Slit-lamp calibration, crucial but neglected

Lutfah Rif'ati,[1] Bastaman Basuki[2]

[1] National Institute for Health Research and Development, Ministry of Health of Indonesia
[2] Department of Community Medicine, Faculty of Medicine, Universitas Indonesia

Abstrak

Latar belakang: *Kalibrasi berkala alat diagnostik sangat esensial untuk diagnosis yang akurat. Riset fasilitas kesehatan (Rifaskes) 2011 mengumpulkan data termasuk kalibrasi lampu celah (slit-lamp) pada sampel rumah sakit (RS) di Indonesia. Tujuan analisis ialah untuk mengidentifikasi faktor dominan yang berpengaruh terhadap pelaksanaan kalibrasi berkala lampu celah di RS.*

Metode: *Analisis memakai sebagian data Rifaskes 2011 di antara 442 RS yang menyediakan layanan kesehatan mata. Risiko relatif dipergunakan untuk menilai kemungkinan tidak dilakukannya kalibrasi lampu celah di RS.*

Hasil: *Di antara 248 RS sampel yang memenuhi kriteria inklusi, hanya 25,8% RS yang melakukan kalibrasi lampu celah tepat waktu. Dibandingkan dengan rumah sakit yang dimiliki oleh Badan Usaha Milik Negara (BUMN), rumah sakit yang dimiliki lembaga lain memiliki risiko yang lebih tinggi tidak mengkalibrasi lampu celah. Menurut tipe RS, RS non-pendidikan dibandingkan dengan RS -pendidikan berisiko 40% lebih tinggi tidak mengkalibrasi lampu [risiko relatif suaian (RRa) = 1,40; 95% interval kepercayaan (CI) = 1,02-1,91].*

Kesimpulan: *Kalibrasi tepat waktu lampu-celah masih menjadi masalah di sebagian besar RS. Dibandingkan dengan rumah sakit yang dimiliki oleh BUMN, rumah sakit yang dimiliki oleh instansi lain berisiko yang lebih tinggi tidak mengkalibrasi lampu celah.* ***(Health Science Indones 2012;2:xx-xx)***

Kata kunci: *kalibrasi, lampu celah, rumah sakit*

Abstract

Background: Periodical diagnostic tool calibration is essential for accurate diagnosis. Health Facilities Research (Rifaskes) in 2011 collected data on the slit-lamp calibration of all registered general hospitals in Indonesia.

Methods: Analysis using a part Rifaskes 2011 data among 442 hospitals that provide eye health services. Relative risk was used to assess the risk of performing calibration slit lamp.

Results: Out of 442 hospitals, 248 hospitals met the inclusion study criteria, and only 25.8% calibrating the slit-lamp on schedule. Ownership and type of hospital were the dominant factors on the risk of not performing on schedule slit- lamp calibration. Compared to hospital owned by government public company, the hospitals owned by the other institution had higher risk did not calibrate their slit-lamp. In term of hospital type, non-teaching hospital compared with teaching hospital had 40% higher risk did not calibrate their slit-lamp [adjusted relative risk [adjusted relative risk (RRa) = 1.40; 95% confidence interval (CI) = 1.02-1.91].

Conclusion: On schedule slit-lamp calibration was still a problem in most of hospitals. Compared to hospital owned by government public company, the hospitals owned by the other institution had higher risk did not calibrate their slit-lamp. ***(Health Science Indones 2012;2:xx-xx)***

Key words: calibration, slit-lamp, hospital

Corresponding author: Lutfah Rif'ati
E-mail: lutfahrifati@yahoo.com

INTRODUCTION

Health Facilities Research (Rifaskes) 2011 was one of the national health research conducted by the Research and Development Agency of the Ministry of Health of Indonesia to obtain the latest information about the adequacy and accuracy of supply in institutions implementing health measures, among other, in hospital.

Calibration of medical equipment is a crucial issue to ensure the accuracy of the results, so it must have become a routine tool maintenance procedures performed by healthcare providers. The facilities are all things related to infrastructure, facilities and equipment (both medical devices and non-medical equipment) required by the hospital in providing the best possible care for patients.

Decrees of the Minister of Health of Republic of Indonesia, among others, indicated that all medical equipment in hospital must be tested and calibrated periodically by the health facilities and testing center or other authorized health facility testing institutions.[1,2]

Diagnostic tools calibration on schedule is an essential issue to maintain the equipment giving accurate results on health examination. The analysis aimed to identify factors associated with slit-lamp calibration regularity.

METHODS

Rifaskes 2011 was a cross-sectional study. Hospital census conducted against the Government/Local Government hospitals, Health Centers, and clinical laboratories in Indonesia, [Rifaskes GUIDE][1]

Data collected included facility data, human resources (HR), medical equipment, organization and management, existing health services, and output of essential health services, as well as the Essential Quality Indicators in 2010. Data were collected through interviews, observation, and assessment of secondary data.

Data collectors were National Institute for Health Research and Development (Litbangkes) researchers, health polytechnics (polytechnic), university (college), professional organizations, or other medical research institutions that meet the required criteria, both at the national and provincial / district / city.

The validation study was carried out by three Schools of Public Health in Indonesia. The validation process carried out 1-2 weeks after the enumerators to collect data. The validity of the data collected has approximately 80%. Therefore it can be concluded that the process of data collection and the data collected was valid.

Among 685 hospitals visited, 442 hospitals providing eye care services using slit-lamp as a basic diagnostic tool.

The slit-lamp calibration divided into four categories: all calibrated on schedule, ≥ 60% on schedule calibrated, not on schedule calibrated, and not calibrated.[2]

The hospital class divided into 4 classes (A, B, C, and D) based on Decree of Ministry of Health of the Republic of Indonesia no. 4 in 2009.[1] Whereas accreditation status of the hospital consisted of: no, accredited for 5 services, accredited for 12 services, and accredited for 16 services.[1]

To identify factors associated with slit-lamp not on schedule calibration among hospitals, we used relative risk to calculate the risk.[4]

Out of 442 hospitals, 64 (14.5%) had on schedule slit-lamp calibration, 194 (43.9%) hospitals with not in schedule slit-lamp calibration, and 184 (41.6%) did not calibrate the slit-lamp.

For this analysis, we compared hospitals which not slit-lamp calibrated with on schedule slit-lamp calibration. Therefore, we excluded 194 hospitals which ≥ 60% on schedule calibrated, or not on schedule calibrated.

The Rifaskes 2011 received ethical clearance from the National Ethics Committee of the National Institute for Health Research and Development, Ministry of Health of Indonesia.

RESULTS

Forty four hospitals located in capital of provinces and 204 located in district/municipal cities. Eleven hospitals were A-class hospital (the highest and the most equipped facilities), 83 are B-class, 131 were C-class, and 23 were D-class. Most hospitals have been accredited (either for 5, 12, or 16 services). Nearly half hospitals (120 hospitals) were under a local public service budgeting management and only 17 hospitals budgeting were managed by central public service. Most hospitals (71.4%) belong to district/municipal government and 44 out of 248 Hospitals are utilized as teaching hospital.

Table 1 show that hospitals which calibrated and did not calibrate slit lamps were similarly distributed with respect

city/town, class of hospital, accreditation, and budgeting management. However, compared with hospital which did not have accreditation, hospital which Accredited for 16 services were less likely did not calibrate slit lamps.

Our final model (Table 2) reveals that ownership and hospital type were related to risk of not slit-lamp calibration. Compared to hospital owned by government public company, the hospitals owned by the other institution had higher risk did not calibrate their slit-lamp. In term of hospital type, non-teaching hospital compared with teaching hospital had 40% higher risk did not calibrate their slit-lamp [adjusted relative risk (RRa) = 1.40; 95% confidence interval (CI) = 1.02-1.91].

Table 1. City/town status, several hospital types and risk of not slit-lamp calibration

	Calibrated		Crude relative risk	95% confidence interval	P
	Yes (n=64)	Not (n=184)			
City/town					
Province	12	32	1.00	Reference	
Municipal/district	52	152	1.02	0.70-1.50	0.901
Hospital Class					
A	2	9	1.00	Reference	
B	27	56	0.82	0.41-1.67	0.591
C	27	104	0.97	050-1.92	0.931
D	8	15	0.80	0.35-1.82	0.591
Accreditation					
No	14	68	1.00	Reference	
Accredited for 5 services	23	67	0.90	0.64-1.26	0.531
Accredited for 12 services	12	22	0.78	0.49-1.26	0.312
Accredited for 16 services	15	27	0.78	0.50-1.21	0.263
Budgeting management					
Central public service	6	11	1.00	Reference	
Local public service	30	90	1.16	0.64-2.17	0.644
Non public service	28	83	1.16	0.62-2.17	0.652

Tabel 2. Relationship between ownership, teaching hospital and risk of not slit-lamp calibration

	Calibrated		Adjusted relative risk	95% confidence interval	P
	Yes (n=64)	No (n=194)			
Ownership					
Government public company	7	4	1.00	Reference	
Ministry of Health	2	6	2.73	1.12-6.65	0.027
Provincial government	7	15	2.10	0.93-4.75	0.074
Municipal/district	41	136	2.06	0.96-4.44	0.065
Armed forces/Police	7	23	1.40	0.96-4.61	0.065
Hospital type					
Teaching hospital		26	1.00	Reference	
Non teaching hospital		158	1.40	1.02-1.91	0.037

DISCUSSION

In interpreting our findings, the readers must be considered limitations of our study. We excluded several participating hospitals with incomplete data.

Hospitals that did not perform slit-lamp calibration were 41.6% (184/442). This was not in line with the regulations of the Minister of Health about the maintenance of the hospital, among others, that all laboratorium equipment and measuring devices (including slit-lamp) need to be calibrated on schedule in accordance with the provisions of calibration.[5] Periodic slit-lamp calibration is generally performed at least 6 months.

Most of the government public company owned hospitals (7 out of 11 hospitals) had slit-lamp calibration on schedule. On the hands, compared to hospital belong to government public company owned hospitals, hospital belong to Ministry of Health, Provincial government, Municipal/ district, and Armed Forces/Police had higher risk not to be calibrated their slit-lamps.

Our finding noted that teaching hospitals than non teaching hospitals had 40% risk not to be calibrated their slit-lamp.

The main factors affecting the calibration execution on schedule most likely were the knowledge and attitude of hospital managers, and in addition to the availability of funds and the existence of institutions implementing the calibration.

The hospital managers of Government public company hospitals more likely to realized the usefulness of maintaining quality include diagnostic equipment calibration, and in addition to the competition among hospitals. They understand that negligence could result in revocation of permits on hospital operations as stated in the Decree of the Minister of Health of Indonesia No. 44 of 2009.

Hospital's stakeholders need to be constantly aware of the usefulness of slit-lamp calibration as suggested by some experts the following statements.

Blumenthal stated that the three factors influencing optimal eyepiece ring setting are examiner ametropia, slit-lamp misalignment due to variations in calibration, and unconscious accommodation. An inaccurate eyepiece ring setting raises problem while using an oblique illumination. The object at the center of examiner view is impossible to be visualized sharply even though the slit-lamp joy-stick have been adjusted optimally.[6] In other words, not correct eyepiece ring setting may lead to the inaccurate diagnosis.

Ritch et al. reported that the slit-lamp eyepiece micrometer calibrated in 50-micron intervals may give a greater precision in measurement of intraocular smaller structures.[7]

Slit-lamp eyepiece micrometer is a very important part, given the structure forming the anterior segment of the eyeball, generally have very small size (micro).Therefore, the smaller the micrometer intervals are used, the required calibration that is timely, given the very high sensitivity of the instrument.

In conclusion, on schedule slit-lamp calibration was still a problem in most of hospitals. Compared to hospital owned by government public company, the hospitals owned by the other institution had higher risk did not calibrate their slit-lamp.

Acknowledgments

This worthy data was collected by the funding support from Ministry of Health, Republic of Indonesia. The author wishes to thank all subjects who contribute cooperatively to Rifaskes 2011, especially the team secretary, Dr. Harimat Hendarwan and his team.

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