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To Study The Seasonal Variation In Sputum Positivity Ratio Among Tuberculosis Suspect

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Abstract

The purpose of the study was to assess monthly trends in tuberculosis suspects and sputum smear-positive cases over the course of four calendar years using representative samples of tuberculosis laboratory registries from Ojha Institute of Chest Diseases. 8.46% (2,363) of the 27,907 suspects listed in the tuberculosis laboratory registries were positive cases. The percentage varied by gender, female having the lowest (2.87%) and male having the highest (5.59%) positive cases. Based on the monthly proportion of suspects and cases relative to the overall number of suspects and cases, seasonal changes were most pronounced in late winter and early spring or summer seasons. Female suspects were consistently older than female cases. Male suspects were nearly always older than male victims. The presentation of tuberculosis suspects and cases to health care facilities appears to be determined by a combination of external and perhaps endogenous factors.

Keywords: Tuberculosis, Trend, Seasonal variation, Laboratory.

Introduction

The Mycobacterium tuberculosis (MTb) bacteria primarily cause tuberculosis (Tb), a serious public health infectious illness. It is the second biggest infectious illness cause of morbidity and mortality. According to the World Health Organization's 2011 study, approximately 9 million individuals are projected to contract the disease in the near future (Dye et al., 1999; World Health Organization, 2001). Trends and seasonal variations of tuberculosis have been demonstrated in several studies in different countries with reported peaks in late winter and early spring or summer (Rios et al., 2000; Atun et al., 2005; Nagayama et al., 2006; Luquero et al., 2008). Acid Fast Bacilli (AFB) staining technique is one of the Mycobacterium tuberculosis (MTb) diagnostic approaches and is used as the primary method for the examination of bacilli from a given sample. It is also recommended by the World Health Organization (WHO) as one of the strategic tools for the global management of tuberculosis (Sotgiu et al., 2017). In resource-poor nations, Ziehl–Neelsen staining is the most cost-effective approach for demonstrating the presence of AFB (Enarson et al., 2000). Much less is known about such variations among patients presenting as tuberculosis suspects as, in contrast to morbidity data, such information is virtually never routinely accessible to national health authorities. The

objective of this study was therefore to analyze monthly trends across a calendar year in tuberculosis suspects and sputum smear-positive cases amongst them, based on nationally representative samples of tuberculosis laboratory registers from.

Material and Method

A retrospective, record-based investigation utilising normally accessible information from Ojha Institute of Chest Diseases was conducted. In Karachi, Pakistan, the study utilised TB Laboratory Registry data from at least four years between January 2017 and December 2020. From list of laboratory that offered tuberculosis diagnostic service utilising sputum smear microscopy and utilised a standard Tuberculosis Laboratory Register, for the evaluation of negative and positive cases. The proportion of tuberculosis suspects identified as tuberculosis cases was determined. A case of smear-positive tuberculosis was defined for the purposes of the study as a suspect with at least one acid-fast bacillus (AFB) in at least one of the serial exams. The analyses comprised univariate and stratified descriptions of suspect and victim gender and age.

Results

Females have lower positive case 2.87% (802) than male which was 5.59% (1561). The ratio of negative cases out of 27907 cases were 25.29% (7059) female and 66.23% (18,485) were male. According to the age distribution highly positive cases in both gender male and female in 40 -45 age group, which were 49.50% (397) female positive case and 49.90 (779) were male positive cases (Table: 1).

Table: 1. Demographic Profiles of TB Cases

Variables	**Categories**	**Cases**	**Percentage**
Gender	Male	20,046	71.84%
	Female	7861	28.16%
Positive Cases	Male	1561	5.59%
	Female	802	2.87%
Negative Case	Male	18485	66.23%
	Female	7059	25.29%
Age Distribution Cases		**Positive**	**Negative**
Male	0 – 18 years	137(8.77%)	1802(9.75%)
	19 – 40 years	779(49.90%)	8960(48.47%)
	40 – 45 years	645(41.31%)	7723(41.78%)
Female	0 – 18 years	116(14.46%)	744(10.54%)
	19 – 40 years	397(49.50%)	3352(47.48%)
	40 – 45 years	289(36.03%)	2963(41.97%)

Based on the monthly proportion of positive cases relative to the overall number, seasonal changes were most pronounced in late winter mainly in January in both cases male and female the ratio were high and in early spring or summer seasons positive cases were again increasing in both genders (Figure: 1).

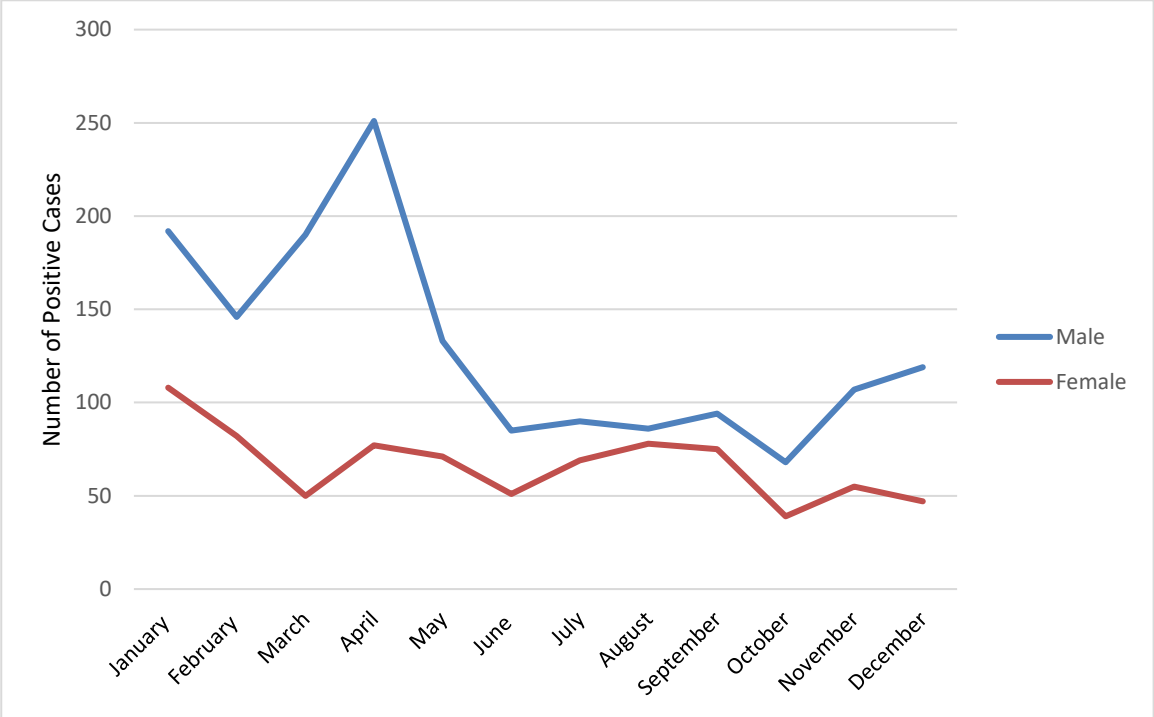

Figure: 1. Monthly Calendar of Positive Male and Female MTb Ratio

Discussion

In this investigation, the majority of pulmonary tuberculosis suspects were male, comprising 1561 (5.59%) of the total. This may be due to the fact that males are more likely than females to attend health care facilities when they have a health condition or have more close social contacts and groups where the sickness is spread. In contrast, the current investigation revealed that AFB smear-negative cases were substantially higher in the 19–40 age group than in the 40 above older age groups. The decline in the prevalence of smear-positive Tb may be attributable to the success of the Tb control strategy programme, or it may be attributable to poor quality AFB smears and detection, or it may be attributable to patients not visiting healthcare facilities, despite being more likely to be tuberculosis suspects. Since the AFB method is an integral part of the DOT's programme for the prevention and control of tuberculosis, additional research is required to evaluate the quality of AFB techniques in the Pakistan and other parameters.

In the investigation of seasonal distribution of tuberculosis, there was no significant variation between the four years and each month in the dispersion of pulmonary tuberculosis. To diagnosis instances of pulmonary tuberculosis, however, rather high levels of AFB were analysed on slides in January, March, and April. This observation was comparable to Iranian research to some extent (Moosazadeh et al., 2013). Different suggestions and hypotheses have been advanced to explain the seasonal variation in the incidence of tuberculosis, as the incidence of tuberculosis is higher in the winter than

in the summer (Leung et al., 2005), due to cold weather, a deficiency in vitamin 6 production in conjunction with a decrease in sun light intensity (Sita-Lumsden et a., 2007).

Conclusion

Throughout the study period, more males than women visited the laboratory for sputum AFB testing. The ratio of infection was predicted to be highest among young individuals and to decrease with age. This study cannot determine whether the observed seasonal changes in the age of tuberculosis cases represent reactivation or direct progression from freshly acquired illness.

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