

Blood born viral infections, sexually transmitted diseases and latent tuberculosis in Italian prisons: a preliminary report of a large multicenter study

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Abstract. – **BACKGROUND:** Recent screenings of inmates for Hepatitis C virus (HCV), Hepatitis B virus (HBV), human immunodeficiency virus (HIV), Syphilis and Latent Tuberculosis (LTB) did not provide sufficient information to improve healthcare strategies.

AIM: To obtain valuable information on the endemicity of the above mentioned infections in prisons of Italy.

MATERIALS AND METHODS: A screening based on a peer-to-peer communication, followed by a month of blood sampling on a voluntary basis was performed to detect antibody to 4 of the 5 above mentioned infections and detect LTB by PPD (purified protein derivative) Skin Test. The present analysis regards data obtained in 9 of the 20 prisons.

RESULTS: The percentage of patients who accepted the screening varied between jails (37.3-95.2%, median 62.2), but it was higher than 10.0-20.5% obtained in the same 9 prisons using traditional methods before our intervention. The participation to the screening reached 65.3% for HBV, 64.6% for HCV, 67.4% for HIV, 55.7% for TPHA (Treponema Pallidum Hemagglutination Assay) and 42.8% for LTB. HBsAg was detected in 4.4% of 2265 subjects, anti-HCV in 22.8% of 2241, anti-HIV in 3.8% of 2339 and TPHA in 2.1% of 1932; PPD Skin Test was positive in 17.2% of 1486 subjects.

The screening identified 183 subjects with an unknown infection, 56 Italian and 127 foreigners to be evaluated for clinical decisions: 35 with HBV chronic infection, 34 with HCV chronic infection, 3 anti-HIV positive, 14 with syphilis and 97 with LTB.

CONCLUSIONS: The new approach to the screening, based on a peer-to-peer communication followed by blood sampling on a voluntary basis provided valuable information to improve the healthcare system in each single prison.

Key Words:

HCV infection, HBV infection, HIV infection, Latent tuberculosis, Syphilis, Infection in prisons.

Introduction

In most countries chronic infections due to Hepatitis B Virus (HBV), Hepatitis C Virus (HCV) and Human Immunodeficiency Virus (HIV), Syphilis, and Latent Tuberculosis (LTB) are a heavy healthcare problem in prison because of their high prevalence and of environmental factors that may favour their spread in resident inmates. The screening for these infections is recommended for all the inmates not only at their

arrival but also during their stay in prison, where the high concentration of at-risk subjects, overcrowding, sharing of sharpened objects such as razors and nail clippers, use of unsterilized instruments for tattoo and possible unsafe homosexual intercourses may favour the spread of these infections. Also the screening for co-infections is recommended in this population group¹⁻⁵.

According to previous observations in the open population, HIV and HCV seropositivity were found associated to intravenous drug use (IDU) even in inmates. However, excluding IDUs and male homosexuals the anti-HIV prevalence, remained high (2.6%) in inmates suggesting an active role of other routes of transmission. Indeed, an association was also observed between tattooing and anti-HCV positivity¹ and noteworthy is the observation that drug-injecting practices and man-to-man sex are important modes of transmission of Blood Born Viral (BBV) infections in UK prisons, whereas the HIV prevalence in IDU inmates reflects the prevalence described in drug users of the geographical area of origin of resident inmates⁶.

Sexual Transmitted Diseases (STD) and Latent Tuberculosis (LTB) in prisons are heavy healthcare burden in most countries, even because newly incarcerated inmates show an increased prevalence of these infections^{7,8}.

A previous survey on the prevalence of chronic infections in Italian prisons, carried out in 2005¹, showed data comparable to that reported for other countries. However, these data are obsolete and, unfortunately, the prevalence of inmates screened in the next seven years failed dramatically to low unacceptable levels (28.2%), according to the last official data of the Ministry of Justice recorded in 2009.

In prison, many patients fall into the difficult to reach, difficult to treat categories, like immigrants, intravenous drug users and homeless, frequently alcohol dependent and or with psychiatric comorbidities^{1-5,10-12}. The hard-to-reach people generally refuse information provided by institutional authorities. This combination of circumstances most probably favours the circulation of infections during the detention period.

To take an action against the transmission of these infections, to obtain the updated prevalence of BBV infections, STDs and LTB in Italian penitentiary system and to promote the highest acceptance of healthcare information by the inmates, we conducted in collaboration with Italian Ministries of Justice and Health and with an HIV patients association (NPS) a specific program in 20 Italian

penitentiaries based on a peer-to-peer communication, followed by a month of blood sampling on a voluntary bases. Preliminary data regarding 9 of the 20 prisons are reported in this paper.

Materials and Methods

The strategies for screening implementation of HBV, HCV and HIV infections, syphilis and latent tuberculosis in Italian prisons were discussed during a consensus meeting of the Italian Society of Infectious and Tropical Diseases, the Italian Association of Penitentiary Medicine and the HIV Patients' Association NPS, under the patronage and with the approval of the Italian Ministries' of Health and Justice. Twenty Italian prisons were chosen on the bases of their geographical position to be representative of the Italian Penitentiary System. A method based on a peer-to-peer communication, followed by a month of blood sampling on a voluntary basis, was used to improve prisoners' compliance to a screening for the infections/diseases mentioned above. The project was presented to the Director and to the Sanitary Staff of each single prison who were asked to cooperate to the screening program. A few weeks later a peer-to-peer communication took place in each single prison. An anti-HIV positive subject who had been imprisoned for several years presented as a peer-educator to an audience of 40-80 selected inmates, in the presence of the Chief of the Sanitary Staff of the prison, the advantages of the screening. At the same time these selected prisoners received a pamphlet explaining the importance of the screening also with informative cartoons to show and comment with other prisoners. The screening started after a few weeks and lasted one month; it was performed by the Sanitary Staff of the prisons, according to roles and the Ethical Standards of the Italian Ministries of Health and Justice. The preliminary data regarding 9 of the 20 prisons are reported in this paper.

In all prisons analogous commercial immunoenzymatic assays were used to detect HBsAg, anti-HCV and anti-HIV 1,2. The anti-HIV positivity by immunoenzymatic assays was always confirmed by specific western blot assay.

The screening of syphilis was made using the *Treponema pallidum* hemagglutination assay (TPHA); positive results were confirmed or by the *Treponema* Antibody Absorbed (FTA-ABS), or by the Venereal Disease Research Laboratory (VDRL) tests.

Purified Protein Derivate (PPD) skin tests was performed using a dose of 5 IU and the reaction evaluated according to widely accepted criteria.

Statistical Analysis

Continuous variables were summarized as mean and standard deviation, and categorical variables as absolute and relative frequencies. Differences in the mean values were evaluated by the Student *t*-test, and the Chi-squared test was applied to categorical variables. A *p* value < 0.05 was considered to be statistically significant.

Results

There was a wide variation in the prevalence of patients who underwent the screening in different prisons (Table I). The prevalence ranged between 37.3% to 95.2% (median 62.2) (Table I), values definitely higher than the 28.2% obtained by the screening performed in 2009 with traditional procedures and higher than those obtained in the 7.931 inmates living in the nine correctional facilities evaluated in this study before peer-education, 10.0% for HBsAg, 20.5% for anti-HCV, 14.1% for anti-HIV, 10.0% for syphilis and 11.3% for PPD (from the record of the nine prisons).

For example, HBsAg was searched in 56.6% of cases in Cagliari (South Sardinia) Jail in 72.7% in Florence, in 83.2% in Palermo, in 92.6% in Pescara in central Italy on the 62.2% in Rebibbia in Rome, in 37.3% in Regina Coeli in Rome, in 40.5% in Turin, 95.2% in Sassari (North Sardinia), and in 78.7% in Verona Jail. Considering together this nine jails the prevalence of patients who underwent the screening reached 65.3% for HBsAg, 64.6% for anti-HCV, 67.4% for anti-HIV, 55.7% for syphilis, and 42.8% for latent tuberculosis (Table I).

HBsAg was detected in 2.7% of the inmates tested in Cagliari Jail, in 4.2% in Florence, in 5.1% in Palermo, in 5.8% in Pescara, in 3.6% in Rebibbia in Rome, in 7.4% in Regina Coeli in Rome, in 2.9% in Sassari, 6.9% in Turin and in 3.6% in Verona Jail. The prevalence of HBsAg in all the 2265 subjects tested was 4.4% (Table I).

The anti-HCV was detected in 18% of cases in Cagliari Jail, in 9.6% in Florence, in 28.8% in Palermo, in 31.5% in Pescara, in 22.6% in Rebibbia in Rome, in 28.9% in Regina Coeli in Rome, in 33.3% in Sassari, in 6.9% in Turin, and in 42.9% in Verona Jail. The anti-HCV seroprevalences in all the 2241 subject tested was 22.8% (Table I).

Table I. Inmates tested and percentages of inmates positive for five viral infections in nine Italian prisons.

Prison	N° of prisoners	HBsAg		HCV-Ab		HIV-Ab		TPHA		PPD	
		tested N° (%)	% of Pos.	tested N° (%)	% of Pos.	tested N° (%)	% of Pos.	tested N° (%)	% of Pos.	tested N° (%)	% of Pos.
Cagliari	532	301 (56.6)	2.7	313 (58.8)	18.8	362 (68.0)	8.5	203 (38.1)	0.5	184 (34.5)	16.8
Florence	1003	729 (72.7)	4.2	722 (72.0)	9.6	723 (72.1)	2.8	619 (61.7)	1.5	567 (56.5)	22.3
Palermo	321	194 (83.2)	5.1	156 (48.6)	28.8	174 (54.2)	3.4	N.D.	N.D.	N.D.	N.D.
Pescara	203	188 (92.6)	5.8	197 (97.0)	31.5	191 (94.1)	1.0	171 (84.0)	4.7	124 (61.1)	16.9
Rebibbia, Rome	135	84 (62.2)	3.6	84 (62.2)	22.6	84 (62.2)	1.2	67 (49.6)	10.4	84 (62.2)	19.5
Regina Coeli, Rome	323	121 (37.3)	7.4	121 (37.5)	28.9	154 (47.4)	7.8	224 (69.3)	2.2	22 (6.8)	18.1
Sassari	211	201 (95.2)	2.9	201 (95.2)	33.3	202 (95.7)	4.9	201 (95.2)	2.5	202 (95.7)	26.7
Turin	355	144 (40.5)	6.9	144 (40.5)	16.7	146 (41.1)	2.7	144 (40.5)	2.1	N.D.	N.D.
Verona	385	303 (78.7)	3.6	303 (78.7)	42.9	303 (78.7)	4.0	303 (78.7)	0.7	303 (78.7)	1.3
Total	3468	2265 (65.3)	4.4	2241 (64.6)	22.8	2339 (67.4)	3.8	1932 (55.7)	2.1	1486 (42.8)	17.2

Pos.: Positive; ND: not detected; HBV: Hepatitis B Virus; HCV: Hepatitis C Virus; HIV: Human Immunodeficiency Virus; TPHA: Treponema pallidum hemagglutination assay; PPD: Purified Protein Derivate skin tests. *PPD Skin test was not available in all Italian regions during the screening.

The anti-HIV was detected in 8.5% of cases in Cagliari Jail, in 2.8% in Florence, in 3.4% in Palermo, 1.04% in Pescara, in 1.2% in Rebibbia in Rome, in 7.8% in Regina Coeli in Rome, in 4.9% in Sassari, in 2.7% in Turin, in 4% in Verona Jail. The anti-HIV in the 2339 subject tested was 3.8% (Table I).

TPHA was found positive in 0.5% of inmates in Cagliari Jail, in 1.5% in Florence, in 4.7% in Pescara, in 10.4% in Rebibbia in Rome, in 2.2% in Regina Coeli in Rome, in 2.5% in Sassari, in 2.1% in Turin, 0.7% in Verona Jail; TPHA was not performed in the Palermo Jail. The prevalence of TPHA in all the 1932 subject tested was 2.1% (Table I).

PPD Skin Test was found positive in 16.8% of inmates in Cagliari Jail, in 22.3% in Florence, in 16.9% in Pescara, in 19.5% in Rebibbia in Rome, in 18.1% in Regina Coeli in Rome, in 26.7% in Sassari, and in 1.3% in Verona; PPD Skin test was not performed in the Palermo and Turin Jails and performed in a few cases in Regina Coeli Jail in Rome and in Verona Jail because PPD Skin Test was not available in some Italian region during the major part of the screening period. The prevalence of inmates PPD Skin Test positive in the 1486 subject tested was 17.2% (Table I).

A chronic infection was first identified by our screening in 183 subjects, 56 Italian and 127 from other countries. This information was missed for several subjects (Table II). HBsAg positivity was first diagnosed in 9 (39.3%) of 23 Italian and 26 (49.1%) of 53 foreign HBsAg positive inmates, anti-HCV positivity in 22 (6.3%) of 347 Italian and 12 (17.6%) of 68 foreign anti-HCV positive subjects and anti-HIV positivity in 1 (1.9%) of 52 Italian and 2 (5.7%) of 35 foreign anti-HIV positive subjects (Table II).

In our screening syphilis was first diagnosed in 4 (33.3%) of 12 Italian and in 10 (62.5%) of 16 foreign TPHA positive subjects and the diagnosis of latent tuberculosis was first made in 20 (36.4%) of 55 Italian and 77 (43.5%) of 177 foreign PPD positive inmates (Table II).

Discussion

Our method based on a peer-to-peer communication, followed by a month of blood sampling on a voluntary basis, was successful in improving the compliance of inmates to undergo a screening to identify chronic infections. In fact, the prevalence of screened persons was dramatically higher as compared with those obtained in previous years. A percentage of screened inmates around 20%, like those obtained in previous years, does not provide useful information to make healthcare decisions about these five chronic infections and limits the possibility of numerous resident inmates to undergo adequate treatment or prophylaxis.

Of course, resident inmates may be considered difficult to reach, difficult to treat people, since frequently they are immigrants, intravenous drug users or homeless, frequently present psychiatric comorbidities and refuse information and suggestions by institutional authorities. This circumstances may explain why the traditional approach to the screening at the time of admission to jail has been poorly efficacious in previous years. Instead our peer-to-peer communication, followed by a month blood sampling on a voluntary basis, provided at its first application a substantial increase of the percentage of screened inmates to nearly 60%, with a range from 37.3% to 95.2%

Table II. Positive subjects for the five infections investigated in nine Italian prisons, by time the diagnosis was made.

	N° of positive inmates	N° of pts with missing information	N° of pts with available information	New diagnosis*		Old diagnosis	
				Italian inmates N° (%)	Foreign inmates N° (%)	Italian inmates N° (%)	Foreign inmates N° (%)
HBsAg	100	24	74	9 (12.2)	26 (35.1)	14 (18.9)	27 (36.5)
HCV-Ab	510	95	415	22 (5.3)**	12 (2.9)	325 (78.3)	56 (13.5)
HIV-Ab	89	2	87	1 (1.1)	2 (2.3)	51 (58.6)	33 (37.9)
TPHA	40	12	28	4 (14.3)	10 (35.7)	8 (28.9)	6 (21.4)
PPD	256	24	232	20 (8.6)	77 (33.2)	35 (15.1)	100 (43.1)
All diseases	995	157	836	56 (6.7)**	127 (15.2)	433 (51.8)	222 (25.6)

*Diagnosis unknown before screening. Statistical analysis: ** $p < 0.001$.

suggesting the possibility of improving in a second screening campaign in more than one prison.

Under this viewpoint our study may represent a milestone for the Italian Ministries of Health and Justice in order to choose future strategies for screening newly admitted and resident inmates for these five chronic infections.

The data also show different prevalences of subjects with a chronic infection in different prisons, most probably reflecting both the endemicity of each single infection in the countries of birth of inmates and environmental factors. The variations between a prison to another further stress the need of strategies useful to obtain a wide participation of the inmates to the screening campaign, in order to obtain valuable information in each single prison to develop specific sanitary strategies. Our screening was accepted by nearly 60% of the inmates, and provided valuable indications for correct healthcare strategies in each prison. The screening identified 183 subjects with a previously unknown chronic infection (Table II), 56 Italian and 127 from other countries. This is another important clue of the success of the screening; the physicians in care may evaluate for treatment 35 subject with HBV chronic infection, 34 with HCV chronic infection, 3 anti-HIV positive subjects, 14 subjects with Syphilis and 97 with Latent Tuberculosis.

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