Trends and Clinical Outcomes of Registered TB Cases 1999-2011: Is There a Significant Change in Extrapulmonary Pattern?

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Objective: To evaluate the patterns, clinical trend and outcome of registered TB cases from 1999 through 2011.

Design: A Retrospective Cohort Study.

Setting: Tuberculosis Unit, Aseer Central Hospital, Abha, Saudi Arabia.

Method: Six-hundred and eighty registered TB records were reviewed. Definitions, diagnostic criteria and treatment regimen of the National Tuberculosis Control Program (NTP) were used.

Result: Six-hundred and eighty registered TB records were reviewed. Four hundred three (59.3%) were pulmonary TB and 277 (40.7%) were extrapulmonary TB. In the period from 1999 to 2002, the pulmonary to extrapulmonary ratio was 4:1. However, in the subsequent years, this ratio has changed to 1:1. During the study period, no significant difference in sex was found; the annual defaulter rate and average cure rate were 12% and 75%, respectively. The best indicator of cure was weight gain. Overall, the mortality rate was approximately 18% (≤10 years and ≥60 years). TB of the Central Nervous System (TB-CNS) showed the highest mortality rate, 211 (31%).

Conclusion: Cure rate is comparable to worldwide figures. Trends towards more TB extrapulmonary cases were observed. The highest mortality rate was reported among TB-CNS. Prospective randomized controlled study is recommended to evaluate the reasons behind the change.

Bahrain Med Bull 2018; 40(2): 90 - 92

The World Health Organization (WHO) reported 10.4 million cases of TB in 2017 and approximately one million deaths worldwide. TB is one of the leading causes of morbidity and mortality. However, there is a wide variation in the annual incidence rate of TB between regions and countries around the world[1].

The estimated rate in the Kingdom of Saudi Arabia (KSA) of TB is 32 per 100,000, and the smear-positive TB is 18 per 100,000 giving an annual risk of infection of 0.35%, which is the middle prevalence (2%-14%) category[1]. However, the local pattern of TB shows marked regional variations due to socioeconomic, genetic, dietary and geographical factors[2,3]. In Saudi Arabia, there is a distinctive population pattern. A large proportion of the expatriates are coming from endemic regions (South East Asia)[4]. Furthermore, the two holy cities are receiving millions of pilgrims annually. The majority are coming from endemic areas[5-9]. Studies reveal that TB in KSA is still not fully controlled despite the government's efforts to eradicate the disease[9]. Data suggest that visitors and immigrants to Saudi Arabia are associated with a higher rate of TB compared to Saudi citizens[10-12]. In Jeddah (Sea and Airports for pilgrims arriving in Makkah), the infection rate can reach up to 64 cases per 100,000 compared to 32 per 100,000 in Riyadh (Central). The higher rate in Jeddah may have been caused by the influx of pilgrims[13].

The Aseer region is located in the southwest of KSA. In 1999, the country introduced the National Tuberculosis Control Program (NTP); new measures were introduced to treat and control the disease[2].

The aim of the study was to evaluate the patterns, clinical trends and outcomes of registered TB cases from 1999 through 2011.

METHOD

The study was performed from February 2017 to May 2017. All registered TB cases during thirteen year-period (1999-2011) were reviewed. The protocol was adapted from NTP.

An enhanced TB notification form was developed and implemented since the establishment of the TB unit. The form summarizes all available clinical, microbiological, histological and epidemiological data for each diagnosed case with TB. Another follow-up form was designed for each follow-up visit to the TB clinic. The follow-up form registers the progress of the illness, side-effects of medications and indicators. The analysis was completed using SPSS program version 22. Frequencies and percentages were used to present the data. Pearson chi-square test was used as a test of significance at 5% level.

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RESULT

Six hundred eighty TB cases were registered in TB unit and included in the study, 367 (53.9%) were males, and 313 (46%) were females. Four hundred three (59.3%) were pulmonary TB (PTB) and 277 (40.7%) were extrapulmonary TB (EXTB). Two hundred twenty-eight (33.5%) of PTB were males compared to 147 (21.6%) among EXTB. The gender differences between PTB and EXTB was not statistically significant (Pearson's chi-square=0.582, P=0.445).

Table 1 shows the annual distribution of PTB and EXTB. It shows that the portion of EXTB cases were 15 (36.6%) of all registered TB cases in 1999, 7 (17.5%) in 2000 and 23 (31.9%) in 2001. In the year 2002, the figure reached up to 37 (50%). This high portion of EXTB continued to be observed from that year until the end of the study period.

Table 1: Distribution of Pulmonary TB and Extrapulmonary TB

Year	Pulmonary TB (403)		Extrapulmonary TB (277)		TOTAL (680)	
	No	%	No	%	No	%
1999	26	6.5%	15	5.4%	**41**	6%
2000	33	8%	7	2.5%	**40**	5.9%
2001	49	12.2%	23	8.3%	**72**	10.6%
2002	37	9.2%	37	13.4%	**74**	10.9%
2003	21	5.2%	24	8.7%	**45**	6.6%
2004	24	6%	19	6.9%	**43**	6.3%
2005	26	6.5%	19	6.9%	**45**	6.6%
2006	21	5.2%	16	5.8%	**37**	5.4%
2007	28	7%	21	7.6%	**49**	7.2%
2008	31	7.7%	23	8.3%	**54**	7.9%
2009	38	9.4%	20	7%	**58**	8.5%
2010	42	10.4%	33	12%	**75**	11%
2011	27	6.7%	20	7%	**47**	6.9%
Total	**403**	**100%**	**277**	**100%**	**680**	**100%**

Figure 1 shows the distribution of EXTB cases (277). The highest frequently involved organs among extrapulmonary TB cases were lymphatic 97 (35%), bone 56 (20.2%), pleural 53 (19.1%) and CNS 49 (17.7%). The lowest was miliary 12 (4.3%), GIT 8 (2.9%) and GU 2 (0.7%).

The annual defaulter rate was about 12%. The total number of patients who were cured during the study were 462 (67.9%).

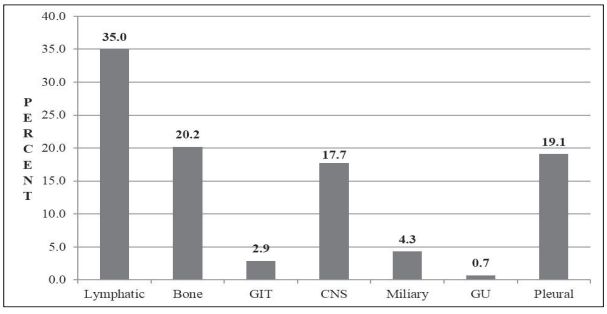

Figure 1: Distribution of Extrapulmonary TB (277)

The average cure rate was 75% (range 51% to 92.9%). Figure 2 shows the cure rate of TB cases by year. The rate increased from 514 (75.6%) in 1999 to 632 (92.9%) in 2011. The best indicator of cure was weight gain. Mortality rate was 122 (18%) which was mainly at the two extremes of age groups (≤10 years and ≥60 years). The highest mortality was observed in TB-CNS 211 (31%).

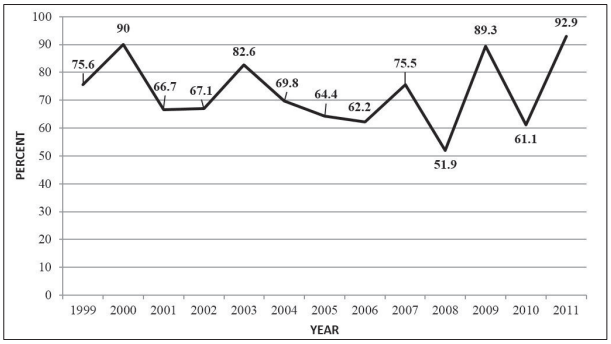

Figure 2: Cure Rate of TB Cases by Year

DISCUSSION

This is the first study regarding TB in the southern region of Saudi Arabia. In this study, it was observed an increase in the proportion of EXTB starting from 2002. In the year 2000, EXTB was only 7 of all TB cases, while in 2002 reached 37 cases; this was similar to other parts of the world. Reports from the WHO showed that Eastern Mediterranean region including Saudi Arabia showed the highest rate of EXTB (22%)[1]. The higher proportion of EXTB has been noticed in Saudi Arabia in several studies[14-16]. Al-Otaibi et al found certain risk factors (younger age, female gender and being non-Saudi) associated with such increase[14]. Memish et al found the same higher proportion of EXTB cases and almost similar risk factors[15]. Alrajhy and Al-Barrak in their review of EXTB in Saudi Arabia identified the increase. They attributed this increase to better diagnostic facilities in identifying more cases and better reporting by health providers[16]. Al-Hajoj et al also noted this increase in EXTB; however, they challenged some of these risk factors and noted different patterns according to the site of the EXTB[17]. The pattern observed in the present study support the conclusion of Al-Hajoj that Saudi Arabia faces a serious threat from EXTB[17]. The current available studies are not enough to explain the reasons behind this fact and more detailed studies are needed to explore this threat.

Another important finding in the present study is the high mortality of TB-CNS (31%), which is one of the most aggressive clinical manifestations of tuberculosis[18]. In a study of EXTB, CNS involvement was noted in 5% to 10% of the cases[19]. In another study regarding CNS tuberculosis, the chance of developing CNS tuberculosis was 1% among 82,764 tuberculosis cases from 1970 to 2001[20]. The Majority of studies found that CNS tuberculosis carries a high mortality rate. Several studies reported mortality rate 20 to 50%[21-26]. In Saudi Arabia, only a few studies have addressed TB-CNS[27-31]. In the report by Bahemuka and Murungi addressing tuberculous CNS infections, the mortality rate was only 5%[26]. Other studies concentrated on the diagnosis only and did not report the

details of prognosis or mortality[30-31]. The present study raises considerable challenges regarding TB-CNS management in our area and urges the need for more comprehensive studies to find out the risk factors behind this lethal pathology.

CONCLUSION

The cure rate is comparable to worldwide figures. The trend of increasing extra-pulmonary TB was observed. The highest mortality rate was among TB-CNS. Prospective randomized controlled study is recommended to evaluate the reasons behind the change.

Potential Conflicts of Interest: None.

Competing Interest: None.

Sponsorship: None.

Acceptance Date: 8 April 2018.

Ethical Approval: Approved by King Khalid University Research Ethics Committee (REC # 2017-01-08), Saudi Arabia.

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