ORIGINAL ARTICLE

Treatment Outcome Monitoring by Using Sputum Conversion Rate of Tuberculosis Patients in Pkd Kinta, Malaysia

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ABSTRACT

Introduction: A control programme termed Directly Observed Treatment Short-Course (DOTS) is adopted to promote early TB detection and effective TB treatment. An indicator of a successful DOTS programme is the Sputum Conversion Rate (SCR) which is obtained at the end of the two-month intensive treatment to measure the treatment outcome by SCR. The present study determined the association between several factors and the SCR among TB patients attending the DOTS clinic at the Kinta District Health Office (PKD Kinta) in 2017. **Methods:** The factors included are sociodemographic factors, physical factors, knowledge, attitude, and practice of TB patients. All groups of 150 sputum smear positive pulmonary TB patients enrolled for treatment at PKD Kinta between January and September 2017 were recruited for this study by the cross-sectional questionnaire method. A statistical analysis was performed to determine the association between the variables and the SCR of the TB patients in the DOTS programme. **Results:** At the end of the two-month intensive period, an SCR of 96.0% was obtained. According to the statistical analysis of the association among sociodemographic factors and SCR, there are no statistical differences between the variables. Similarly, no association was found between the physical characteristics and SCR in the current study. **Conclusion:** SCR methods are perfect methods used in regular medicine to monitor TB cases' treatment. The identification of factors influencing the DOTS programme is critical to ensuring the program's success in eradicating TB in society.
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INTRODUCTION

Tuberculosis (TB) remains a common and deadly disease in the world and has an enormous impact on the economy. In 2021 WHO estimates that 9.9 million new cases of TB occurred. Of these, Asia in the SEA and Western Pacific regions accounts for 55% of global cases (1). TB cases notified globally in Global Tuberculosis Report 2022 drop in the reported number of people newly diagnosed with TB. From a peak of 7.1 million in 2019, this fell to 5.8 million in 2020 (2). In Malaysia TB cases report in 2021 was 21727 cases (incident rate of 63.5 per 100,000 residents), a decrease of 1,917 Case (8.1%) compared to 23, 644 cases (incident rate 72.4 per 100,000 population) by 2020 (3). The number of tuberculosis is 2,288, decreasing by 32 Death (1.4%) in 2021 compared

to 2020 with a mortality rate of 6.6 Every 100,000 population (4).

Sputum conversion and successful treatment outcomes are important to reduce the transmission of TB disease in the community (5). Success TB programme when sputum conversion rate (SCR) is the percentage of smear-positive pulmonary TB (PTB+) cases registered in a specified period that converted to smear negative status after the standard two months of the intensive phase of treatment (6)

The number of tuberculosis of TB cases reported in Malaysia in 2021 stands at 21,727 down by 8.1% from 23,644 cases reported in 2020, 26000 incident report in 2019, in the previous year 2018 total of cases 25837 and in 2017 number of cases 26168 (7)

Due of the COVID-19 pandemic's effects, tuberculosis (TB) mortality rate by 5% and case detection fell by
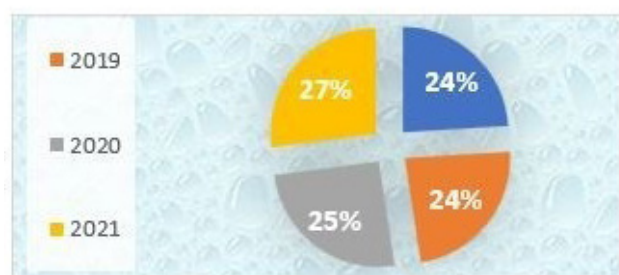
Figure 1 : Total number of TB cases in Malaysia from 2017-2021 (7).

Table I : No of TB Cases in Malaysia and PKD Kinta from 2018-2021 MyTB[7]

Year	2018	2019	2020	2021
No of TB Cases Malaysia	25111	24620	26580	28304
No of TB Cases Pkd Kinta	395	418	439	360

10% in Malaysia in 2018 compared to 2019 (8). In addition, the Ministry of Health, Malaysia has improved the capacity of tuberculosis Diagnostic Treatment centre at 1 (PR1) to provide a total of 109 fluorescent microscope apparatus that can increase the sensitivity of TB diagnosis compared to the use of test methods Staining ZiehlNilson usual. The Ministry's efforts to provide high-tech equipment for diagnosis of Tuberculosis will be continued from time to time (8). The Revised National Tuberculosis Program ensures all TB+ve cases are examined for AFB sputum sample after 2 month of treatment SCR and before success regime. Monitoring the SCR result is an important indicator (8). The result studies report age, male gender, good quality sputum to be associated with poor sputum conversion rate at the end of 2 month of treatment. Among the few states with poor performance indicators, especially regarding sputum conversion rates (9). While monitoring treatment, these associated factors should be considered in the treatment programme. Research aim to measure the treatment outcome by SCR, which is one of the strategy effective management can save costs the country and TB patients to improvement of supervisory activities TB programme and management task in accordance with SOP established by Ministry of Health of the effectiveness of DOTS programme (10) The present study determined the association between several factors and the SCR among TB patients attending DOTS clinic at the Kinta District Health Office (PKD Kinta) in 2017.

MATERIALS AND METHODS

The factors included are sociodemographic factors, physical factors as well as the knowledge, attitude and practice of TB patients during the DOTS programme. All group of 150 sputum smear positive pulmonary TB patients enrolled for treatment at PKD Kinta between January to September 2017 were recruited for this study by cross sectional questionnaire method. All patients completed the intensive phase treatment were reviewed by follow up sputum smear microscopy to determine the SCR. In addition to the SCR, sociodemographic information and physical evaluation of the TB patients were also obtained. A questionnaire on knowledge, attitude and practice about TB was also given to the TB patients (11).

Study Location: Research is done conducted at Pejabat Kesihatan Kinta Batu Gajah, Perak, Kinta district is one of the 12 districts in the state of Perak and the most densely populated area and many people in the Perak state. Perak is the second largest state in Penisular Malaysia. The size of the administrative area covers an area of 1256 km². Kinta districts consist of 6 mukimUlu Kinta, Sungai Raia, Teja, Tualang, Sungai Terap and Blanja. A total population of 1, 275, 260 people. Study will be conducted in Pejabat Kesihatan Kinta District, Perak.

Study Duration: The period of the subjects' enlistment altered from 1 January 2017 to 30 June 2017. (6 months). Additional compliance was required from July 1 to August 30, 2017. (1 month). According to WHO recommendations, all National TB Control Programs should assess patients' treatment outcomes 12 months after starting TB therapy, this time frame was adopted.

Study Design: Surveys (Descriptive - quantitative) cross-sectional study.

Sampling Technique (simple random sampling): There will be two distinct populations chosen: first group of everyone who has signed up for TB treatment. All patients who have enrolled with our facility in Pejabat Kesihatan Kinta for TB treatment. Time frame (December 2017 – February 2018). 1st group: registered TB patients: Sampling frame: name list registered TB patient. 2nd group: registered TB patient our clinics in PKD Kinta. Sampling frame: name list registered TB patient in PKD Kinta. Both sample group must fulfil the inclusion. Sample size was calculated according to Table II 1st group: 36 samples and 2nd group: 80 samples.

Materials: This research will use a close ended

Table II : Sample size

Population size	1st group (TB patient in my KKs)			Population size	2nd group (TB patient district)		
	Confidence level (95%)				Confidence level (95%)		
	Margin of error				Margin of error		
	5%	2.5%	1%		5%	2.5%	1%
40	36	39	40	100	80	94	99
50	44	48	50	250	152	215	244

questionnaire as a tool for data collection. The tool will be creating by the researcher and a pilot study will be conduct before it will be distributed to the respondent. The questionnaire will be divided into 2 sections. First section will be a data demographic. On the second section, will be a research question regarding a research objective. The questionnaire distributed by the researcher itself in order to help respondent during answer the questionnaire. Before respondents answering the questionnaire, they will be brief about this questionnaire in order to avoid confusion and to explain the purpose of the study. The respondent should not put their name and personal details in to ensure the confidentiality in the result and also to ensure the privacy of the respondent. Data analysis and interpretation of results (12). Data collected through a set of questionnaires and written tests were processed using the Social Science Statistics Package, SPSS version 23 from the data obtained. The analysed data will be presented with the help of diagrams, graphs and charts to easily understand the results of the study. (13) Independent it-test as follows:
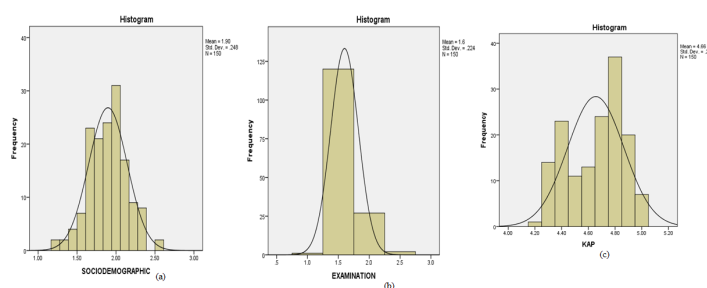
$$CVr = i\,\frac{Ne - \frac{N}{2}}{N-1}$$

CVR: Content Validity Ratio
Ne: Number of experts with answer "yes, Relevant"
N: Total Number of experts in TB registered patients

Ethical Clearance
This article has passed the ethical clearance from Pejabat Kesihatan Kinta Jalan Aman 31000 Batu Gajah Perak Darul Ridzuan with Ethical Approval No. PKDKTA.500-6/1/3 dated 11th February, 2022.

(a) socio-demographic information, (b) physical examination, (c) knowledge, attitude and Practice (KAP)
Figure II: Reliability and validity of questionnaire (a,b,c)

Figure 2 : Reliability and validity of questionnaire (a,b,c).

RESULTS

Reliability and validity of questionnaire: In the questionnaire, ten items were included which covered the element of knowledge, attitude and practice among the respondents. A score of 0.68 was obtained from the dataset as shown in Table I which suggest that questionnaire is reliable to be used in the current study.

Record the percentage difference multidrug resistant TB remains a public health crisis as the rise of strains that are resistant to one or more anti-TB medicines have been documented in PKD Kinta surveyed. Statistical analysis was performed to determine the association between the variables and SCR of the TB patients in the DOTS programme. At the end of the two-month intensive period, an SCR of 96.0 % was obtained. Figure 2 present normal distribution of data for (a) socio-demographic information, (b) physical examination, (c) knowledge, attitude and Practice (KAP) among the respondents. The mean values of 1.90 ± 0.248, 1.6 ± 0.224 and 4.66 ± 0.211 were obtained for sociodemographic,

physical examination and KAP among of the respondents. The data are presented as mean ± SD (n =150).

Sociod-emographic data analysis: Analysis of the socio-demographic data showed that 18% of TB patients attended in Pejabat Kesihatan Daerah Kinta were 45-64 years old group are the maximum recorded as shown in Figure 3.
The majority were cases male, Malay, single and

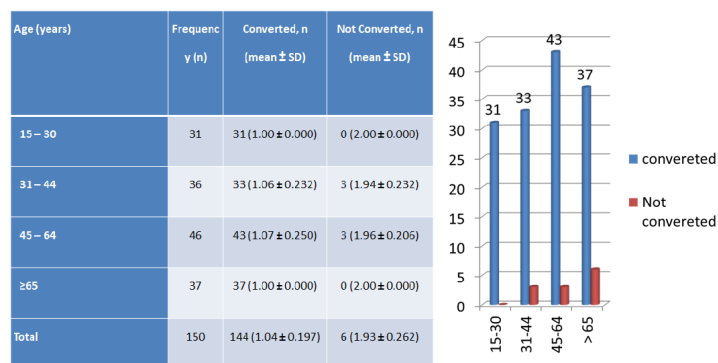| Age (years)	Frequency (n)	Converted, n (mean ± SD)	Not Converted, n (mean ± SD)
15 − 30	31	31 (1.00 ± 0.000)	0 (2.00 ± 0.000)
31 − 44	36	33 (1.06 ± 0.232)	3 (1.94 ± 0.232)
45 − 64	46	43 (1.07 ± 0.250)	3 (1.96 ± 0.206)
≥65	37	37 (1.00 ± 0.000)	0 (2.00 ± 0.000)
Total	150	144 (1.04 ± 0.197)	6 (1.93 ± 0.262)

Figure III: Sputum smear conversion according to age distribution

Figure 3 : Sputum smear conversion according to age distribution.

semi-skilled worker 105 cases (from factory and industrial) as presented in Figure 4.
There are several factors that are related distribution

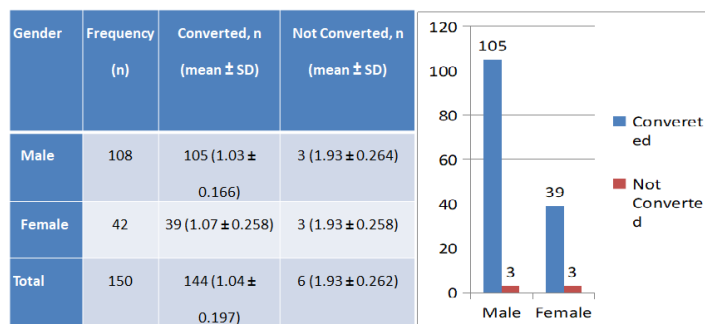| Gender	Frequency (n)	Converted, n (mean ± SD)	Not Converted, n (mean ± SD)
Male	108	105 (1.03 ± 0.166)	3 (1.93 ± 0.264)
Female	42	39 (1.07 ± 0.258)	3 (1.93 ± 0.258)
Total	150	144 (1.04 ± 0.197)	6 (1.93 ± 0.262)

Figure IV: Sputum smear conversion according to gender distribution

Figure 4 : Sputum smear conversion according to gender distribution.

factor sputum convert not done after 2nd month treatment by age mean score 2.83, gender mean 1.50, nationality mean 1.00, ethics mean 1.50, religion mean 1.00, education mean score 2.83, education mean 4.50, marital mean 2.00 and income mean score 2.33.

Four percent of respondents did not convert SCR after 2nd month treatment in intensive phase this is a relatively low percent, and too high to significantly impact on the SCR in PKD Kinta as shown in Table III.
DISCUSSION

Table III : SCR outcome

SCR	Frequency, n (mean ± SD)	Percentage (%)	Statistical test
Positive	144 (2.301 ± 0.412)	96.0	t-test = 0.784; df = 148;
Negative	6 (2.167 ± 0.363)	4.9	p-value = 0.4346
Total	150	100	

The findings from this study TB treatment outcomes and predictors among socio-demographic:

Analysis of the socio-demographic data showed that 18 % of TB patients attended in Pejabat Kesihatan Daerah Kinta were 45-64 years old which slightly different than the result reported results 45–54 years old 77 (22.92%) (14).

The majority were male, Malay, single and semi-skilled worker (factory and industrial) which different than result. (15) Foreign-born single males (48%, 125/263) and married females (71%, 187/263) in Malaysia.

There are several factors that are related distribution factor sputum convert not done after 2nd month treatment by age mean score 2.83, gender mean 1.50, nationality mean 1.00, ethics mean 1.50, religion mean 1.00, education mean score 2.83, education mean 4.50, marital mean 2.00 and income mean score 2.33, which agreed.

Four percent of respondents did not convert SCR after 2nd month treatment in intensive phase this is a relatively low percent, and too high to significantly. (16) According to the statistical analysis of association among sociodemographic factors and SCR, we did not find any statistical differences between the variables. Similarly, no association was found between the physical characteristics and SCR in the current study. Significant association between compliance in following instruction when taking the medicine with SCR was obtained suggesting that non-adherence to the treatment could lead to failure in the DOTS programme (17).

Among the 150 cases eligible for analysis, 96 percent (144) achieved convert to negative result. Tuberculosis positive sputum have 92.7 % (139) and Extra TB is 73 % (11). Number being studied in phase standardized daily treatment of the first 2 months TB was detected is 40.7 % i(61) and 59.3 % i(89) on standardized treatment phase twice a week (biweekly)

to ensure the success of the programme in eradicating TB in the society (19).

CONCLUSION

It can be concluded that SCR approaches are ideal for monitoring the treatment of TB cases on a frequent basis. It is critical to identify the factors that influence the DOTS programme in order to assure the program's effectiveness in eradicating TB in society.

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