

**ORIGINAL ARTICLE**

**OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT SYSTEM (OSHMS) GUIDELINE COMPLIANCE AMONG MEDICAL LABORATORIES IN KLANG VALLEY**

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**ABSTRACT**

**Background:** Nowadays, most medical laboratories in Malaysia practice occupational safety and health based on standard operating procedure and sometimes ad-hoc characteristic limited to only internal use. The level of compliance of the national occupational safety and health management system (OSHMS) guidelines among medical laboratories in Malaysia is still largely unexplored.

**Methods:** This study was carried out on 34 medical laboratories consisting of 17 public medical laboratories and 17 private medical laboratories in Klang Valley using self-administered questionnaire based on guideline of OSHMS<sup>6</sup>. This study covered 112 medical laboratories units including pathology chemistry (18), microbiology (20), virology (7), histopathology (16), cytopathology (17), hematology (19) and 15 multi discipline medical laboratories.

**Results:** This study showed the level of compliance to the national OSHMS guideline among medical laboratories who are MS ISO 15189:2004 accredited & have a higher scores ( $p<0.01$ ) in mostly measurement indicators and measurement indicators, such as element of policies (7.2% vs. 53.5%), organizing (71.5% vs. 54.9%), evaluation (77.1% vs. 52.8%) and action for improvement (86.2% vs. 50.6%) compared to those do not have that accreditation except in the of planning and implementation (86.2% vs. 50.6%) which is not significant statistically. However, there are significant difference ( $p<0.05$ ) between government medical laboratories and private medical laboratories. There are no significant difference ( $p>0.50$ ) between medical laboratories which have ISO 9000 quality management system certification or not compared to level of compliance to the national OSHMS guideline among medical laboratories and the laboratories operating more than 10 years compared to those with less than 10 years of operation as well towards implementing to OSHMS.

**Conclusion:** This study showed that medical laboratory which is accredited with MS ISO 15189 is more compatible in terms of compliance to the national OSHMS guideline compared to other management system.

**Keywords:** Occupational Safety and Health Management System, Occupational Safety and Health, Medical Laboratory

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## INTRODUCTION

Environmental, health and safety auditing activities in industries date back to the mid-1970s as internal tools to review and evaluate environmental problems at the operating unit level<sup>10</sup>. Standard of occupational safety and health (OSH) vary in accordance with the degree of national economic development and the strength of both the legislature and the enforcement authorities<sup>2</sup>. Audits are used as key management tool in assessing the strengths and weakness of management systems for health and safety, in order to bring about a process of continuous improvement in performance<sup>2</sup>.

Clinical laboratories operate in a constantly changing environment and much of that change is driven by rules, regulations, and laws as well as voluntary standard<sup>3</sup>. Nowadays, mostly medical laboratories in Malaysia practicing the Occupational Safety and Health (OSH) based on procedure or standard operation procedures (SOP) and sometimes ad-hoc characteristic for internal use only. However, the effectiveness practiced each elements of MS 1722:2003 in medical laboratory still unexplored prior this study. The national Occupational Safety and Health Management System (OSHMS) guideline, MS 1722:2003 which is mainly adapted from OSHMS-ILO 2001 guidelines was introduced 3 years ago in Malaysia<sup>4</sup>. Although the practiced of MS 1722:2003 guidelines not completely applied but the elements were used are practiced indirectly in the existing of OSHMS in medical laboratory.

Occupational safety and health management system (OSHMS) implementation

in private and government medical laboratory was not also studied and disclosed yet. This knowledge is expected to help in designing OSHMS and application of it in both private and government sector medical laboratory services. Besides, compatibility between different laboratory accreditation system like MS ISO 15189:2004 and other management system such as ISO 9000 was not also studied thoroughly in order to practice in medical laboratories. Therefore, this study is to determine the compatibility of existing OSH management system which is practiced in medical laboratory towards implementing of national OSHMS guideline, MS 1722:2003 and factor influenced its effectiveness.

## METHODOLOGY AND MATERIAL

This study was prepared by using self administered OSHMS checklists which is based on MS 1722:2003<sup>5</sup> which are modified from OSHMS-ILO 2001<sup>6</sup>. This self-administered OSHMS checklist containing 5 elements, 16 measurements and 225 indicators was devised to assess the level of compliance for the national OSHMS guidelines in the medical laboratory. Each element in the given OSHMS checklist was coded with "compliance" and "not compliance". Every respondent was asked to answer their laboratory compliance to each element either by giving "Yes" or "Not".

Internal reliability of 225 questions related OSHMS compliance is high reliability which Croanbach Alpha is 0.9943. Data gained was analyzed using Statistical Package for Social Science (SPSS) programme.

**Table 1 Sociodemographic characteristics of study population**

Factors		n	Percentage (%)
Position	Executive	7	6.3
	Manager	52	46.4
	Supervisor	53	47.3
Service sectors	Public laboratory	86	76.8
	Private laboratory	26	23.2
Units of medical laboratory discipline	Pathology chemistry	19	16.1
	Microbiology	20	17.9
	Virology	7	6.3
	Histopathology	16	14.3
	Hematology	19	17.0
	Multi Discipline	15	13.4

This study was conducted in 34 medical laboratories categorized as public laboratories (17 laboratories) and private laboratories (17 laboratories) in Selangor and Kuala Lumpur. Respondents were the persons who were responsible for the safety and health of their medical laboratory. The categories of respondents in this study were executives (7 people), managers (52 people) and supervisors (53 people) of the medical laboratories. Each of these medical laboratories offers medical laboratory investigations in chemical pathology, medical microbiology, histology & cytology, hematology and multi discipline laboratory.

## RESULTS

Table 2 showed that, there is significant difference ( $p<0.05$ ) in mean score of measurement indicators between medical laboratories in government and private sector. On the other hand, the comparison between medical laboratories which are accredited or certified by MS ISO 15189:2004<sup>7</sup>, show a

significant difference ( $p<0.05$ ) between accredited medical laboratories compared to non-accredited medical laboratories.

However, there is no significant difference ( $p>0.05$ ) between the medical laboratories which have quality system certification series of ISO 9000<sup>9</sup> and the laboratories which do not have it, in terms of measurement score indicator of OSH. There is also no significant difference ( $p>0.05$ ) between the laboratories operating more than 10 years with the laboratories less than 10 years of operation.

Based on the outcome of the study, it is clear that by getting accreditation or certification of either MS ISO 15189:2004 helps in implementing OSH element in medical laboratory. Result shows that accreditation or certification can influence personal awareness among the medical laboratory workers. Therefore, further comparison will be done among the medical laboratories based on laboratory accreditation or certification mentioned earlier.

**Table 2 Comparison of percentage means score of overall indicator OSHMS in medical laboratory follow the study factors**

Medical laboratories	n	mean±S.D	t value	p value*
Services sector				
Private	27	60.85±35.5	0.20	0.05
Government	86	59.46±29.3		
Accreditation certification (MS ISO 15189)				
Accredited	31	72.60±25.6	2.82	0.01
Not accredited	81	54.88±31.2		
Year of operation				
≤ 10 years	50	57.11±29.4	-0.83	0.43
> 10 years	62	61.94±31.8		
Quality management system (ISO 9000)				
ISO 9000 certified	70	82.84±31.2	2.82	0.50
Not certified	42	54.69±29.4		

\* Significant value is 0.05

Table 3 shows that, the medical laboratories which have accreditation have more higher percentage compared to the medical laboratories which have no accreditation in terms of the 5 elements of OSHMS, that are, policy (72.5% vs. 53.5%), organizing (71.5% vs. 54.9%), planning and implementation (65.1% vs. 58.8%), evaluation (77.1% vs. 52.8%) and action for improvements (86.2% vs. 50.6%).

Results revealed (not showed) that the level of compliance for the national guideline of OSHMS, also show some element and measurement of indicator have high-value and in distribution with good diversion to the right (*skewed*) of medical laboratory which have accreditation scheme MS ISO 15189 compared with medical laboratory had no accreditation.

**Table 3 Comparison of means score measurement percentage of Occupational Safety and Health between medical laboratory getting accreditation MS ISO 15189:2004 and non accredited medical laboratories.**

<b>OSH measurements</b>	<b>n</b>	<b>mean±S.D</b>	<b>p value*</b>
<b>Policy</b>			
Accredited	31	72.58±27.41	0.00
Not accredited	81	53.58±35.26	
<b>Organizing</b>			
Accredited	31	71.51±24.06	0.00
Not accredited	81	54.94±32.93	
<b>Planning and implementation</b>			
Accredited	31	65.12±29.17	0.64
Not accredited	81	58.87±29.67	
<b>Evaluation</b>			
Accredited	31	77.10±29.18	0.00
Not accredited	81	52.80±35.64	
<b>Action for improvement</b>			
Accredited	31	86.29±29.77	0.00
Not accredited	81	50.69±44.44	

\* Significant value is 0.05

## DISCUSSION

OSHMS implementation in medical laboratory between service of private and government may had been diversity in compliance OSHMS implementation in medical laboratory-services determine way and goals of OSH in service between private bodies and government who have not yet known and understood by society and also to related law and legislator about OSH. This knowledge expected can help in terms of design OSHMS in both use of medical laboratory-services either private or government sector. Suitability of system scheme as laboratory accreditation MS ISO 15189:2004 or other management system such as ISO 9000 not-yet study about it use in medical laboratory.

Therefore, this study revises the level of compliance of OSHMS aspect in Malaysia. The takings from observation in all information can reflected to guideline level of implementation of OSHMS include all the elements residing in integrated OSHMS especially for use in medical laboratory in Malaysia as generalized.

Comparison of measurement indicator OSH which has carried out on medical laboratory of government and private sector, there are significant difference ( $p<0.05$ ) score of mean measurement indicator OSH of government and private sector. This shows that there is difference in level of compliance of OSH implementation between laboratory of private sector and government service.

Instead, the comparison of medical laboratory which have owned accreditation either MS ISO 15189:2004, shows there are differences significant ( $p<0.05$ ) mean score of percentage measurement of OSH compare with the medical laboratory which has no accreditation certificate. This has shows that accreditation recognition can influence the bodies awareness those who involved in medical laboratory in practice and implement aspects of OSH as written in the national OSHMS guideline.

Even though by implanted ISO 9000, the organization will gained advantages in term of improved in quality and increased customer perception to their services or products<sup>10</sup> but by the comparison between medical laboratory which have quality certificate series of ISO 9000 compared with the laboratory which not get it, show no significant difference ( $p>0.05$ ) in terms of measurement score indicator of OSH. This is because may be ISO 9000 only stresses on aspect of documentation system quality and behave as general to every industry, beside little emphasis in safety aspects and occupational health in this certification scheme.

Also with the period of one medical laboratory was operate, show that there is no difference significant ( $p>0.05$ ) of medical laboratory which has been operational exceed to 10 years as compared with those less of 10 years operation. This was indicates although it has been long operate but if no integration and implementation in occupational safety and health aspects in his system of operation, one medical laboratory which stated unable to promote culture of OSH in his organization effectively. This indicates if there is no integration and implementation in safety aspects and occupational health, certain medical laboratory which stated earlier is unable to promote good quality of OSH.

Based on the outcome of the study, clearly shows that get accreditation certification laboratory as MS ISO 15189 will give help in the implementation OSH element in medical laboratory. This also show that has variety which is significant ( $p<0.05$ ) between laboratory which have laboratory accreditation compared with the laboratory don't have laboratory accreditation for implementation of OSH elements. All of the elements have been measured between medical laboratories which have accreditation have more higher in percentage compared to medical laboratory which had no accreditation.

An element of policy has been looked upon as one of the important OSHMS issues in an organization which reflexes the image of implemented OSH activities in the organization. Comparison which provide for element of policy show the medical laboratory which have MS ISO 15189:2004 accreditation certification have higher score in mean percentage ( $p<0.05$ ) compared with the laboratory which had no accreditation.

The overall comparison for organization element show medical laboratory have accreditation certificate have higher percentage score that is 72.6% ( $p<0.05$ ) compared with the laboratory which had no accreditation is 54.8%. The analysis gets to evaluate the medical laboratory in the accomplishment and implementation element of OSH indicators. It is also can differentiate the OSH well achievement between the medical laboratories with better OSH as compared to those with weaker implementing of OSH.

## CONCLUSION

Factors influencing the OSHMS compliance in medical laboratory-services was accreditation for medical laboratory through MS ISO 15189:2004. It show that accreditation can influence awareness of involved medical laboratory in practicing and implementing aspects of the OSH as written in the national guideline of OSHMS. Some other factors such as service sectors (government vs. private), years of operation (more or less than 10 years), quality management system other than MS ISO 15189:2004 such as ISO 9000 have no significant influence in compliance to national OSHMS guideline in medical laboratories.

This study shows only one of the factors influence the compliance for occupational safety and health management system in medical laboratory-services that is accreditation or certification by MS ISO 15189:2004. It shows that the accreditation by MS ISO 15189:2004 are more compatible with integrated in management system in the medical laboratory.

## REFERENCES

1. Peter G. Nicoll 1999: *Auditing risk assessment and management*. In Sadhra S. & Rampal K. G (pnyt.). *Occupational Health Risk Assessment and management*. pg. 315. London: Blackwell Science (1999).

2. Linda G. & Gillian S. Howard 1999: *Demonstrating compliance with the law*. In Sadhra S. & Rampal K. G (pnyt.). *Occupational Health Risk Assessment and management*. pg. 344. London: Blackwell Science (1999).
3. Susan D. Roseff, Ann L. Harris, & Carol H. Rodgers. 2004. *The Impact of Regulatory Requirements*. In. Clinical Laboratory Management. ASM Press. pg. 79.
4. Ismail Bahari. 2006. *Pengurusan Keselamatan dan Kesihatan Pekerjaan*. 2<sup>nd</sup> Edition. 80-81. Mc Graw Hill Education, Malaysia.
5. MS 1722:2003. *Occupational Safety and Health Management System-guidelines*. Department of Standards Malaysia.
6. Rampal KG, Maimunah K, Ng Wei Kiang & Azmi T. 2001. *Guidelines on Malaysian Occupational Safety and Health Management System (MOSHMS)*. Department of Occupational Safety and Health.
7. MS ISO 15189:2004. *Medical Laboratories-Particular requirements for quality and competence*. Malaysian Standard, Department of Standards Malaysia.
8. ISO/IEC 17025 (2005), International Organisation for Standardization, Geneva, Switzerland
9. ISO 9000(2005), International Organisation for Standardization, Geneva, Switzerland
10. Hasnan H. & Rasidi Sufian, 1996. "Nota Kursus: Ke arah Pengiktirafan ISO 9000", Perbadanan Usahawan Nasional Berhad, Bandar Baru Bangi, Mei 1996.