SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Medicine

Clinical and Diagnostic Findings Among Tubercular Meningitis Patients without Pulmonary Signs and Symptoms

Dr. Sayat Quayum[1*], Prof. Dr. Md. Titu Miah[2], Dr. Tanzila Ferdous[3], Dr. Suriya Shahaly[4], Dr. Sayeda Moni Chowdhury[5], Dr. Faisal Bin Yousuf[6], Dr. Syed Mohimeen Ahmed[7]

[1]Specialist, Internal Medicine Department, Evercare Hospital, Dhaka, Bangladesh
[2]Professor of Medicine, Acting Director General of Directorate General of Medical Education, Bangladesh
[3]Specialist, Internal Medicine Department, Evercare Hospital, Dhaka, Bangladesh
[4]Junior Consultant, Physical Medicine and Rehabilitation Department, Ahsania Mission Cancer and General Hospital, Dhaka, Bangladesh
[5]Assistant Professor, Department of Internal Medicine, International Medical College Hospital, Dhaka, Bangladesh
[6]Medical Officer, Internal Medicine Department, Dhaka Medical College & Hospital, Dhaka, Bangladesh
[7]Junior Consultant, Medicine and Cardiology, Ispahani Islamia Eye Hospital, Dhaka, Bangladesh

DOI: 10.36347/sasjm.2023.v09i08.015 | **Received:** 05.07.2023 | **Accepted:** 08.08.2023 | **Published:** 29.08.2023

***Corresponding author:** Dr. Sayat Quayum
Specialist, Internal Medicine Department, Evercare Hospital, Dhaka, Bangladesh
E-mail: neel.nilima07@gmail.com

Abstract **Original Research Article**

Background: Tubercular meningitis (TBM) is the most frequent one among the different forms of CNS tuberculosis. Early diagnosis, as well as treatment of tubercular meningitis (TBM), can give an excellent outcome with minimal residual morbidity. Clinical and diagnostic findings of patients without pulmonary signs and symptoms may be useful for the treatment of suspected tubercular meningitis patients. ***Aim of the study:*** This study aimed to make a patient profile on the clinical and diagnostic findings of tubercular meningitis patients without pulmonary signs and symptoms. ***Methods:*** This cross-sectional study was conducted in the Department of Medicine, Dhaka Medical College Hospital (DMCH), Dhaka, Bangladesh, from September 2020 to August 2021. A total of 77 confirmed cases of tubercular meningitis without pulmonary signs and symptoms admitted to the mentioned hospital were enrolled in this study as the study population. A purposive sampling technic was used in sample selection. Along with the clinical and diagnostic findings, all relevant information was recorded in a data collection sheet. ***Results:*** In this study, 61% of the study population had a family history of TB. Among all the patients, all had fever, 80.5% had headache, 68.8% had altered sensation, 62.3% had anorexia and nausea, 55.8% had vomiting, 19.5% had a convulsion and 15.6% had neck stiffness. In our settings, the majority (46.8%) of the respondents had TBM Grade II. The mean WBC count was 134.80±34.59 106/L, Lymphocyte (%) was 79.49±11.77, Glucose was 26.49±5.43 mg/dl, Protein was 142.8±72.5 and ADA level was 12.08±1.29 U/L. In our settings, 58.4% of the respondents had Mantoux test and 36.4% showed chest X-ray positive. In this study, 22.1% of the respondents had CT scan or MRI findings normal. ***Conclusion:*** A family history of tuberculosis may be a potential factor for TBM. Fever, headache, altered sensation, anorexia/nausea and vomiting are very common clinical features in such patients. Chest X-ray may play an important role in suspecting a TBM patient earlier. However, further extensive study with a more generalized study population is recommended.

Keywords: Clinical, Diagnostic findings, Tubercular meningitis, Pulmonary sings.

INTRODUCTION

In CNS tuberculosis, tubercular meningitis (TBM) is the most common form, associated with a higher degree of long-term consequences if not identified and treated promptly [1]. Natural history and clinical manifestations of tuberculosis are different in children and adults, with a higher incidence rate of disseminated forms [2]. In tubercular meningitis (TBM), bacilli seeds to meninges or brain parenchyma, resulting in the formation of small subpial or subependymal foci of metastatic caseous lesions, termed “Rich Foci” [3]. In a study, [4] it was reported that both clinically and pathologically, tubercular meningitis is difficult to diagnose because of its similarity with other neurological disease manifestations. Specific clinical characteristics like moderate CSF pleocytosis, longer duration of symptoms and the presence of focal deficits increase the

probability of tubercular meningitis (TBM) [5]. Currently, most experts reported that commercial nucleic acid amplification tests (NAAT) can confirm TBM but cannot rule it out [1]. A study [6] found that 50% of patients with TBM had abnormal chest X-ray findings. At the same time, chest X-ray findings favoring pulmonary tuberculosis were found in 30% of tubercular meningitis (TBM) patients without respiratory signs and symptoms [7]. In another study [8], it was described that approximately half of the cases of tubercular meningitis have chest X-ray abnormalities, among them parenchymal infiltration in one-quarter of patients and the remaining were miliary opacities, hilar lymphadenopathies, pleural effusion and atelectasis. A study conducted by Corral *et al*., (2004) [9] showed in tubercular meningitis patients, approximately one-third of them had a background of miliary tuberculosis. A study conducted by Aurangzeb *et al*., (2008) [7] found in the study of respondents who had positive chest X-rays, among them 43.3% of patients were in grade III clinical grading of TBM. The major objective of this current study was to make a patient profile on the clinical and diagnostic findings of tubercular meningitis patients without pulmonary signs and symptoms.

METHODOLOGY

This was a cross-sectional study and was conducted in the Department of Medicine, Dhaka Medical College Hospital (DMCH), Dhaka, Bangladesh, from September 2020 to August 2021. A total of 77 confirmed cases of tubercular meningitis without pulmonary signs and symptoms admitted to the mentioned hospital were enrolled in this study as the study population. A purposive sampling technic was used in sample selection. The study was approved by the ethical committee of the mentioned hospital. Properly written consent was taken from all the participants before data collection. The whole intervention was conducted following the principles of human research specified in the Helsinki Declaration [10] and executed in compliance with currently applicable regulations and the provisions of the General Data Protection Regulation (GDPR) [11]. As per the inclusion criteria of this study, patients of age >18 years fulfilling the Modified Ahuja criteria for tubercular meningitis were included. On the other hand, as per the exclusion criteria, patients who complained of respiratory symptoms like productive cough, breathlessness or chest pain, patients who had abnormal findings of chest examination on admission, who were already on anti-TB drugs and pregnant women were rejected. In this study, clinical and laboratory variables were clinical presentation, grading of TBM, chest radiograph findings, CSF examination findings, Mantoux test and CT scan of the head or MRI findings of the brain. Along with the clinical and diagnostic findings, all relevant information was recorded in a data collection sheet.

RESULT

Among the total of our participants, 53.2% were male and 46.8% were female. The mean age of the respondents was 37.93±11.8 years. In our study, 61% of the study population had a family history of TB and 39% had no family history of TB. Among all the patients, all had fever, 80.5% had headache, 68.8% had altered sensation, 62.3% had anorexia and nausea, 55.8% had vomiting, 19.5% had a convulsion and 15.6% had neck stiffness. In our settings, the majority (46.8%) of the respondents had TBM Grade II. Besides, 31.1% had TBM Grade III and 22.1% had Grade I. Among our settings, the mean WBC count was 134.80±34.59 106/L, Lymphocyte (%) was 79.49±11.77, Glucose was 26.49±5.43 mg/dl, Protein was 142.8±72.5 and ADA level was 12.08±1.29 U/L. In our settings, 58.4% of the respondents had Mantoux test positive and 41.6% had a negative result. Among all the respondents, 36.4% showed chest X-ray positive and 63.6% showed negative chest X-ray for TB. Among the positive chest X-ray, 42.9% showed Apical infiltration, 32.1% showed Miliary mottling, 28.6% showed Hilar enlargement, 21.4% showed pleural effusion, 10.7% showed Lower/middle zone infiltration and 7.1% had shown Acute on chronic TB. Among all, 3 patients showed Apical infiltration with Miliary mottling, 3 patients showed Apical infiltration with pleural effusion, 2 patients showed pleural effusion with Hilar enlargement and 4 patients showed Miliary mottling with Hilar enlargement. In this study, 22.1% of the respondents had CT scan or MRI findings normal; 31.2% had shown Exudates in the basal cisterns or the sylvain fissures, 26% had shown Gyral enhancement, 20.8% had shown Hydrocephalus, 7.8% had showed Infarcts and 6.5% showed multiple ring enhancement lesions of variable sizes in different areas having different intensities (MRI) or densities (CT). Among all, 5 patients showed Exudates in the basal cisterns or the Sylvain fissures with Gyral enhancement, 3 patients showed Gyral enhancement with Hydrocephalus and 3 patients showed Hydrocephalus with Infarcts.

Table 1: Distribution of the study population by clinical features of TBM, (N=77)

Clinical features	n	%
Fever	77	100
Headache	62	80.5
Altered consciousness	53	68.8
Anorexia, Nausea	48	62.3
Vomiting	43	55.8
Convulsion	15	19.5
Neck stiffness	12	15.6

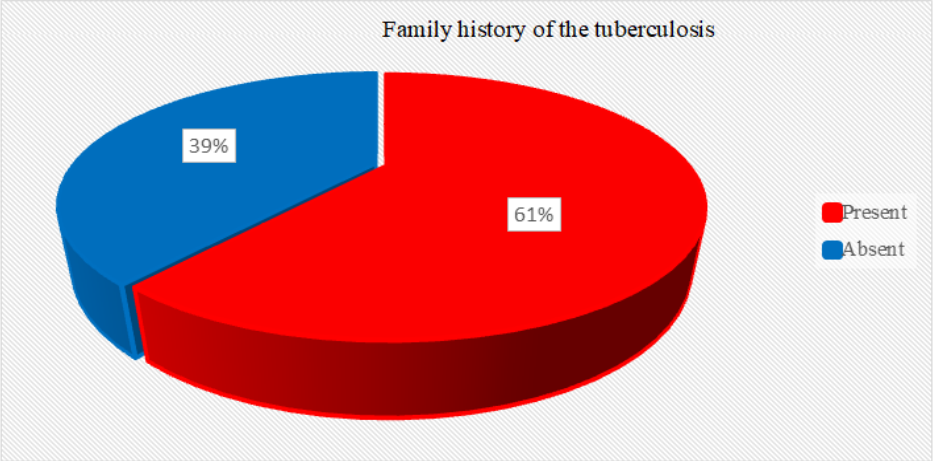

Figure I: Pai chart showed distribution of the participants by family history of tuberculosis, (N=77)

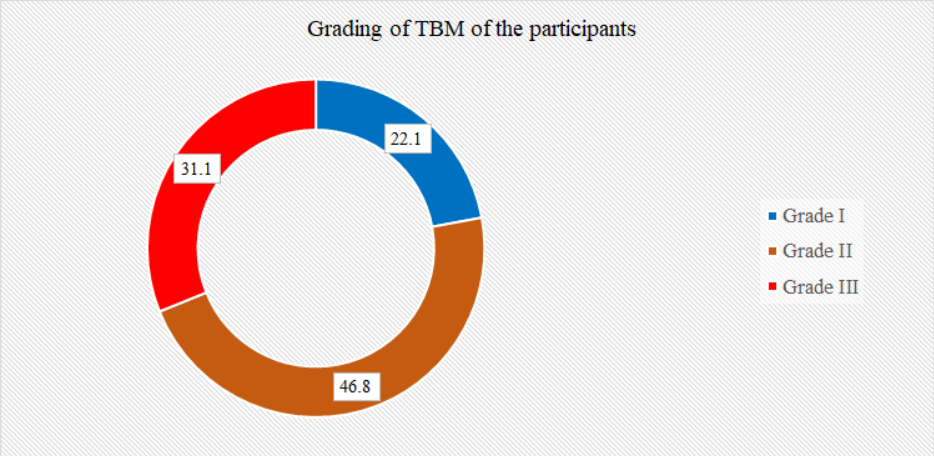

Figure II: Ring chart showed distribution of the participants by grading of TBM, (N=77)

Table 2: CSF findings of the study population, (N=77)

CSF findings	Mean ±SD
WBC count (10^6/L)	134.80±34.59
Lymphocyte (%)	79.49±11.77
Glucose (mg/dl)	26.49±5.43
Protein (mg/dl)	142.8±72.5
ADA (U/L)	12.08±1.29

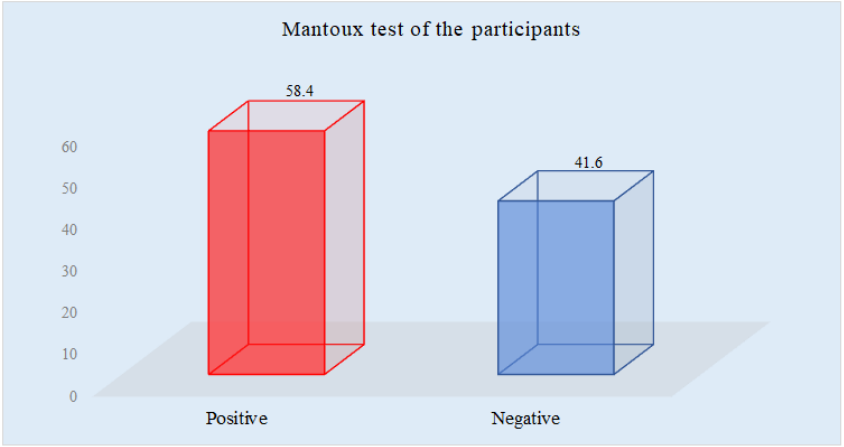

Figure III: Column chart showed mantoux test wise participants, (N=77)

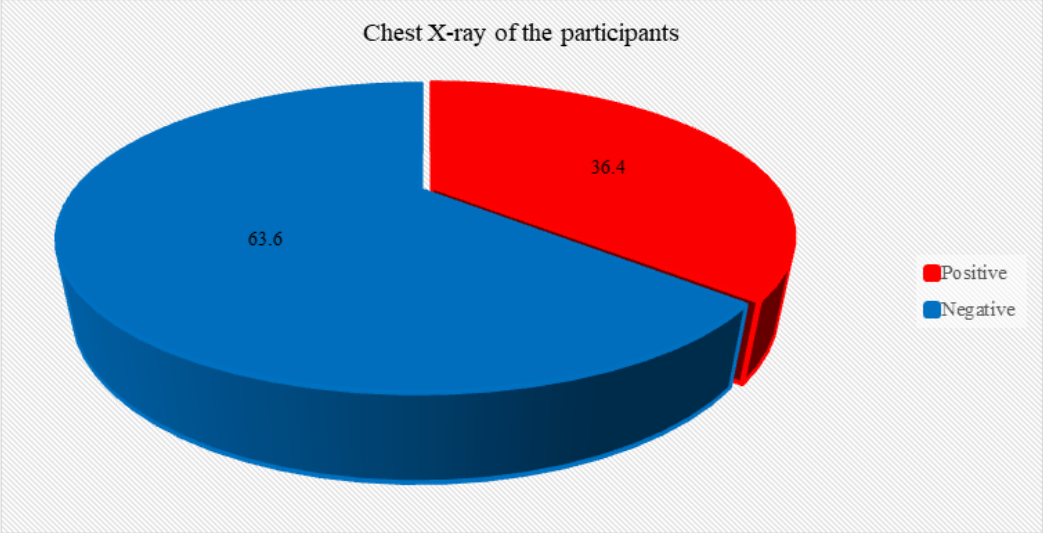

Figure IV: Pie chart showed distribution of the respondents by chest X-ray, (N=77)

Table 3: Pattern of positive Chest X-ray, (n=28)

Patterns	n	%
Apical infiltration	12	42.9
Miliary mottling	9	32.1
Hilar enlargement	8	28.6
Pleural effusion	6	21.4
Lower/middle zone infiltration	3	10.7
Acute or chronic TB	2	7.1

Table 4: CT scan of the head or MRI findings of the brain, (N=77)

CT scan or MRI findings	n	%
Normal	17	22.1
Exudates in the basal cisterns or in the Sylvain fissures	24	31.2
Gyral enhancement	20	26
Hydrocephalus	16	20.8
Infarcts	6	7.8
Multiple ring enhancement lesions of variable sizes in different areas having different intensities (MRI) or densities (CT)	5	6.5

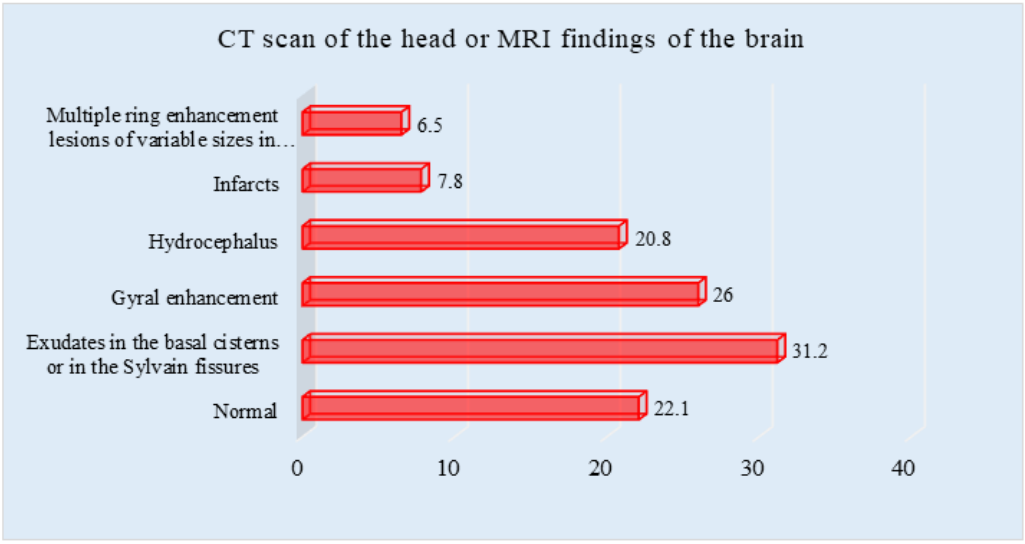

Figure V: Bar chart showed respondents by CT scan of the head or MRI findings of the brain, (N=77)

DISCUSSION

This study aimed to make a patient profile on the clinical and diagnostic findings of tubercular meningitis patients without pulmonary signs and symptoms. In this current study, during the study period, male cases were admitted slightly higher than female that may be the reason for the higher number of male patients. In our study, the majority (46.8%) of the respondents had TBM Grade II, followed by 31.1% had TBM Grade III and 22.1% had Grade I. Another study found 6.3% with grade I, 69.3% with grade II and 24.3% with grade III [12]. All of our patients had fever (100%) and other complaints included headache (80.5%), altered sensation (68.8%), anorexia and nausea (62.3%), vomiting (55.8%), convulsion (19.5%) and neck stiffness (15.6%). A study conducted in Dhaka conducted by Joy *et al*., (2020) [13] found that fever (93%) was the most common symptom noted in all TBM patients, followed by headache and loss of consciousness. Other studies also found similar symptoms as the most frequent among the patients of TBM [7, 14]. In this study, among all the respondents, 36.4% of patients had positive chest X-ray findings for TB, where 42.9% had Apical infiltration, 32.1% had Miliary mottling, 28.6% had Hilar enlargement, 21.4% had pleural effusion, 10.7% had Lower/middle zone infiltration and 7.1% had Acute on chronic TB which was consistent with a previous study [13]. It was observed in this study that 58.4% of patients had the positive Mantoux test. Although the diagnostic practice of the Mantoux test gives much value to the diagnosis of tuberculosis, current reviews suggest that skin testing is probably of limited value, except in infants [15]. According to this study, patients of TBM may have chest radiographic evidence even in the absence of pulmonary signs and symptoms at presentation. The diagnosis of TBM depends mainly on clinical criteria and microbiological confirmation. The diagnosis of TBM cannot be excluded on clinical grounds alone and definitive diagnosis depends on the detection of the tubercle bacilli in the CSF, either by staining, culture or PCR. But these molecular techniques are highly expensive, not very available in our country's context and take much time, which is another cause of delayed treatment. Chest X-ray findings can play a supportive role in the diagnosis of suspected TBM patients and help to decide on the physician in giving empirical anti-TB treatment earlier; thus, it can prevent the delayed consequence of TBM as well as mortality. All the findings of this current study may be helpful in further similar studies.

LIMITATION OF THE STUDY

This was a single-centered study with small-sized samples. Moreover, the study was conducted over a very short period. So, the findings of this study may not reflect the exact scenario of the whole country.

CONCLUSION & RECOMMENDATION

As per the findings of this current study, we can conclude that a family history of tuberculosis may be a potential factor for TBM. Fever, headache, altered sensation, anorexia/nausea and vomiting are very common clinical features in such patients. Chest X-ray may play an important role in suspecting a TBM patient earlier. However, further extensive study with a more generalized study population is recommended. To get more specific results, we would like to recommend conducting similar studies in several places with larger-sized samples.

REFERENCES

1. Marx, G. E., & Chan, E. D. (2011). Tuberculous meningitis: diagnosis and treatment overview. *Tuberculosis research and treatment*, *2011*, 1-9.
2. Fatema, K., Rahman, M. M., Akhter, S., Akter, N., Paul, B. C., Begum, S., & Begum, F. (2020). Clinicoradiologic profile and outcome of children with tubercular meningitis in a tertiary care hospital in Bangladesh. *Journal of Child Neurology*, *35*(3), 195-201.
3. Rock, R. B., Olin, M., Baker, C. A., Molitor, T. W., & Peterson, P. K. (2008). Central nervous system tuberculosis: pathogenesis and clinical aspects. *Clinical microbiology reviews*, *21*(2), 243-261.
4. Arshad, A., Dayal, S., Gadhe, R., Mawley, A., Shin, K., Tellez, D., ... & Venketaraman, V. (2020). Analysis of tuberculosis meningitis pathogenesis, diagnosis, and treatment. *Journal of clinical medicine*, *9*(9), 2962-2964.
5. Thwaites, G. E., Chau, T. T. H., Stepniewska, K., Phu, N. H., Chuong, L. V., Sinh, D. X., ... & Farrar, J. J. (2002). Diagnosis of adult tuberculous meningitis by use of clinical and laboratory features. *The Lancet*, *360*(9342), 1287-1292.
6. Palacios, C. F., & Saleeb, P. G. (2020). Challenges in the diagnosis of tuberculous meningitis. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, *20*, 100164.
7. Aurangzeb, S., Badshah, M., & Khan, R. S. (2008). Chest radiographic findings in neurotuberculosis without pulmonary signs and symptoms. *J Coll Physicians Surg Pak*, *18*(1), 27-30.
8. Güneş, A., Uluca, Ü., Aktar, F., Konca, Ç., Şen, V., Ece, A., ... & Gürkan, F. (2015). Clinical, radiological and laboratory findings in 185 children with tuberculous meningitis at a single centre and relationship with the stage of the disease. *Italian Journal of Pediatrics*, *41*(1), 1-6.
9. Corral, I., Quereda, C., Navas, E., Martin-Davila, P., Pérez-Elías, M. J., Casado, J. L., ... & Moreno, S. (2004). Adenosine deaminase activity in cerebrospinal fluid of HIV-infected patients: limited value for diagnosis of tuberculous meningitis. *European Journal of Clinical Microbiology and Infectious Diseases*, *23*, 471-476.
10. World Medical Association. (2001) . World Medical Association Declaration of Helsinki. Ethical principles for medical research involving human

subjects. Bulletin of the World Health Organization, 79(4), 373-374. World Health Organization. https://apps.who.int/iris/handle/10665/268312.

11. Voigt, P., & von dem Bussche, A. (2017). Enforcement and fines under the GDPR. The EU General Data Protection Regulation (GDPR). Springer, Cham, 201-217.
12. Luo, M., Wang, W., Zeng, Q., Luo, Y., Yang, H., & Yang, X. (2018). Tuberculous meningitis diagnosis and treatment in adults: A series of 189 suspected cases. *Experimental and Therapeutic Medicine*, *16*(3), 2770-2776.
13. Joy, K. N. I., Kundu, N. C., Akhter, M., Hossain, M. Z., Rahman, A. H. M. W., Rahman, M. M., ... & Haque, M. M. (2019). Evaluation of the Various Clinical Presentations of Adult Cns Tuberculosis. *Journal of Dhaka Medical College*, *28*(1), 76-84.
14. Yaşar, K., Pehlivanoğlu, F., Şengöz, A., & Şengöz, G. (2012). Evaluation of radiological findings in 160 adult patients with tuberculous meningitis. *Turkish Journal of Medical Sciences*, *42*(2), 259-267.
15. Cairns, H., Smith, H. V., & Vollum, R. L. (1950). Tuberculous meningitis. *Journal of the American Medical Association*, *144*(2), 92-96.