

Sexually transmitted infections in male prison inmates. Prevalence, level of knowledge and risky behaviours

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SUMMARY

Data on the prevalence of sexually transmitted infections (STIs) and risk factors among incarcerated people are few and data about STIs awareness among inmates are even lacking. This study aimed to assess prevalence of STIs, risky behaviours and STIs level of knowledge in male inmates of the Casa Circondariale-Genova Marassi, the main penitentiary in Genoa, Italy. Between January and June 2019, 662 inmate medical records were retrospectively examined to obtain clinical and laboratory data about STIs. To investigate the inmate level of knowledge of STIs and their risky behaviours, 111 consenting participants answered, anonymously, a written questionnaire. One hundred and twenty-two patients had at least one infectious disease when entered the prison: HIV (1.8%), HBV (2.7%), HCV (12.5%) and syphilis (1.3%). When asked to select from a list of diseases which ones they thought to be

sexually transmitted, only 12% of the inmates answered correctly; most of them ignored which body fluids are at risk for HIV transmission, which STIs can induce tumors and if any vaccination exists to prevent STIs. Substance abuse was common among inmates that frequently exchanged needles for injecting drugs. To reduce the STIs incidence, it is necessary to target high-risk populations: everyone entering a prison should be offered a systematic screening of all STIs, including those currently neglected. Since STIs knowledge among inmates is poor and risky behaviours are diffuse, informative interventions in prison may provide an opportunity to educate such a high-risk population.

Keywords: sexually transmitted infections, prisoners, inmates, knowledge, risky behaviours.

INTRODUCTION

Prison inmates are exposed to the risk of acquiring sexually transmitted infections (STIs) and blood-borne infections more than the general population. Their vulnerability is due to several factors: the poor socio-economic and cultural context of origin, the precarious living conditions in jail and the high frequency of risky behaviours

before and during imprisonment, like tattoo practices, substance abuse and unprotected sexual practices [1-4]. These behaviours may contribute to spread infections outside the prison establishing a "bridge" towards the general population [1]. STIs are widely spread worldwide, affecting millions of people every year. The burden of morbidity and mortality worldwide which derives from STIs compromises the quality of life, the sexual/reproductive health and even the newborns and children health [5]. The Italian National Institute of Health recently reported that in the last ten years the number of people with confirmed STIs, mainly condylomas, syphilis and infections by

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Chlamydia trachomatis and *Neisseria gonorrhoeae* has increased progressively [6, 7]. However, the level of knowledge of STIs, their transmission and prevention are still poor in the population and even in some health care settings [8-10].

Updated data on the prevalence of STIs and risk factors among incarcerated people in Italy are few and data about the awareness of STIs among inmates are lacking [11-13].

This study aimed to assess the prevalence of STIs, risky behaviours and level of knowledge of these diseases in male inmates of the Casa Circondariale di Genova Marassi, the main penitentiary in Genoa, Italy.

■ PATIENTS AND METHODS

In January 2019, the Marassi prison housed 672 male inmates, a number that exceeded the 546 existing regular places.

After obtaining the consent of the prison director and of the college of physicians in charge, between January and June 2019, the inmate medical records were retrospectively examined to obtain clinical and laboratory data about STIs that have been diagnosed, treated and monitored in prison. In fact, at their arrival all inmates are screened for HIV, HBV, HCV infections and syphilis and, during their imprisonment, can ask for a medical consultation in case of signs or symptoms of disease. To investigate the inmate level of knowledge of STIs and their risky behaviours, the consenting participants answered, anonymously, a written questionnaire administered by a physician to one prisoner at a time in a room of the prison clinic. The questionnaire was composed by 40 questions, some with multiple choice answers, exploring the following aspects: socio-demographic characteristics (age, country of birth, religion, education level, working activity before incarceration), exposure to factors potentially related to STIs (sexual behaviours, past/current injecting drug use), and the level of knowledge on the main STIs, way of transmission, possible consequences and prevention methods. The inmates were also requested to recall their own sexual behaviour back to 2 years before detention and, at any time, their use of injecting drugs. The questionnaire was provided in Italian language, but it was orally translated by the physician in English or French languages when needed.

The followed procedures were in accordance with the Helsinki Declaration of the World Medical Association.

For statistical analysis we used the χ^2 test and p values <0.05 were considered statistically significant.

■ RESULTS

The medical records of 662 male inmates aged from 18 to 79 years (mean age 48 years) were retrospectively examined; 48% of the inmates were Italian and 52% foreign citizens. Overall, 122 patients (62 Italians, 60 foreigners), corresponding to 18.4% of the prisoner population, had at least one infectious disease when they entered the prison. In particular, 12 inmates were infected with HIV (1.8%), 18 with HBV (2.7%), 83 with HCV (12.5%) and 9

Table 1 - Questions and answers investigating the socio-demographic context.

	Question	Answer
		Socio-demographic features
1	Age	≤30 years 23%; >30 years 77%
2	Nationality	Italian 71% ; others 29% (North Africa, Eastern Europe, South America)
3	How long have you been in prison?	mean 4 years (range: 1 months - 40 years)
4	Previous working activity:	retailers 24%; construction workers 24% ; employed in restaurants 10%; factory workers 17%; employed in transports 6%; freelancers 4%; unemployed 5%; employed in health sector 1%; various 9%
5	Educational level:	high school/university 36%; primary/middle schools 74%
6	Self-evaluation of the sexual education received by Institution:	good/sufficient 57% ; insufficient/inexistent 43%
7	Religion:	Catholic 57% ; Atheist 22%; Islamic 15%; others 6%
8	How much does religion affect choices on your sexual life?	highly/quite 36%; a little/none 64%

were diagnosed as having late latent syphilis (1.3%). Seven inmates were HIV-HCV co-infected (1%) and 5 HBV-HCV co-infected (0.7%). All of the infected people underwent specific treatments during detention. Quite interestingly, the medical records had no trace of STIs other than HIV, HCV, HBV and syphilis, including genital /anal warts, genital herpes, urethritis nor other STIs.

The questionnaire was distributed to 111 inmates, aged from 18 to 77 years (mean age 43 years). The inmates under high surveillance were excluded. Most of the interviewed were Italians (71%) and the average time spent in prison was 4 years. The 32 foreign inmates who completed the questionnaire were: 13 Moroccans, 2 Algerians, 2 Tunisians, 2 Nigerians, 6 Romanians, 1 Albanian, 1 Bulgarian, 1 Ecuadorian, 1 Sri Lankan, 1 Brazilian, 1 Pakistani and 1 Guinean.

Most inmates had a low educational level (73% of them had attended the primary/middle schools) and the most common working activities before

detention were retailers, construction workers and factory workers. As for their religion, 57% of the inmates declared themselves Catholic. Questions and answers investigating the socio-demographic context, risky behaviours and STI knowledge are shown in Table 1, 2 and 3.

Most of the interviewed inmates (76%) admitted to be sufficiently informed to avoid transmission of STIs, but all of them considered useful any further information. However, when asked to select from a list of diseases (including HIV, syphilis, hepatitis A, hepatitis B, hepatitis C, herpes simplex, candida and genital warts) which ones they thought to be sexually transmitted, only 12% of the inmates answered correctly, identifying all the eight infections. More than half of the interviewed correctly knew that STIs can be acquired from any partner (63%), that transmission can occur through oral sex (51%) as well and that condom is not only a contraceptive but also a STIs prevention method (83%). However, down in detail, the

Table 2 - Questions and answers investigating the STIs knowledge.

	Questions	Answers
		STIs knowledge
1	Sources of information about sex:	friends 29%; parents 30%; teachers 10%; internet 4%; books/journals 4%
2	Marital status:	married 57%; not married 43%
3	Sexual education determines:	greater awareness 82%; anxiety 16%; not answered 2%
4	promoting informations on STIs is:	useful 100%
5	Do you feel sufficiently informed to avoid STIs transmission?	yes 76%; no 24%
6	STIs knowledge (identifying STIs from a list of 8 diseases):	optimal (identification of the 8 STIs listed) 12%; partial (identification of at least 5 of the 8 STIs listed) 3%; scarce (identification of less than 5 STIs from the list) 85%
7	How can you acquire a STI?	"Having sexual intercourse with any partner" or "even through a single sexual intercourse" 63%; wrong answers 37%
8	Is transmission possible through oral sex?	yes 51%; no 29%; don't know 20%
9	Which means of contraception protect against STDs?	condom, abstinence 83%; wrong answers 27%
10	Which are the body fluids at high risk for HIV transmission?	blood, spermatic fluid and vaginal secretions 35%; wrong answers 65%
11	Do you know what PAP test is?	no 74%; yes 26%
12	Which of these infections can induce the onset of tumors?	HPV (correct answer) 22%; HPV+other infectious agents (partially correct answer) 11%; wrong answers 67%
13	Is there a vaccine that protects against some STIs?	yes (identification of at least one between HPV and HBV) 4%; wrong answers 53%; don't know 43%
14	Do you always recover from STIs?	no 70%; yes 15%; don't know 15%

majority of the inmates ignored which body fluids are at high risk for HIV transmission, what a PAP test is, which STIs can induce tumors and if any vaccination may prevent STIs (Table 2). As for the risky behaviours, most of the inmates had more than 2 sexual partners, either stable or occasional, in the years immediately preceding detention and about half of them declared to have used the condom to prevent STIs. Substance abuse, including alcohol and intravenous drugs, was common among inmates that frequently exchanged

needles with other people for injecting drugs and also for tattoo practices (Table 3).

As for the inmates' nationality, foreign citizens had a lower level of education than Italians and also less knowledge of STIs, route of contagion and prevention methods. In addition, foreign citizens more frequently have promiscuous behaviours and used alcohol and drugs. Italians, however, used more often intravenously injected drugs. The main differences in the ethnic groups are showed in Table 4.

Table 3 - Questions and answers investigating the risky behaviours.

	Questions	Answers
		Risky behaviours
1	How many sexual partners have you had in the 2 years before detention?	≥two partners 68%; 1 partner 20%; nobody 12%
2	Which type of sexual partners did you have?	stable 38%; sex workers 1%; stable partner+sex workers 8%; occasional sexual partners 17%; stable+occasional sexual partners 33% ; not answered 3%
3	What is your sexual orientation?	heterosexual 100%; homosexual 0%
4	Before detention, did you use a contraceptive method that was also a method to prevent STIs?	condom, abstinence 52%; none or contraceptive methods that not prevented from STIs 48%
5	Why did you use the condom?	contraception 15%; contraception+STIs prevention 14%; STIs prevention 47% ; I don't use condom 7%; not answered 16%
6	Why didn't you use the condom?	I had sex with stable partners 38%; fear of losing spontaneity 38% ; use of other preventive/contraceptive methods 26%
7	Have you ever had a STI?	yes 39% (HIV, HCV infection, gonorrhea, syphilis, condylomas, genital herpes) ; no 61%
8	Have you ever drunk alcohol?	yes 88% ; no 12%
9	When do you use alcohol?	during the week 29%; during the week ends 21%; during parties 40% ; never 10%
10	Have you ever done a tattoo in prison?	yes 22% ; no 78%
11	Who have performed the tattoo?	self-made 2%; cellmate 12% ; inmate not cellmate 3%; tattoo artist inmate 5%
12	What kind of material was used?	sewing / injection needle 50% ; wire 25%; tattoo machine 25%
13	Has the tattoo material previously been used by other inmates?	yes 37% ; 63%
14	Have you ever used drugs?	yes 66% ; no 34%
15	Have you ever used intravenous drugs?	yes 45% ; no 55%
16	Have you ever exchanged injection needles with other people?	yes 57% ; no 43%
17	Have you ever encountered internet sites containing pornographic material?	yes 63% ; no 34%; not answered 3%
40	How much do you agree on the importance of STIs knowledge in order to improve the "quality of life"?	quite/highly 94%; little/not at all 6%

Table 4 - Main differences between Italian and foreign inmates in the questionnaire's answers.

Question	Italians (n=79)	Foreigners (n=32)
Educational level	high school/university 41%; primary/middle schools 59%	high school/university 25%; primary/middle schools 75 %
STIs knowledge (identifying STIs from a list of 8 diseases):	optimal (identification of the 8 STIs listed) 10% ; low (identification of less than 8 STIs) 90%	optimal (identification of the 8 STIs listed) 6% ; low (identification of less than 8 STIs) 94%
How can you acquire a STI?	"Having sexual intercourse with any partner" or "even through a single sexual intercourse" 59%; wrong answers 41%	"Having sexual intercourse with any partner" or "even through a single sexual intercourse" 44%; wrong answers 66%
Is transmission possible through oral sex?	yes 52%; no/don't know 48%	yes 50%; no/don't know 50%
Which means of contraception protect against STDs?	condom, abstinence 38%; wrong answers 62%	condom, abstinence 37%; wrong answers 63%
Which are the body fluids at high risk for HIV transmission?	Blood, spermatic fluid and vaginal secretions 38% ; wrong answers 62%	Blood, spermatic fluid and vaginal secretions 28% ; wrong answers 72%
Do you know what PAP test is?	yes 81% ; no 19%	yes 9% ; no 91%
Which of these infections can induce the onset of tumors?	HPV (correct answer) 24%; wrong answers 76%	HPV (correct answer) 16%; wrong answers 84%
Is there a vaccine that protects against some STIs?	yes (identification of at least one between HPV and HBV) 21% ; wrong answers/don't know 79%	yes (identification of at least one between HPV and HBV) 12% ; wrong answers/don't know 88%
How many sexual partners have you had in the 2 years before detention?	≥2 partners 53% ; <2 partners 47%	≥2 partners 62% ; <2 partners 38%
Which type of sexual partners did you have?	occasional/sex workers 58%; stable/not answered 42%	occasional/sex workers 62%; stable/not answered 38%
Before detention, did you use a contraceptive method that was also a method to prevent STIs?	condom/abstinence 48%; none or contraceptive methods that not prevented from STIs 52%	condom/abstinence 53%; none or contraceptive methods that not prevented from STIs 47%
Have you ever had a STI?	yes 37% ; no 63%	yes 31% ; no 69%
Have you ever drunk alcohol?	yes 86% ; no 14%	yes 94% ; no 6%
Have you ever done a tattoo in prison?	yes 21%; no 79%	yes 22%; no 78%
Have you ever used drugs?	yes 62% ; no 38%	yes 75% ; no 25%
Have you ever used intravenous drugs?	yes 53% ; no 47%	yes 29% ; no 71%
Have you ever exchanged injection needles with other people?	yes 50% ; no 50%	yes 100%; no 0%

Table 5 - Prevalence of HIV, HBV, HCV infection and syphilis in our study in comparison with other studies.

Infection	Prevalence in Marassi prison	Prevalence in other Italian prisons ¹¹	Prevalence in other European prisons ^{2,16-18}	Prevalence in Italian general population ¹⁴	Prevalence in Ligurian blood donors ¹⁵
HIV	1.8%	3.8%	0-0.4%	0.005%	0.005%
HBV	2.7%	4.4%	0.1-1.9%	0.0004%	
HCV	12.5%	22.8%	4.9-11.5%	0.0001%	
Syphilis	1.3%	2.1%	0.3-1.1%	0.002%	0.003%

■ DISCUSSION

As expected, the prevalence of HIV-HBV-HCV infections and syphilis found in our inmates (1,8%, 2,7%, 12,5% and 1,3%, respectively) was definitely higher than in the Italian general population and Ligurian blood donors [14, 15]. Instead, the infectious rate was lower among our inmates than in other Italian jails, but higher than reported by other European studies [2, 11, 16-18] (Table 5).

Such differences in prevalence may be explained, not so much by religious beliefs, which, in relation to sexual choices, played a substantial role only in 36% of our subjects, but mainly by the differences in the demographic composition of our sample, such as the proportions of people who injected drugs, HIV infected people or prisoners born in Countries endemic for HBV, HCV or HIV infections [19].

As for the risky behaviours, we found that clandestine tattooing in prison was a very common practice as in other European and North American prisons [5, 20]. Notoriously, the risk comes from sharing tattoo devices with other inmates. Likewise, using intravenous drugs often involves sharing needles. In addition, the precarious living conditions in overcrowded cells and the inadequate hygiene habits, may facilitate infections. Our inmates admitted other behaviours that, before and during detention, help to acquire infections: promiscuity (more than 2 sexual partners in the 2 years before detention), carelessness in using condoms and in consuming alcohol and recreational drugs. In particular, the last two habits are of concern because both reduce the self-control and may induce unsafe sex and violence. Moreover, 39% of our inmates admitted having had a STIs diagnosis (HCV/HIV infection, condylomas, gonorrhoeae, syphilis) before entering the jail. The history of STIs was statistically correlated with intravenous drug use ($p < 0.0001$) and sexual intercourses with sex workers ($p < 0.003$), whereas no correlation was found with sexual promiscuity, non-use of condom, absence of a stable partner and alcohol consumption ($p > 0.05$). These results suggest that infections usually considered sexually transmitted (HIV, HBV, HCV) can be acquired, among inmates, through incorrect hygienic-sanitary behaviours (use of non-sterile needles for drug injection, unsafe tattoo practices) rather than sexually.

Regrettably, STIs other than HIV, HBV, HCV infections and syphilis were never reported in the medical records of our inmates. Although genital-anal condylomas, *Chlamydia trachomatis* urethritis and other infections are widely diffuse in the general population and also among prisoners, studies on their prevalence among the inmates are scarce [5, 17]. Verneuil et al. found that among 597 male inmates aged 18 to 88 years (mean age 29.7 years) in a French prison, 4.0% had genital-anal condylomas and 4.0% *Chlamydia* urethritis [17]. Among younger inmates (aged 15 to 21 years) *Chlamydia trachomatis* genital infection rate was even higher (13%) [22]. In addition, 12% of the inmates of the Bullingdon Prison (Oxfordshire, England) had condylomata acuminata [23]. The lack of data relating to infections other than HIV, HBV, HCV, and syphilis in the medical records of our prisoners, as well as the scarcity of studies on this issue, both reflect the wrong perception, perhaps diffuse even among physicians, that these are infections of little importance, probably because they are frequently asymptomatic [10]. Therefore, even if not mentioned in the medical records, we cannot exclude that our inmates had not been affected by STI like *Chlamydia trachomatis* or human papillomavirus. Since these infections are largely diffuse in the general population, it can be likely that they are widespread also in prisoners [5-7].

As stressed by the World health organization (WHO), while the HIV/AIDS epidemic has received substantial attention since the 1980s leading to the present high HIV awareness, much less attention has been given to other STIs and this neglect may be the cause for their increase [24]. Yet, *Chlamydia trachomatis* and other bacterial STIs are the main cause of pelvic inflammatory disease, preventable women infertility, miscarriage and birth defects, and increase the risk of HIV transmission during unprotected sexual contact. Furthermore, human papillomavirus (HPV) persistent infection may lead to oropharyngeal/ano-genital neoplasias both in women and men [5, 24].

Although WHO stated that the lack of education among vulnerable people, like prisoners, is a factor that contributes to the STIs epidemic, very few studies have been conducted about prisoners' level of knowledge of STIs and our survey was the first investigating this issue in an Italian pris-

on [5, 13, 25, 26]. A study on Taiwanese male inmates showed a low level of knowledge about safe sex and, except for sharing needles, HIV transmission routes. Indeed, up to 63% of Taiwanese prisoners used intravenous drugs (more than in our study, 45%), and the duration of this habit was directly related to needle sharing and HIV [13]. In Briman Prison, Saudi Arabia, a poor knowledge was common among 204 female inmates (aged 16-60 years, mean age 33.3 years), 42.6% of them being even uncertain about the role of condoms in protection from STIs [26]. Interestingly, an Australian study comparing the level of knowledge on STIs (especially on *Chlamydia* and genital herpes) between prisoners and the general population, showed that, despite their poor background, prisoners were relatively well informed on STIs: they had a better knowledge than the general community of chlamydia-related questions, whilst the level of knowledge on herpes was slightly better in the community sample [25]. Although aware of some ways of infection transmission (oral sex, any partner) and prevention (condom use), the level of knowledge of STIs of our inmates was low. In line with the Taiwanese and Saudi Arabian studies, 85% of our inmates were unable to identify correctly STIs from a list of diseases, 65% did not know that blood, spermatic fluid and vaginal secretions are at high risk for HIV transmission and almost all (96%) were not aware of the existence of vaccines to prevent some STIs [13, 26]. Nevertheless, most of the inmates declared at the beginning of the questionnaire to feel sufficiently informed to avoid STIs transmission. This overestimation recalls the Dunning-Kruger effect: a cognitive distortion whereby subjects with little experience/knowledge in one field tend to overestimate their skills, wrongly evaluating themselves as experts in that field [27]. We observed a similar overvaluation in two other studies investigating the level of knowledge of STIs among Italian adolescents and Albanian undergraduate students: most of all regarded themselves as being sufficiently informed about STIs, but, answering to anonymous questionnaires, their awareness proved unsatisfactory among Albanians and was even extremely poor among Italians [9, 28]. For example, only 20% of Albanians and a miserable 0.5% of Italians were able to correctly identify the STIs from a list of diseases and only one fourth of them demonstrated a

good knowledge about contraceptive and preventive methods [9, 28]. We suppose that, at least in Italy, the lack of knowledge of STIs found in the inmates, school students and, probably also in the general population, may reflect the national policy on sex education that is still not obligatory in the school programs, differently from many other European and extra-European countries [9, 29]. Lastly, the substantial differences in STIs knowledge and risky behaviours among our inmates (Table 2) may reflect the different socio-cultural contexts of their ethnic origin. In fact, our foreign inmates mainly came from Countries of North Africa, South America and Eastern Europe that are economically and culturally more underprivileged compared to Italy. For example, the fact that foreigners admitted less frequently (31%) than Italians (37%) having had a STIs diagnosis before imprisonment, may be due to the limited access to health care in their countries.

To reduce the incidence of HIV and STIs, it is necessary to target high-risk populations such as prison inmates. Everyone entering a prison should be offered a systematic screening of all STIs, including those currently neglected, in order to diagnose them timely and, by treating them, avoid their dissemination in and outside prisons. Since STIs knowledge among inmates is poor and the risky behaviours are diffuse, informative interventions in prisons may provide an opportunity to educate this high-risk population. Better knowledge might not directly and immediately translate into less risky sexual behaviours, but would abate the persistent misconceptions about STIs' transmission that constitute a barrier to a safer sexual activity.

Conflict of interest

None.

Financial support

None.

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