Introduction
Transmission of infectious diseases through donated blood is of concern to blood safety as transfusion forms an integral part of medical and surgical therapy. Blood transfusion carries the risk of transfusion-transmissible infections, including HIV, hepatitis, syphilis, malaria and infrequently toxoplasmosis. 

Aims & Objectives: To find out the seroprevalence of Syphilis in blood donors, to find the incidence of spectrum of Transfusion transmitted diseases in blood bank donation & to find the age distribution of the cases studied.

Material & Methods: The present study was undertaken in the Department of Pathology MGM Medical College Indore. This is a retrospective study that was conducted, during the period 2008 –2015. The screening for Syphilis was done by rapid chromatographic assay for detection of antibodies to T. pallidum

Results: Out of total 137689 blood donations, majority of donors are voluntary donors 83.02 % as compared to replacement donors 17.05 %. Seroprevalence of Anti TP is 0.26 %. Seroprevalence of Anti TP is higher in the age group 26-35 year. Among Voluntary & replacement/relative donors. Overall seropositivity of TTI’s (HIV, HBV, HCV, Syphilis & Malaria) is higher in replacement donors 3.71 % as compared to voluntary donors 1.75 %.

Conclusion: voluntary blood donation should be encouraged for prevention of transfusion-transmissible diseases. The time and cost involved in screening donated blood can be reduced by an effective donor education and selection program that promotes self-exclusion by donors at risk of transfusion-transmissible infections.

Keywords: Treponema Pallidum, Seroprevalence, Transfusion Transmitted Diseases, Voluntary Donors, Replacement Donors
Syphilis, an ancient disease caused by Spirochete Treponema pallidum. According to The World Health organization estimates, there are approximate 12 million new cases diagnosed each year, with more than 90% in developing countries. Syphilis has acquired new potential for morbidity with the advent of HIV & AIDS.

**Natural History of syphilis**: Syphilis is a chronic disease caused by *Treponema pallidum*. Treponemes (trep - to turn & nema - thread) are relatively short, slender spirochetes with fine spirals & pointed ends. Some of them are pathogenic while others occur as commensals in the mouth, intestines & genitalia. Treponemes causes the following diseases in the humans:

1. **Venereal Syphilis**: *Treponema pallidum*.
2. **Endemic Syphilis**: *Treponema pallidum* (T endemicum)
3. **Yaws**: *Treponema pertenue*
4. **Pinta**: *Treponema carateum*

They are almost identical in their morphology & antigenic structure though there are differences in clinical features & natural history.

*Treponema Pallidum*: the causative agent of syphilis was discovered by Schaudinn & Hoffmann (1905) in the chancres & inguinal lymph nodes of syphilitic patients. The name *pallidum* refers to its pale staining. *Treponema pallidum* is a thin, delicate spirochete with tapering ends, about 10 μm long (range 4-14 μm) & 0.1-0.2 μm wide. It has ten regular spirals, which bare sharp, angular at regular intervals. The spirochete is actively motile, rotating around long axis with backward & forward movements. *Treponema pallidum* cannot be seen under light microscope but can be appreciated under dark ground or phase contrast microscope. *Treponema pallidum* can be demonstrated in tissue sections using silver impregnation methods.

**Antigenic Structure of Treponema Pallidum**: Infection induces three types of antibodies:

1. **Reagin Antibody**: reacts in Wasswrmann, Kahn & VDRL tests, in which hapten extracted from beef heart (Cardiolipin) is used as Antigen.
2. **Group Antigen**: found in *Treponema pallidum* & non-pathogenic treponemes.
3. **Species Specific**: antibody to this antigen is demonstrated by specific *Treponema pallidum* tests & which are positive in sera of patients infected with *Treponema pallidum*.

On the basis of clinical presentation, infectivity & progression Syphilis is divided into 5 clinical stages – primary, secondary, latent & tertiary syphilis.

1. **Primary Syphilis**: painless genital ulcer (chancre) following exposure to infection.
2. **Secondary Syphilis**: macular popular rash involving palms & soles with high bacteremia in blood.
3. **Latent Phase**: asymptomatic but positive serological test for syphilis.

**Transfusion Transmitted Syphilis**: The first case of Transfusion transmitted syphilis was reported in 1915. 138 cases were reported in the literature by 1941. Cases were mostly discovered in donors with primary or secondary stage of disease. *Treponema pallidum* may be found in blood, not levels are variable & bacteremia is short lived. Treponemes are sensitive to cold; hence risk of transmission through stored blood at 4-8°C is very low.

In India, most blood donors are first-time donors. The prevalence of syphilis among blood donors in India was reported to be 0.7%. The global incidence of syphilis in blood donors is variable ranging from 0.75% in Pakistan to 12.7% in Tanzania.

**Testing Methodologies**: Three methods are currently used.

1. Direct microscopic examination in early stage.
2. **Non-treponemal Serological Tests** e.g : RPR & VDRL
3. **Indirect Treponemal Tests**: FTA-ABS(Fluorescent treponemal antibody absorption test), TPHA (Treponema pallidum Hemaglutination assay), EIA (enzyme immunoassay), Rapid assays (immune-chromatographic strips) & western Blotting
4. **Molecular Based Methods**: PCR (Polymerase chain reaction)

**Aims and Objectives**
The study is being conducted in the department of pathology, M.G.M.M.C, Indore.

1. To find out the seroprevalence of Syphilis in blood donors.
2. To find the age distribution of the cases studied.
3. To find the incidence of spectrum of Transfusion transmitted diseases in blood bank donation.

**Material and Methods**
The present study is being undertaken in the Department of Pathology MGM Medical College Indore. This is a
A retrospective study that will be conducted, during the period 2008 – 2015. Tests are routinely done on every blood unit to exclude HIV, HBV, HCV, syphilis and malaria. Donors were selected by the standard criteria for donor fitness. The screening for Syphilis was done by rapid chromatographic assay for detection of antibodies to T. pallidum. ABO and Rhesus (Rh) blood groups were determined using blood grouping antisera: anti-A, anti-B, anti-AB, and anti-D. Selection of cases for the study included the donors of MYH Blood Bank.

**Results**

The present study was conducted in the Department of Pathology MGM Medical College Indore and M. Y. Hospital blood bank. This is a retrospective study that was conducted, during the period 2008 – 2015. In the present study, 137689 blood donors are observed in the year 2008-15 in the M. Y. Blood Bank. The data collected from donor register record book, donors form, master record book, HIV, & HBV positive bag number records. The results and observations studies are presented below:

**Graph 1:** Out of total 137689 blood donations, majority of donors are voluntary donors 83.02 % as compared to replacement/relative donors 17.05 %

**Graph 2:** Out of total 137689 blood donations, majority of donors are male donors 95.59 % as compared to female donors 4.40 %

**Graph 3:** Seropositive donors for Anti TP in 2008-15. Seroprevalence of Anti TP is 0.26 %.

**Graph 4:** Age wise distribution of Anti TP in the year 2008-15. Seroprevalence of Anti TP is higher in the age group 26-35 year

**Table 1**: Seropositivity of transfusion transmitted diseases (HIV, HBV, HCV, Syphilis & Malaria) in 2008-15. Among Voluntary & replacement/relative donors. Overall seropositivity of TTI’s (HIV, HBV, HCV, Syphilis & Malaria) is higher in replacement donors 3.71 % as compared to voluntary donors 1.75 %

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**Graph 1:** Number of blood units collected during the year 2008-15. Out of total 137689 blood donations, majority of donors are voluntary donors 83.02 % as compared to replacement/relative donors 17.05 %
Graph 2: Number of male and female donors during the year 2008-15. Out of total 137689 blood donations, majority of donors are male donors 95.59% as compared to female donors 4.40%.

Graph 3: Seropositive donors for Anti TP in 2008-15. Seroprevalence of Anti TP is 0.26%.

Graph 4: Age wise distribution of Anti TP in the year 2008-15. Seroprevalence is higher in the age group 26-35 year.
Discussion
Voluntary or Replacement/Relative Donor - In our study, out of total 137689 blood donations, majority of donors are voluntary donors 83.02% as compared to replacement/relative donors 17.05% (Graph 1). Similarly majority of donors are voluntary in another study by Nagarekha Kulkarni et al., out of 19135 blood donors, 11165 (58%) were voluntary and 7970 (42%) were replacement donors.

Male or Female Donors: In our study, out of total 137689 blood donations, majority of donors are male donors 95.59% as compared to female donors 4.40% (Graph 2). Similarly another study is comparable for majority of donors are male 96.22% by Dimple Arora and Bharti Arora et al in Haryana. In the another study, the percentage of male patients was 73% (860/1178) as compared with 27% (318/1178) for female patients by Manisha Jain et al, conducted in New Delhi.

Seroprevalence of Anti TP (Anti Treponema pallidum): In our study, the Seroprevalence of Anti TP is 0.26%. In total blood donations in the year 2008-15 (Graph 3). Seroprevalence of Syphilis is comparable to another study with seroprevalence of Anti TP was 0.91% by Sultan S, Murad S Irfan m et al conducted in Pakistan. In another study by Elyamany G et al seroprevalence was found to be 0.044%. In a study conducted at Mangalore, India by Zulfikar A et al seropositivity of syphilis was found to be 0.07%.

Age Wise Distribution: In our study, overall Seroprevalence of Anti TP (2008-15) is higher in the age group 26-35 years for anti TP (0.09%) (Graph 4). In a study conducted at Mangalore, India by Zulfikar A et al incidence of seropositivity was found to be more in donors in the group aged 18-35 years old than in the group 36-55 years old. In a study by Tessema et al., seropositivity of syphilis was found to be 0.9% & 1.7% in age groups 17-25 & 26-35 yrs respectively. In another study by Elyamany G et al seropositivity was found to be highest in age group 21-30 yrs.

Seropositivity in Voluntary/replacement Donors: Among Voluntary & replacement/relative donors, Overall seropositivity of TTI’s (HIV, HBV, HCV, Syphilis & Malaria) is higher in replacement donors 3.71% as compared to voluntary donors 1.75% (Table 1). In study by Nagarekha Kulkarni et al., the seroprevalence was more in relative/replacement donors as compared to voluntary donors.

Conclusion
The present study was conducted in the Department of Pathology MGM Medical College Indore and M. Y. Hospital blood bank. This is a retrospective study that was conducted, during the period 2008-2015. Tests are routinely done on every blood unit to exclude HIV, HBV and HCV. Donors were selected by the standard criteria for donor fitness. The data collected from donor register record book, donors form, master record book, HIV, HBV and HCV positive beg number records. Out of total 137689 blood donations, majority of donors are voluntary donors 83.02% as compared to replacement/relative donors 17.05%. Out of total 137689 blood donations, majority of donors are voluntary donors 83.02% as compared to replacement donors 17.05%. Seroprevalence of Anti TP is 0.26%. Seroprevalence of Anti TP is higher in the age group 26-35 year. Among Voluntary & replacement/relative donors, Overall seropositivity of TTI’s (HIV, HBV, HCV, Syphilis & Malaria) is higher in replacement donors 3.71% as compared to voluntary donors 1.75%. HBV and HIV are the most prevalent transfusion-transmissible diseases among blood donors in Indore. Screening and better selection of donors are necessary to improve blood safety in the regional blood transfusion centre of M. Y. Hospital. Therefore, it is concluded that voluntary blood donation should be encouraged for prevention of transfusion-transmissible diseases. The time and cost involved in screening donated blood can be reduced by an effective donor education and selection program that promotes self-exclusion by donors at risk of transfusion-transmissible infections.

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