

# Tropical Medicine Journal

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- Risk Factor of HIV Infection Among Young Age in Voluntary Counseling Testing (VCT) Clinics of Yogyakarta
- Evaluation of the Performance of Malaria Microscopist in Primary Health Center and Cross Checker in Belu East Nusa Tenggara
- The Kinetics of White Blood Cells in Acute Dengue Infection
- The Effect of *Pandanus conoideus* Lamk. Extract to the Serum Level of TNF- $\alpha$ , IL-10 and Parasitemia of *Plasmodium berghei* Infected in Mice
- Comparison of Immunochromatography Method and Immunocytochemistry Method in Rapid Detection of NS-1 Antigen in Dengue Infection
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# Training of Sputum Microscopy Improves the Smear Quality and Slide Positivity Rate for Pulmonary Tuberculosis Diagnosis

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## ABSTRACT

**Introduction:** Microscopic examination of sputum is a key component of the diagnosis of pulmonary tuberculosis. The accuracy of this method is influenced by quality of laboratory and human resources. Indonesia is one of endemic country for pulmonary tuberculosis. Efforts to improve the quality of microscopic examination are needed, including training of human resources.

**Objectives:** To determine impact of microscopic examination training to smear quality and slide positivity rate.

**Methods:** This work is an analytic quasi experimental research. The research was involved 18 laboratory technician. Subjects were divided into experimental and control group, which was consisting 9 technicians in each group. The differences of smear quality and slide positivity rate were analyzed by using independent t-test and Mann-Whitney test with 95% of Confident Interval.

**Results:** Training increased the knowledge of laboratory technician (40.7 points) and the smear quality. Specimen quality was increased 90 points, staining 84.4, cleanness 85.6, thickness 91.1, smear size 88.9, evenness 87.8 and increase the average of smear readings score test 22 points. The mean of smear quality and slide positivity rate of the experimental group were higher than control group. Statistical test of smear quality between eksperimental group with contol group were: specimen quality  $p=0.03$ , staining quality  $p=0.03$ , cleanness  $p=0.02$ , thickness  $p<0.001$ , size  $p<0.001$ , good evenness  $p<0.001$ , and slide positivity rate  $p=0.02$

**Conclusion:** The mean of smear quality and slide positivity rate of the experimental group were higher than control group. There were significant differences of smear quality and slide positivity rate between experimental group with control group at 3 months after training.

**Keywords:** training, sputum microscopy, smear quality, slide positivity rate, tuberculosis

## INTISARI

**Pendahuluan:** Pemeriksaan dahak mikroskopis merupakan komponen kunci penegakkan diagnosis Tuberkulosis (TB). Pemeriksaan mikroskopis TB di KabupatenPurbalingga dilakukan di 24 laboratorium mikroskopis. Lima petugas mikroskopis dilatih tahun 2011-2012 dan 12 petugas tahun 2003-2009. Tujuh petugas belum dilatih. Tahun 2011 *slide positivity raterata-rata* 9,1%, sediaan jelek 73,4%, pewarnaan jelek 11,5%, dan *error rate* 1,4% terjadi pada 34,7% SPK. Tahun 2012 *slide positivity rate rata-rata* 8,9 kualitas sediaan jelek tertinggi adalah kerataan jelek sebesar 77,7%, *error rate* 4,6% terjadi pada 66,7% SPK. Untuk itu perlu dilakukan *refresher* dan *initial training*.

**Tujuan:** Mengetahui pengaruh pelatihan terhadap kualitas sediaan dan *slide positivity rate*.

**Metode:** Rancangan penelitian adalah analitik *quasi experiment post-test control design* dengan eksperimen berupa pelatihan mikroskopis selama 5 hari. Subyek penelitian sebanyak 18 petugas mikroskopis dibagi menjadi kelompok eksperimen dan kontrol dengan *purposive sampling*. Perbedaan kualitas sediaan dan *slide positivity rate* kelompok dilatih dan tidak dilatih dianalisis dengan *independent t test* dan *Mann-Whitney* 3 bulan setelah pelatihan.

**Hasil:** Pelatihan meningkatkan rerata skor tes pengetahuan sebesar 40,7 point, pembuatan sediaan yang baik : spesimen 90, pewarnaan 84,4, kebersihan 85,6, ketebalan 91,1, ukuran 88,9, kerataan 87,8 dan rerata skor pembacaan sediaan 22 poin. Pada 3 bulan sesudah pelatihan, rerata persentase sediaan yang berkualitas baik dan *slide positivity rate* kelompok dilatih lebih tinggi dibandingkan kelompok tidak dilatih. Hasil uji statistik antara kelompok dilatih dengan kelompok tidak dilatih : kualitas spesimen  $p=0,03$ , kualitas pewarnaan  $p=0,03$ , kebersihan  $p=0,02$ , ketebalan  $p<0,01$ , ukuran  $p<0,01$ , kerataan  $p<0,01$ , dan *slide positivity rate*  $p<0,02$ .

**Simpulan:** rerata persentase sediaan berkualitas baik dan *slide positivity rate* pada kelompok dilatih lebih tinggi dibandingkan kelompok tidak dilatih. Terdapat perbedaan rerata persentase sediaan berkualitas baik dan *slide positivity rate* yang bermakna antara kelompok dilatih dengan kelompok tidak dilatih pada 3 bulan sesudah pelatihan mikroskopis.

**Kata kunci:** pelatihan mikroskopis, kualitas sediaan, *slide positivity rate*, tuberkulosis.

## INTRODUCTION

Tuberculosis (TB) control programs aimed to decrease the morbidity and mortality of this disease in Indonesia. It was targeted to decrease the morbidity and mortality by 50% in 2015. The long term goal of TB control is that TB will not be a public health problem in 2050<sup>1</sup>.

Culture of *Mycobacterium tuberculosis* from sputum is a gold standard of pulmonary tuberculosis diagnosis. However, *M. tuberculosis* culture has several pitfalls e.g. time consuming, expensive, and need a special facilities. Sputum microscopy is a powerful method to diagnose pulmonary tuberculosis which can be carried out in limited resources laboratory. A quality control and monitoring system should be implemented for this method<sup>2</sup>. Training is one of important components of laboratory management and it may useful to maintain and improve the quality of technicians performance for sputum microscopy of pulmonary TB<sup>3</sup>.

In Purbalingga district, sputum microscopy of pulmonary TB was conducted at 24 laboratories. Five technicians were trained by National Tuberculosis Programs (NTP) in 2011-2012, 12 technicians in

2003-2009. Seven technicians have not trained yet. Slide Positivity Rate (SPR) in 2011 and 2012 are 9.1 % and 8.9% respectively. The quality control audit conducted in 2011 found that there were 73.4% poor smear quality and 11.5% with poor staining process. In 2012 it was reported that all of the laboratories had poor smear quality.

Based on that data, it is important to study the effect of sputum microscopy of pulmonary TB training to the smear quality and slide positivity rate.

## MATERIALS AND METHODS

Eighteen laboratory technicians were enrolled in 5 days sputum microscopy of pulmonary TB training conducted on 25-29 Juni 2013. The subjects were divided into experimental group and control group evenly. The subjects were technicians which have not trained yet and not working in the others laboratories.

Pre – post test evaluation was conducted before and after training. The parameters which were evaluated for smear quality were: sputum quality, staining quality, smear cleanness, smear thickness, smear size, and smear evenness. Speciment which

were used for smear quality test were cross checked with Lot Quality Assurance System (LQAS) recorded in TB 12. Each laboratory received 17 suspected TB positive smears.

Slide positivity rate was evaluated 3 months after training. Specimens for slide positivity rate test of each peripheral laboratory were 51 suspected preparations recorded in TB 04, that have the same identity number with the specimen for smear quality test. Data were analyzed by independent t-test, independent t-test unequal, and Mann-Whitney test with 95% CI.

## RESULTS AND DISCUSSION

Three months after training, the smear quality and slide positivity rate of the experimental group were higher than control group. Statistical test for the difference of smear quality between experimental group with control group were: specimen quality  $p=0.03$ , staining quality  $p=0.03$ , cleanness  $p=0.02$ , thickness  $p<0.001$ , size  $p<0.001$ , good evenness  $p<0.001$ , and slide positivity rate  $p=0.02$ . Table 1 shows the evaluation result of smear quality and slide positivity rate.

Table 1. Increase of smear quality and slide positivity rate after training

Variable	Pre-post training difference				P	
	Experiments group		Control group			
	Mean	SD	Mean	SD		
Sputum quality	94.7	3.5	74.6	23.7	0.03	*
Staining quality	96.7	3.1	91.5	6.6	0.03	**
Smear cleanness	95.4	3.9	88.2	7.2	0.01	***
Smear thickness	92.8	7.1	64	28.3	<0.001	**
Smear size	99.3	1.9	39.2	30.7	<0.001	**
Smear evenness	91.5	5.9	30	29.6	<0.001	*
Slide positivity rate	14.4	4.8	8.7	4.1	0.02	**

\* Independent t test unequal

\*\* Mann-withney test

\*\*\* Independent t test

Training is a process to improve skills and to help achieve the objectives of the organization<sup>4</sup>. Training is a systematic process to change the behavior of the employee's, related with skills and competence<sup>5</sup>. Sputum microscopy for TB training is part of the effort to encourage TB laboratories fulfill the needs of TB control program, and important to improve the accuracy of diagnosis process<sup>6,7</sup>.

Our result was in parallel with previous studies. It was reported from Kinhansa in 2007 that there was a significant growing skills of participants in the preparation of smear, staining, and the smear examination between before and after training<sup>8</sup>.

A study in Mexico, which was started by external quality assessment laboratory for microscopic

examination by LQAS method and continued with the training, have been shown that training able to enhance the capabilities of technician based on the smear quality and consensus results of smear reading<sup>9</sup>.

Training and retraining study in Tanzania showed that training was able to enhance the smear quality, staining techniques, and smear reading. It was conceived by based on the results of research to the smear quality for microscopic and readings results<sup>10</sup>.

Training of sputum microscopy for TB was able to improve the quality of preparations and the quality of the staining significantly in Taiwan. Training has also been able to lower the Low Negative False (LNF) thereby increasing slide positivity rate<sup>11</sup>. The low slide

positivity rate largely caused by training who are not adequate thus causing low quality material<sup>10</sup>.

Training of sputum microscopy for TB was needed in order to improve the skills of technician to prepare a high quality of smear that eventually result to improvement of slide positivity rate. A poor smear quality causes false positive or false negative and decline the positivity rate<sup>12,13</sup>.

## CONCLUSION

The smear quality and slide positivity rate of the experimental group were higher than control group. There were significant differences of smear quality and slide positivity rate between experimental groups with control group after 3 months.

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## REFERENCES

1. WHO. Diagnostics for Tuberculosis-Global Demand and Market Potential: Nonserial Publication: World Health Organization, 2006. Available from: <http://www.who.int/>.
2. Kemenkes\_RI. Pedoman nasional pengendalian tuberkulosis. Jakarta: Kemenkes RI, 2011.
3. Fatchiyah. Training needs analysis : analisis kebutuhan pelatihan bagi personel laboratorium [cited 2013 Feb, 06]; Available from: URL: <http://fatchiyah.lecture.ub.ac.id/>
4. Mathis RL, Jackson JH. Manajemen sumber daya manusia. Jakarta: Salemba Empat, 2002.
5. Ivancevich JM. Perilaku dan manajemen organisasi Jilid 1. Surabaya: Erlangga, 2008.
6. Widyastuti S, Sumartini S, Mustikawati DE, Rizkiyani N, Sjahrurrachman A, Harini J, et al. Modul pelatihan pemeriksaan dahak mikroskopis TB. Jakarta: Kemenkes RI, 2012.
7. Mase S, Ramsay A, Ng V, Henry M, Hopewell P, Cunningham J, et al. Yield of serial sputum specimen examinations in the diagnosis of pulmonary tuberculosis: a systematic review [Review Article]. *The Int J Tuber Lung Dis*, 2007;11(5):485-95.
8. Van Rie A, Fitzgerald D, Kabuya G, Van Deun A, Tabala M, Jarret N, et al. Sputum smear microscopy: evaluation of impact of training, microscope distribution, and use of external quality assessment guidelines for resource-poor settings. *J clin microbial*, 2008;46(3):897-901.
9. Martinez-Guarneros A, Balandrano-Campos S, Solano-Ceh M, Gonzalez-Dominguez F, Lipman H, Ridderhof J, et al. Implementation of proficiency testing in conjunction with a rechecking system for external quality assurance in tuberculosis laboratories in Mexico. *The International Journal of Tuberculosis and Lung Disease*, 2003;7(6):516-21.
10. Basra D, Matee M, McNerney R. Quality assessment of sputum smears microscopy for detection of acid fast bacilli in peripheral health care facilities in Dar es Salaam, Tanzania. *EAMJ*, 2006;83(6):306-10.
11. Wu M, Chiang C, Jou R, Chang S, Luh K. External quality assessment of sputum smear microscopy in Taiwan. *The Int J Tuberc Lung Dis* : the official journal of the IUATLD, 2009;13(5):606.
12. Fujiki A. AFB microscopy training. Japan: RIT, 2005.
13. Aziz MA, Ba F, Becx-Bleumink M, Britzel G, Humes R, Lademarco M. External quality assessment for AFB smear microscopy. USA: Association of Public Health Laboratories, 2002.

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## Sample References

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You CH, Lee KY, Chey RY, Menguy R. Electro-gastro-graphic study of patients with unexplained nausea, bloating and vomiting. *Gastroenterology* 1980; 79(2):311-14.

Goate AM, Haynes AR, Owen MJ, Farral M, James LA, Lai LY, et al. Predisposing locus for Alzheimer's disease on chromosome 21. *Lancet* 1989;1:352-55.

#### 2. *Organization as author*

The Royal Marsden Hospital Bone-marrow Transplantation. Team. Failure of syngeneic bone-marrow graft without preconditioning in post-hepatitis marrow aplasia. *Lancet* 1977;2:742-44.

#### 3. *No author given*

Coffee drinking and cancer of the pancreas [editorial]. *BMJ* 1981;283-628.

#### 4. *Article not in English*

Massone L, Borghi S, Pestarino A, Piccini R, Gambini C. Localisations palmaires purpuriques de la dermatite herpetiforme. *Ann Dermatol Venereol* 1987;114:1545-47.

#### 5. *Volume with supplement*

Magni F, Rossoni G, Berti F, BN-52021 protects guinea-pig from heart anaphylaxis. *Pharmacol Res Commun* 1988;20 Suppl 5:75-78.

#### 6. *Issue with supplement*

Gardos G, Cole JO, Haskell D, Marby D, Paine SS, Moore P. The natural history of tardive dyskinesia. *J Clin Psychopharmacol* 1988;8(4 Suppl):31S-37S.

#### 7. *Volume with part*

Hanly C. Metaphysics and innateness: a psychoanalytic perspective. *Int J Psychoanal* 1988;69(Pt 3):389-99.

#### 8. *Issue with part*

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Baumeister AA. Origins and control of stereotyped movements. *Monogr Am Assoc Ment Defic* 1978; (3):353-84.
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12. *Type of article indicated as needed*  
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Fuhrman SA, Joiner KA. Binding of the third component of complement C3 by *Toxoplasma gondii* [abstract]. *Clin Res* 1987; 35:475A.
13. *Article containing retraction*  
Shishido A. Retraction notice: Effect of platinum compounds on murine lymphocyte mitogenesis [Retraction of Alsabti EA, Ghalib ON, Salem MH. In: *Jpn J Med Sci Biol* 1979; 32:53-65). *Jpn J Med Sci Biol* 1980;33:235-37.
14. *Article retracted*  
Alsabti EA, Ghalib ON, Salem Mh. Effect of platinum compounds on murine lymphocyte mitogenesis [Retracted by Shishido A. In: *Jpn J Med Sci Biol* 1980;33:235-7]. *Jpn J Med Sci Biol* 1979;32:53-65.
15. *Article containing comment*  
Piccoli A, Bossatti A. Early steroid therapy in IgA neuropathy: still open question [comment]. *Nephron* 1989;51:289-91.
16. *Article in comment*  
Kobayashi Y, Fujii K, Hiki Y, Tateno S, Kurokawa A, Kamiyama M. Steroid therapy in IgA nephropathy: a retrospective study in heavy proteinuric cases [see comments]. *Nephron* 1988;48:12-7. Comment in: *Nephron* 1989;51:289-91.
17. *Article with published erratum*  
Schofield A. The CAGE questionnaire and psychological health [published erratum

appears in *Br J Addict* 1989;84:701]. *Br J Addict* 1988;83:761-64.

### **Books and Other Monographs**

18. *Personal author(s)*  
Colson JH, Armour WJ. Sports injuries and their treatment. 2nd rev. ed. London: S. Paul, 1986.
19. *Editor(s) as author*  
Diener HC, Wilkinson M, editors. Drug-induced headache. New York: Springer-Verlag, 1988.
20. *Organization(s) as author*  
Virginia Law Foundation. The medical and legal implications of AIDS. Charlottesville: The Foundation, 1987.
21. *Chapter in a book*  
Winstein L, Swartz MN. Pathologic properties of invading microorganisms. In: Sodeman WA Jr, Sodeman WA, editors. *Pathologic Physiology, mechanisms of disease*. Philadelphia: Saunders, 1974:457-72.
22. *Conference proceedings*  
Vivian VL, editor. Child abuse and neglect: a medical community response. Proceedings of the First AMA National Conference on Child Abuse and Neglect; 1984 Ma 30-31; Chicago. Chicago: American Medical Association, 1985.
23. *Conference paper*  
Harley NH. Comparing radon daughter dosimetric and risk models. In: Gammage RB, Kaye SV, editors. *Indoor air and human health*. Proceedings of the Seventh Life Sciences Symposium; 1984 Oct 29-31; Knoxville (TN). Chelsea (MI):Lewis, 1985:69-78
24. *Scientific or technical report*  
Akutsu T. Total heart replacement device. Bethesda (MD): National Institutes of Health. National Heart and Lung Institute; 1974 Apr. Report No.:NIH-NIHI-69-2185-4.  
Disertasi Youssef NM. School adjustment of children with congenital heart disease [dissertation]. Pittsburg (PA): Univ. of Pittsburg, 1988.

25. *Dissertation*  
Kay JG. Intracellular cytokine trafficking and phagocytosis in macrophages [Dissertation]. St Lucia, Qld: University of Queensland; 2007.
26. *Patent*  
Harred JF, Knight AR, McIntyre JS, inventors. Dow Chemical Company, assignee. Epoxidation process. US patent 3,654,317, 1972 Apr 4.

### **Other Published Material**

27. *Newspaper article*  
Resberger B, Specter B. CFCs may be destroyed by natural process. The Washington Post 1989 Aug 7;Sect. A:2(col. 5).
28. *Audiovisual material*  
AIDS epidemic: the physician's role [video-recording]. Cleveland (OH): Academy of Medicine of Cleveland, 1987.
29. *Computer program*  
Renal system [computer program]. MS-DOS version. Edwardsville (KS): Medi-Sim, 1988.
30. *Legal material*  
Toxic Substances Control Act: Hearing on S. 776 Before the Subcomm. on the Environment of the Senate Comm. on Commerce, 94th Cong., 1st Sess. 343(1975).
31. *Map*  
Scotland [topographic map]. Washington: National Geographic Society (US), 1981.
32. *Dictionary or Encyclopaedia*  
Ectasia. Dorland's illustrated medical dictionary. 27th ed. Philadelphia: Saunders, 1988: 527.
33. *Classic material*  
The Winter's Tale: act 5, scene I, lines 13-16. The complete works of William Shakespeare. London: Rex, 1973.
34. *In press*  
Lillywhite HB, Donald JA. Pulmonary blood flow regulation in an aquatic snake. Science. In press.

### **Electronic Material**

35. *Journal article in the internet*  
Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis [serial online] 1995 Jan-Mar [cited 1996 Jun 5];1(1):[24 screens]. Available from: URL: <http://www.cdc.gov/ncidod/EID/eid.htm>
36. *Monograph in electronic format*  
CDI, clinical dermatology illustrated [monograph on CD-ROM]. Reeves JRT, Maibach H. CMEA Multimedia Group, producers. 2nd ed. Version 2.0 San Diego: CMEA; 1995.
37. *Computer program*  
Hemodynamics III: the ups and downs of hemodynamics [computer program]. Version 2.2. Orlando (FL): Computerized Educational System; 1993.

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