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Active TB screening among homeless people attending soup kitchens in Verona (Italy)

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Key words: Hard-to-reach, homeless, screening, active tuberculosis, mobile X-Ray unit, active research, non-profit association

Parole chiave: Popolazioni difficili da raggiungere, senza fissa dimora, screening, tubercolosi attiva, sistema radiografico mobile, ricerca attiva, associazione non-profit

Abstract

Background. *The hard-to-reach populations, including the homeless, are particularly vulnerable to the development of active tuberculosis. According to the World Health Organization, tuberculosis rates among the homeless in industrialized Countries are up to 20 times higher if compared with the general population, representing a relevant public health problem. The aim of our study was to describe the results of an active tuberculosis screening applied in order to find out suspected active TB cases among the homeless in Verona.*

Methods. *As part of a partnership between the non-profit association Medici per la Pace and one of the Local Health Units of Veneto Region (ULSS 9 Scaligera) in 2018, a tuberculosis screening, based on thoracic radiographs, was offered to the homeless guests of two Verona's soup kitchens.*

Results. *The studied population included 139 people, and three cases of suspected active tuberculosis, all in males, were observed. Among these, two received a diagnostic confirmation of active tuberculosis (a prevalence of 1.44% - CI: 0,17 – 5,1). Moreover, radiographic patterns of tuberculosis aftermaths were found in six additional subjects.*

Conclusions. *Interventions specifically dedicated to hard-to-reach populations, can be useful in identifying tuberculosis active cases and controlling the disease in low tuberculosis burden countries. In particular, the active research of subjects, the screening carried out with mobile X-ray, and also the constant caring of the patients with active disease, could be the right method to keep under control this relevant public health problem.*

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Introduction

Tuberculosis (TB) represents a major worldwide public health problem with a notification rate of 10.7 per 100,000 population within the European Region of the World Health Organization (WHO) in 2017 (1). The hard-to-reach populations are particularly susceptible to infection with *Mycobacterium tuberculosis*. In addition, their common exposure to specific risk factors, such as living in crowded areas with poor ventilation, comorbidity, substance abuse, HIV infection and malnutrition, lead to a high risk of developing active TB. Moreover, hard-to-reach populations have difficulties to gain access to healthcare facilities and to follow the necessary therapeutic protocols with consequent diagnostic delay, worse health outcomes, and higher risk of spreading the infection for a long time (2).

The European Typology of Homelessness and Housing Exclusion (ETHOS) defines the homeless population not only as people who are roofless, but also people who are houseless and people who live in temporary, insecure, and inadequate, poor-quality housing (3). The number of homeless people is widely increasing in the European Region, including Italy. As stated by the survey carried out in 2018 in Italy, the percentage of people living in absolute poverty was 8.4% (4).

According to the WHO, TB rates among homeless people in industrialized Countries are up to 20 times higher compared with the general population. In Western Europe, the prevalence of active TB in homeless people ranges from 1 to 2% (5). Given this public health problem, the actions aimed in reducing the incidence of TB among the homeless are undertaken in many Countries. Appropriate targeted interventions, such as active case finding, can be effective in controlling the disease in low TB burden Countries (e.g. Western Europe, USA, Australia) (6).

The aim of our study is to describe the results of an active TB screening performed to detect suspected active TB cases among the homeless of the city of Verona.

Material and methods

In 2016, the non-profit association *Medici per la Pace* (*Doctors for Peace*) signed an agreement with one Local Health Unit (*ULSS 9 Scaligera*) of the Veneto Region; the purpose was the implementation of priority preventive interventions towards the hard-to-reach people in the Verona area.

As part of this partnership, in 2018, a TB screening was offered to homeless guests of two Verona's soup kitchens. The screening was based on thoracic radiographs performed by a mobile radiological equipment. It took place over the whole year period and included three sessions of exams (chest X-ray) carried out in March, June and October. The only exclusion criterion was an ongoing pregnancy.

Informed consent was collected before the exam (LD 230/95 and following. and LD 196/2003 amended by LD 101/2018). Suspected active TB cases detected by chest X-Ray, entailed an immediate admission to specialized health facilities in order to receive a diagnostic conclusion and a targeted therapy.

Descriptive statistics were used for data analysis, while STATA 14 was used to calculate confidence interval for the retrieved proportion of active TB cases.

Results

The studied population was 139 people. The demographic characteristics of the people included in the sample (e.g. gender, age, WHO Regions of origin) are reported in Table 1. There were 3 cases of suspected active TB, all in male subjects, one aged

23 and two aged 41 years. Two of them received a diagnostic confirmation of active TB (prevalence 1.44%; CI: 0.17 – 5.1). One of these died soon in hospital from another illness, while the other started the therapeutic program.

Moreover, a radiographic pattern of TB aftermaths was found in six additional subjects, all male and with a mean age of 46 years (SD 12.15, range 27-63).

Table 1 - Demographic characteristics of the studied population.

Caracteristics (n=139)	Total patients (n=139)	
Gender	*%*	*(n)*
Female	18	(25)
Male	82	(114)
Age	*Years*	
Mean age	43	
Standard Deviation	14.00	
Minimum	18	
Maximum	78	
Origin – WHO Regions	*%*	*(n)*
African Region	21.6	(30)
East Mediterranean Region	25.9	(36)
European Region	47.5	(66)
South-East Asian Region	5.0	(7)
Origin- Country	*%*	*(n)*
Italy	23.0	(32)
Romania	16.5	(23)
Morocco	15.8	(22)
Others	44.6	(62)

Discussion

This project was conducted over a sample of the homeless in a Local Health Authority of the Veneto Region. This activity is not part of the ULSS routine activities, but is performed by voluntary staff, whose interventions are deferred over time. Although our sample is limited for this reason, its demographic characterization is similar to those described by ISTAT for the Italian homeless population (7).

According to the literature, the prevalence of active TB we detected (1.44%) is in line with the data from Western Europe (1-2%) (5). Given that 4.3% of the screened population showed radiographic aftermaths of TB, and that the disease could reactivate more easily in this fragile population, tuberculosis in our area represents a relevant public health problem.

There are several reasons for an insufficient coverage of current TB control strategies among the homeless: for example, difficulties for them in accessing health facilities, perception of unfair treatment and fear of negative consequences in the event of positive findings (2). The homeless are also less likely to know their contacts by name, and consequently to be able to identify them; so conventional contact tracing is not feasible in these groups (8).

The diagnostic delay, that is often observed in the hard-to-reach populations, can result in some cases from the fact that healthcare workers, practicing in low incidence areas, might not suspect TB initially and also because the homeless usually refer the symptoms of TB to other causes (2). Furthermore, it was observed that a cost-effective intervention among all vulnerable populations could be represented by chest X-ray (CXR) screening (9). Story at al. report a specificity and sensitivity of screening with mobile digital CXR of 99.2% and 81.8% respectively (10).

Therefore, as reported by other Authors, the screening performed by actively contacting the population at risk, with a mobile X-ray unit, is more targeted for this type of subjects (10).

The homeless cannot be reached with a standardized call system, having poor compliance with health interventions. In addition, sputum smear examination is difficult to implement for large numbers of persons, and the alternative use of the

tuberculin skin testing (TST) does not allow an immediate result leading to a loss of subjects at the time of test reading. Moreover, a disadvantage of skin testing is the high rate of false negative results in case of immunodeficiency, a frequent condition among the homeless population particularly in individuals with active pulmonary TB. The active research of the subjects, the screening carried out with mobile X-ray and the immediate taking in charge of the people with active disease could be an optimal method to deal with the problem of TB in the homeless.

Limitations

Our sample is quite small and larger studies are necessary to confirm the prevalence of active TB in this frail population. However, a literature concerning this fragile and hard to reach population is still very scarce, especially in Italy. Our retrieved proportion is consistent with the prevalence data of larger similar studies conducted in other countries and underlines the needs to focus more efforts on improving TB control over this subgroup of people.

Conclusions

Interventions specifically dedicated to hard to reach populations, such as active case finding, can be useful in identifying TB active cases and controlling the disease in low TB burden countries. In particular, the use of mobile X-Ray is an effective tool in promoting early diagnosis of active TB. It is desirable that in the future this model will be standardized and expanded to provide a high case-finding rate.

Conflict of interest: the authors do not have any personal conflict of interest.

Riassunto

Screening per TB attiva condotto tra i senza fissa dimora ospiti delle mense dei poveri di Verona (Italia)

Premessa. Le popolazioni difficili da raggiungere, inclusi gli homeless, sono particolarmente vulnerabili allo sviluppo della tubercolosi attiva. Secondo l'Organizzazione Mondiale della Sanità (OMS), il tasso di tubercolosi tra i senza fissa dimora nei Paesi industrializzati è 20 volte superiore rispetto a quello della popolazione generale, costituendo un rilevante problema di salute pubblica. Lo scopo del nostro studio è stato descrivere i risultati di uno screening, eseguito allo scopo di rilevare i casi sospetti per tubercolosi attiva tra i senza fissa dimora residenti a Verona.

Metodi. Nel 2018, ai senza fissa dimora ospiti di due mense dei poveri di Verona, è stato offerto uno screening per tubercolosi basato su radiografie del torace. Ciò faceva parte di una collaborazione tra l'associazione non-profit *Medici per la Pace* e una delle Unità Sanitarie Locali del Veneto *(ULSS 9 Scaligera)*.

Risultati. La popolazione studiata era composta da 139 persone, tra cui sono stati rilevati tre casi di sospetta tubercolosi attiva, tutti in soggetti di sesso maschile. Tra questi, due hanno ricevuto la conferma diagnostica di tubercolosi attiva, corrispondente ad una proporzione dell'1,44% (CI: 0,17 – 5,1). Inoltre, pattern radiologici indicativi di esiti di tubercolosi sono stati rilevati in sei soggetti.

Conclusioni. Interventi mirati alle popolazioni difficili da raggiungere possono essere utili per identificare casi di tubercolosi attiva e controllare la malattia nei paesi poco interessati da quest'ultima. In particolare, la ricerca attiva dei soggetti, lo screening condotto con unità radiografiche mobili ed ulteriormente la presa in carico dei pazienti con malattia attiva possono essere metodi adeguati per fronteggiare questo rilevante problema di salute pubblica.

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