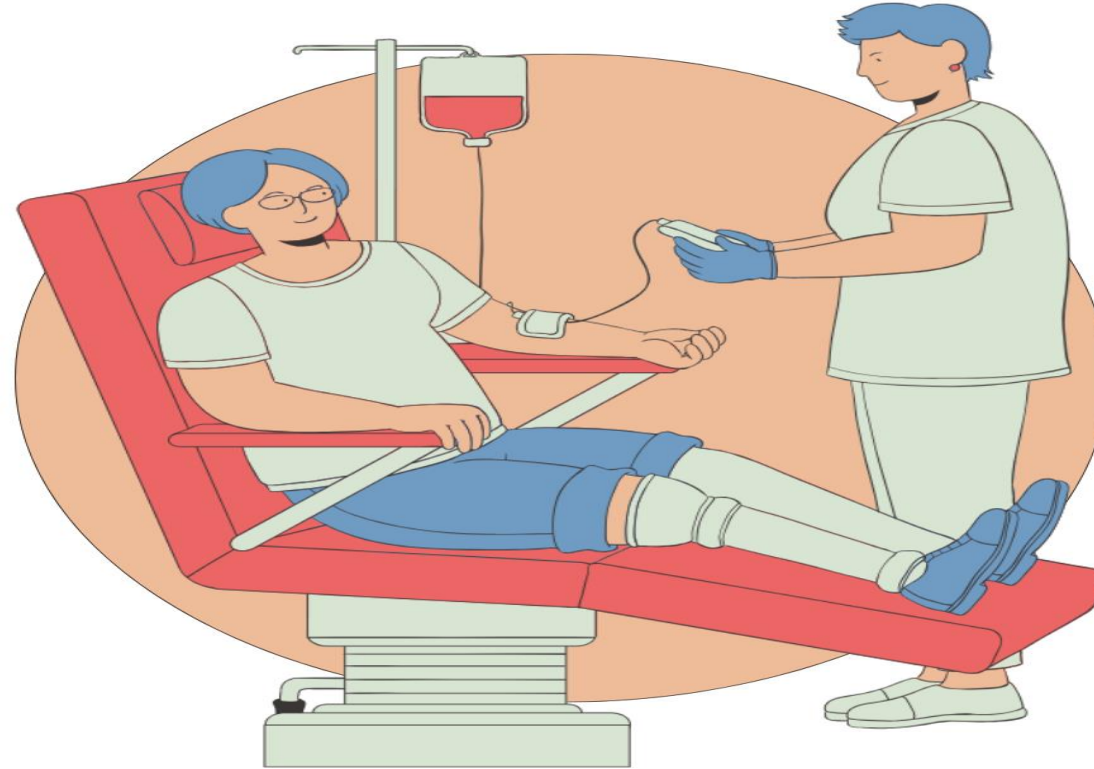


# *Prevalence of Transfusion-Transmitted Infections (HCV, HIV, Syphilis and Malaria) in Blood Donors: A Large-Scale Cross-Sectional Study*



**Presentation :**

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# Introduction

# INTRODUCTION

- Blood transfusion is a mandatory and therapeutic procedure that plays a crucial role in saving patient lives. Globally, it is estimated that 92 million people donate blood annually [1].
- Roughly, 1.6 million of these blood units are discarded because of the presence of infectious agents [2].
- Blood transfusion carries the risk of transmitting major infections, such as hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), syphilis, cytomegalovirus (CMV), herpes simplex virus (HSV), and Epstein–Barr virus (EBV), along with toxoplasmosis and malaria [3].



# INTRODUCTION

- Therefore, collected blood units must be serologically tested to prevent the transmission of infections caused by such pathogens, as per the recommendation of the World Health Organization (WHO) [4].
- Infections due to HBV, HCV, and HIV are major public health concerns.
- the prevalence of HCV among healthy volunteers and blood donors in Yemen was 1.7% and 2.7%, respectively.
- HIV is a global health problem with a considerable socioeconomic impact.
- In Yemen, it was reported that the prevalence of HIV ranges from 0.30% to 0.60%.
- and syphilis from 0.60% to 0.75% with the number of cases expected to increase.



# JUSTIFICATION

- Transfusion-transmitted infections (TTIs) in Yemen are one of the major public health problems.
- there is limited current information on blood transfusion infections and the impact of this problem on the Yemeni population.
- We still lack comprehensive studies dealing with this issue due to the absence of a nationwide registry, hospital studies, or reports.





# OBJECTIVES

- the modest goal of this study is to assess the prevalence of HCV, HIV, syphilis, and malaria among blood donors from different Yemeni communities.



# METHODS





**RESULTS**



- **Table 1.** Seropositivity of anti-HCV and anti-HIV Abs in relation to the demographic characteristics of donor population.

| Demographic Characteristics |  | Total<br><i>n</i> = 16,367 |      | HCV                   |     |                                |      | HIV                  |     |                               |       |
|-----------------------------|--|----------------------------|------|-----------------------|-----|--------------------------------|------|----------------------|-----|-------------------------------|-------|
|                             |  |                            |      | Reactive<br>320 (2.0) |     | Non-Reactive<br>16,047 (99.2%) |      | Reactive<br>33 (0.2) |     | Non-Reactive<br>16,334 (99.8) |       |
|                             |  | <i>n</i>                   | %    | <i>n</i>              | %   | <i>n</i>                       | %    | <i>n</i>             | %   | <i>n</i>                      | %     |
| Occupation                  | Students                                 | 3312                       | 20.2 | 63                    | 1.9 | 3249                           | 98.1 | 4                    | 0.1 | 3308                          | 99.9  |
|                             | Professional worker                      | 5193                       | 31.7 | 83                    | 1.6 | 5110                           | 98.4 | 6                    | 0.1 | 5187                          | 99.9  |
|                             | Military                                 | 2422                       | 14.8 | 69                    | 2.8 | 2353                           | 97.2 | 4                    | 0.2 | 2418                          | 99.8  |
|                             | Manual workers                           | 5440                       | 33.2 | 105                   | 1.9 | 5335                           | 98.1 | 19                   | 0.3 | 5421                          | 99.7  |
|                             | <i>X</i> <sup>2</sup><br><i>p</i> -value |                            |      |                       |     | 13.6<br>0.003 *                |      |                      |     | 9.0<br>0.039 **               |       |
| Residency                   | Capital city                             | 8820                       | 53.9 | 181                   | 2.1 | 8639                           | 97.9 | 22                   | 0.2 | 8798                          | 99.8  |
|                             | Alganad                                  | 845                        | 5.2  | 17                    | 2.0 | 828                            | 98.0 | 1                    | 0.1 | 844                           | 99.9  |
|                             | Azal                                     | 6438                       | 39.3 | 115                   | 1.8 | 6323                           | 98.2 | 9                    | 0.1 | 6429                          | 99.9  |
|                             | Shepah                                   | 150                        | 0.9  | 3                     | 2.0 | 147                            | 98.0 | 0                    | 0.0 | 150                           | 100.0 |
|                             | Tehama                                   | 114                        | 0.7  | 4                     | 3.5 | 110                            | 96.5 | 1                    | 0.9 | 113                           | 99.1  |
|                             | <i>X</i> <sup>2</sup><br><i>p</i> -value |                            |      |                       |     | 2.8<br>0.585                   |      |                      |     | 5.4<br>0.248                  |       |
| Age groups                  | 16–25                                    | 5045                       | 30.8 | 106                   | 2.1 | 4939                           | 97.9 | 7                    | 0.1 | 5038                          | 99.9  |
|                             | 26–35                                    | 7968                       | 48.7 | 159                   | 2.0 | 7809                           | 98.0 | 20                   | 0.3 | 7948                          | 99.7  |
|                             | 36–45                                    | 2689                       | 16.4 | 45                    | 1.7 | 2644                           | 98.3 | 6                    | 0.2 | 2683                          | 99.8  |
|                             | 45–55                                    | 601                        | 3.7  | 9                     | 1.5 | 592                            | 98.5 | 0                    | 0.0 | 601                           | 100.0 |
|                             | More than 55                             | 64                         | 0.4  | 1                     | 1.6 | 63                             | 98.4 | 0                    | 0.0 | 64                            | 100.0 |
|                             | <i>X</i> <sup>2</sup><br><i>p</i> -value |                            |      |                       |     | 2.5<br>0.654                   |      |                      |     | 3.4<br>0.499 **               |       |
| Type of donors              | Volunteer                                | 4563                       | 27.9 | 110                   | 2.4 | 4453                           | 97.6 | 11                   | 0.2 | 4552                          | 99.8  |
|                             | Replacement                              | 11,804                     | 72.1 | 210                   | 1.8 | 11,594                         | 98.2 | 22                   | 0.2 | 11,782                        | 99.8  |
|                             | <i>X</i> <sup>2</sup><br><i>p</i> -value |                            |      |                       |     | 6.8<br>0.009 *                 |      |                      |     | 0.5<br>0.484                  |       |

\* Statistically significant; *X*<sup>2</sup>, chi-square; *p* value < 0.05, significant; *n*, number; %, percentage; \*\* Fisher exact test.

- **Table 2.** Seropositivity of anti-malarial and anti-Treponema pallidum in relation to the demographic characteristics of donor population.

| Demographic Characteristics |  | Total<br><i>n</i> = 16,367 |      | Syphilis               |      |                                |      | Malaria                |     |                                |      |
|-----------------------------|--|----------------------------|------|------------------------|------|--------------------------------|------|------------------------|-----|--------------------------------|------|
|                             |  |                            |      | Reactive<br>387 (2.4%) |      | Non-Reactive<br>15,980 (97.6%) |      | Reactive<br>107 (0.7%) |     | Non-Reactive<br>16,260 (99.3%) |      |
|                             |  | <i>n</i>                   | %    | <i>n</i>               | %    | <i>n</i>                       | %    | <i>n</i>               | %   | <i>n</i>                       | %    |
| Occupation                  | Students                                 | 3312                       | 20.2 | 51                     | 1.5  | 3261                           | 98.5 | 13                     | 0.4 | 3299                           | 99.6 |
|                             | Professional worker                      | 5193                       | 31.7 | 97                     | 1.9  | 5096                           | 98.1 | 42                     | 0.8 | 5151                           | 99.2 |
|                             | Military                                 | 2422                       | 14.8 | 72                     | 3.0  | 2350                           | 97.0 | 14                     | 0.6 | 2408                           | 99.4 |
|                             | Manual workers                           | 5440                       | 33.2 | 167                    | 3.1  | 5273                           | 96.9 | 38                     | 0.7 | 5402                           | 99.3 |
|                             | <i>X</i> <sup>2</sup><br><i>p</i> -value |                            |      |                        |      | 30.9<br>0.001 *                |      |                        |     | 5.8<br>0.123                   |      |
| Residency                   | Capital city                             | 8820                       | 53.9 | 215                    | 2.4  | 8605                           | 97.6 | 36                     | 0.4 | 8784                           | 99.6 |
|                             | Alganad                                  | 845                        | 5.2  | 16                     | 1.9  | 829                            | 98.1 | 4                      | 0.5 | 841                            | 99.5 |
|                             | Azal                                     | 6438                       | 39.3 | 140                    | 2.2  | 6298                           | 97.8 | 64                     | 1.0 | 6374                           | 99.0 |
|                             | Shepah                                   | 150                        | 0.9  | 4                      | 2.7  | 146                            | 97.3 | 2                      | 1.3 | 148                            | 98.7 |
|                             | Tehama                                   | 114                        | 0.7  | 12                     | 10.5 | 102                            | 89.5 | 1                      | 0.9 | 113                            | 99.1 |
|                             | <i>X</i> <sup>2</sup><br><i>p</i> -value |                            |      |                        |      | 35.0<br>0.029 *                |      |                        |     | 21.0<br>0.0031 **              |      |
| Age groups                  | 16-25                                    | 5045                       | 30.8 | 93                     | 1.8  | 4952                           | 98.2 | 29                     | 0.6 | 5016                           | 99.4 |
|                             | 26-35                                    | 7968                       | 48.7 | 195                    | 2.4  | 7773                           | 97.6 | 41                     | 0.5 | 7927                           | 99.5 |
|                             | 36-45                                    | 2689                       | 16.4 | 81                     | 3.0  | 2608                           | 97.0 | 27                     | 1.0 | 2662                           | 99.0 |
|                             | 45-55                                    | 601                        | 3.7  | 15                     | 2.5  | 586                            | 97.5 | 7                      | 1.2 | 594                            | 98.8 |
|                             | More than 55                             | 64                         | 0.4  | 3                      | 4.7  | 61                             | 95.3 | 3                      | 4.7 | 61                             | 95.3 |
|                             | <i>X</i> <sup>2</sup><br><i>p</i> -value |                            |      |                        |      | 12.6<br>0.027 **               |      |                        |     | 26.4<br>0.37 **                |      |
| Type of donors              | Volunteer                                | 4563                       | 27.9 | 81                     | 1.8  | 4482                           | 98.2 | 34                     | 0.7 | 4529                           | 99.3 |
|                             | Replacement                              | 11,804                     | 72.1 | 306                    | 2.6  | 11,498                         | 97.4 | 73                     | 0.6 | 11,731                         | 99.4 |
|                             | <i>X</i> <sup>2</sup><br><i>p</i> -value |                            |      |                        |      | 9.5<br>0.002 *                 |      |                        |     | 0.8<br>0.367                   |      |

\* Statistically significant; *X*<sup>2</sup>, chi-square; *p* value < 0.05, significant; *n*, number; %, percentage; \*\* Fisher exact test.

- **Table 3.** Final model of factors associated with positive HCV, HIV, syphilis and malaria among blood donors.

| Characteristics          | Adjusted odds Ratio (AOR) | 95% Confidence Interval | p-Value |
|--------------------------|---------------------------|-------------------------|---------|
| <b>HCV reactive</b>      |                           |                         |         |
| Professional worker      | 0.88                      | 0.764, 1.438            | 0.615   |
| Volunteer                | 0.73                      | 0.580–0.926             | 0.009   |
| Manual worker            | Ref                       |                         |         |
| <b>HIV reactive</b>      |                           |                         |         |
| Military                 | 3.21                      | 1.260, 8.151            | 0.014   |
| Manual worker            | Ref                       |                         |         |
| <b>Syphilis reactive</b> |                           |                         |         |
| students                 | 1.983                     | 1.442, 2.726            | 0.001   |
| Military                 | 1.74                      | 1.345, 2.255            | 0.001   |
| Manual worker            | Ref                       |                         |         |
| Capital City             | 4.708                     | 2.542, 8.720            | 0.001   |
| Alganad                  | 5.36                      | 2.864, 10.017           | 0.001   |
| Azal                     | 5.93                      | 2.717, 12.933           | 0.001   |
| Shepam                   | 4.74                      | 1.480, 12.933           | 0.009   |
| Tehama                   | Ref                       |                         |         |
| Replacement              | 1.414                     | 1.103, 1.813            | 0.006   |
| Volunteer                | Ref                       |                         |         |
| <b>Malaria positive</b>  |                           |                         |         |
| 16–25 years old          | Ref                       |                         |         |
| 26–35 years old          | 4.17                      | 1.052, 16.554           | 0.034   |
| 36–45 years old          | 4.85                      | 1.432, 16.416           | 0.010   |
| 46–55 years old          | 8.507                     | 2.523, 28.675           | 0.004   |
| >55                      | 9.51                      | 2.867, 31.539           | 0.001   |





## DISCUSSION

- The present study highlights the prevalence of TTIs among blood donors in Yemen.
- A large proportion of donors (99.1%) were male.
- Various studies also reported a larger number of male donors than female donors [22,23].
- Regarding the gender profile of blood donors, WHO has revealed that 33% of blood donations have been given by women.

**Conclusion**





## CONCLUSIONS

- The prevalence of HCV, HIV, syphilis, and malaria among blood donors in Yemen was 2.0%, 0.2%, 2.4%, and 0.7%, respectively.
- Further studies are indispensable to provide a complete picture of the disease prevalence.
- It is recommended that the public be offered more health education about the risk factors.
- The data generated could increase public awareness and assist in understanding the occurrence and risk factors related to TTIs.

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*The End*