-Maillo *et al.,* highlighted the importance of systematic screening for hepatitis B in asymptomatic immigrants, citing its long-term implications for public health [8]. Our study supports this stance, as the identification of asymptomatic carriers prior to departure can help reduce disease transmission to host populations and ensure the well-being of migrants themselves.

Notably, this study's findings contrast with research in high-prevalence settings. For instance, Almlyan *et al.,* in Libya reported higher hepatitis B rates (2.8%) among migrants, likely influenced by regional epidemiological differences [14]. This emphasizes the need for country-specific data to inform screening guidelines and health policies.

The relatively low seroprevalence of HIV and other infections in this study may also reflect Bangladesh's currently low generalized HIV epidemic status, as suggested by Mondal *et al.,* who discussed the transition of HIV in Bangladesh into a concentrated epidemic among key populations [15]. However, the potential for undiagnosed or latent infections remains a concern, particularly given the transit exposure risks and limited access to care in migrant camps and recruitment centers.

Our findings support recommendations by Seybolt *et al.,* and Scott *et al.,* that stress the importance of infectious disease screening not only for public health reasons but also as an ethical responsibility to protect the health of migrants [7, 16]. Screening also presents an opportunity to offer vaccinations, counseling and linkage to care—especially in the case of hepatitis B, where preventive options are available.

The 5.1% held-up rate and 1.1% unfitness rate in this study underscore the operational implications of screening programs. As noted by Canova *et al.,* even minor delays in medical clearance can significantly impact migration processes and workforce deployment. Thus, streamlining diagnostics and implementing efficient referral systems are crucial [17].

Lastly, the findings highlight the necessity of national and international policy alignment in migrant health screening. As described by Castelli and Sulis, harmonized protocols across countries of origin and destination can enhance early detection, reduce costs and protect both migrant and host populations [2].

Limitations of the study

This study was conducted at a single center with a relatively small sample size, which may limit the generalizability of the findings to all migrant populations. Additionally, only selected infectious markers were screened, excluding other relevant infections such as malaria, tuberculosis, or emerging viral illnesses. The cross-sectional design also precludes any assessment of temporal changes or long-term outcomes. Lastly, data on participants' vaccination status, prior exposure and behavioral risk factors were not collected, which could have provided deeper insights into the seroprevalence patterns.

CONCLUSION

This study demonstrates a low but notable seroprevalence of hepatitis B among pre-departure migrants, with no detected cases of HIV, HCV, or syphilis. The results support continued, structured infectious disease screening, especially for hepatitis B, to ensure safe migration practices. Future research should include larger samples and consider co-infection risks and vaccination history to better inform public health interventions.

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