

**An Interview Survey: Knowledge on CSDS Among Chemistry  
Teachers at Secondary Schools in Kubang Kerian, Kelantan,  
Malaysia.**

**by**

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**Dissertation submitted in partial fulfillment  
of the requirements for the degree  
of Bachelor of Health Sciences (Biomedicine)**

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# CERTIFICATE

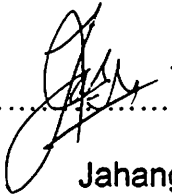
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## **Abstract**

Lack of knowledge or awareness in dealing with chemicals substances in laboratory may potentially lead to chemical accidents at workplace which may contribute towards major injuries or damages especially among school children in school laboratory.

This study quantified how well the knowledge of Material Safety Data Sheet (MSDS) or Chemical Safety Data Sheet (CSDS) and determined understanding of MSDS/CSDS and their practice of obeying the regulation stated in Classification, Packaging and Labeling (CPL) Regulation 1997 among chemistry teachers in secondary schools in Kubang Kerian and to determine training needs in chemical safety at schools.

Face to face interview survey was done among chemistry teachers consist of six respondents from five schools in Kubang Kerian district using standard questionnaires base on CPL Regulation 1997.

None of the respondent knows about MSDS/CSDS or aware about CPL 1997 and there is no specific training in chemical safety even though they are dealing with hazardous chemicals in the laboratory. However, most of them know parts of the dangerousness of the chemicals from the labels.

A very useful information was obtained in the study that can be used by various departments for training and preventive programs at school level for the MSDS/CSDS system to be implemented effectively and thereby protect staffs and school children from the harmful effects of the hazardous chemicals.

## **Abstrak**

Pengetahuan atau keperihatinan yang rendah dalam pengendalian dan penggunaan bahan kimia berbahaya boleh mendorong kepada kemalangan, kecederaan dan kerugian yang lebih besar terutamanya melibatkan keselamatan pelajar sekolah di dalam makmal amali.

Kajian ini dijalankan bagi menilai tahap pengetahuan terhadap Risalah Data Keselamatan Kimia atau *Material Safety Data Sheet (MSDS)* atau *Chemical Safety Data Sheet (CSDS)* dan sikap dalam mematuhi peraturan *Classification, Packaging and Labeling (CPL) Regulation 1997* di kalangan guru kimia di sekolah menengah yang menawarkan aliran sains di Kubang Kerian serta mengenalpasti keperluan latihan dari segi keselamatan makmal.

Satu tinjauan temuramah telah dijalankan yang melibatkan enam orang guru kimia di kawasan Kubang Kerian menggunakan soalan piawai berpandukan kepada *CPL Regulation 1997*.

Tidak terdapat guru yang mengetahui mengenai MSDS/CSDS atau yang peka tentang *CPL Regulation 1997*. Walau bagaimanapun kebanyakannya mengetahui tentang bahaya sesuatu bahan kimia yang digunakan di dalam makmal.

Maklumat yang amat berguna telah didapati dari kajian ini bagi jabatan-jabatan terlibat untuk merangka program latihan atau pencegahan untuk sistem MSDS/CSDS ini digunapakai secara efektif bagi menghindar kemalangan yang mungkin berlaku melibatkan kakitangan makmal dan pelajar sekolah.



## **CHAPTER 1**

### **Introduction**

A large number of hazardous chemicals are present in workplaces including in schools laboratories all around the world. The Occupational Safety and Health Administration (OSHA) estimate that there are 575,000 hazardous chemical products in American workplaces. In June 1990, the International Labor Organization (ILO) adopted a convention concerning safety in the use of chemicals at workplaces. In the convention, the MSDS was defined as one of the fundamentals for protection of workers from the harmful effects of chemicals (Akihiko,2001). The harmful effects of these chemicals are acute toxicity, irritation, corrosion, sensitization, carcinogenicity, reproductive toxicity, and all side effects either physicochemical or health that resources from chemicals. Several measures have been taken to protect workers or teachers as well as schools children against such adverse effects by proposing regulation like Classification, Packaging and Labeling (CPL) regulation 1997 which requires suppliers to provide Chemical Safety Data Sheets (CSDS) and OSHA 1994 and Use and Standards of Exposure of Chemicals Hazardous To Health (USECHH) regulations `2000 requires employers to make available CSDS to workers or users (OSHA 1994). Furthermore, by improving the knowledge of the chemical substances itself is so helpful in chemical health and safety (Kenneth, 2000).

That is why we need to have indicators that relatively explain and ensure the level of safety and health in our country which personnel deals with hazardous chemicals at a high standard and comply to the international standards.

A Material Safety Data Sheets (MSDS) is designed to provide crucial information to users, workers and emergency personnel who are exposed to hazardous materials. MSDS is a document prepared by the manufacturer of a hazardous substance which describes the properties and uses of a particular hazardous substances (Jonathan, 2002). MSDS can be divided into 3 main groups which are chemical hazard, biohazard and mechanical hazard. For chemical substances Chemical Safety Data Sheets (CSDS) is used which is similar to MSDS. There are details in the MSDS which contain 15 or 16 sections. Although a generic CSDS format has been suggested by OSHA, there is no regulation regarding the specific design of the form. However, most CSDS documents are uniform in their format and in the types of information recorded on the sheet.

However, difficulty in the interpretation and use of the MSDS has often been reported in the literature (Charles,1999). Further, manufacturers may assume that simply providing the CSDS to users will enable them to understand all that is necessary for protection and that such actions will meet OSHA requirements. Others assume, as indicated by current formats in use, that the more information provided on the CSDS form, the better for the worker and employer (Samways,1988). Either assumption could result in worker avoidance or misunderstanding of content of the CSDS that could lead to injury or death

associated with unnecessary exposure to toxic chemicals or their reactions (Charles,1999). The results of studies conducted by Nelkins and Brown (1984), Hadden(1988), Lu and Moure-Eraso (1993) was that CSDS formats were hard for users to understand and that content and readability needed improvement.

## **1.1 Objectives of the research**

The objectives of this study are divided into 2 categories which are general objective and specific objective.

### **1.1.1 General objective**

It is to ensure safety environment in chemistry laboratory in schools for staffs and schoolchildren who are operating or handling hazardous chemical substances regarding the regulations and laws.

### **1.1.2 Specific objectives**

1.1.2.1 To gauge the level of knowledge and awareness among school teachers on importance of CSDS.

1.1.2.2 To promote the importance of CSDS among school teachers.

1.1.2.3 To determine the training need for school teachers on chemical safety.

All of the main reasons which is why the research is carried out mainly to minimize risks of health hazards from the exposure to hazardous substances, thereby achieving a reduction in the incidence of occupational disease and mortality associated with these substances.

This project aimed to contribute information that can be used in the planning and prioritizing of educative and other preventive programs to Ministry of Education, Ministry of Environment and Ministry of Human Resource.

The study can be extend to other district or even though the whole schools in the state of Kelantan or even to other state in Malaysia for more accurate and more samples available.

## CHAPTER 2

### Literature Review

In North America and Europe, the CSDS system has been obligated and the format is fixed to the international standard.(Akihiko,2001). However, in developing countries there is still lack of knowledge on the importance of CSDS and the hazardous of chemical substances among the workers and the end users.(Takala,1996). CSDS is not only useful for the person who deal with chemicals but it is also helpful to emergency physicians who need a source of readily available information regarding chemical hazards that can assist them in the diagnosis and treatment of such exposures.(Michael,1996). Delays in diagnosis of these occupational diseases will leads to further risk for development of occupational-related long-term disorders.(Jonathan, 2002). Understanding CSDS is also so helpful in chemical health and environment safety for individuals who are dealing with chemicals.(Kenneth, 2000). By providing CSDS in the premises will promote a better understanding and make the individuals aware and protect them from the hazards posed by the substances.(Bluff,1998). For the employers and the authorities, there is a legal obligation to obtain a CSDS on or before the first supply of the hazardous substances. This CSDS must be made readily available to all persons that use the substance or have reasonable need for requesting the information.(Rosanne,1997).

## **2.1 Contents of CSDS/MSDS**

### **Section 1: Chemical product and company identification.**

This section must delineate the product's name exactly as it appears on the product label, as well as the internal inventory code used to manage the material. This may be in the form of a specific chemical name, or it may be simply be the commercial name of the product. The name, address and telephone number of the manufacturer must appear, along with an emergency telephone number for accessing information about the product that may not be included on the CSDS. This section must also show the date the CSDS was prepared, thereby providing some idea of how current the information contained therein actually is. This section is important because most of the organic compounds have more than one name and the systematic way for the name of the compound through International Union of Pure and Applied Chemistry or IUPAC (Donald, 2001).

### **Section 2: Composition or information on ingredients.**

In this section the detail composition or information on the active and non active ingredient of the chemical substances will be mentioned in percentage. The information should allow employers and users to identify clearly the risks associated with a particular chemical so that they may conduct a risk assessment. In this section the information that should be provided a description of the main

components, including their chemical nature and Chemical Abstract Service Number (CAS No.). Furthermore, the identity and concentrations of other components which are hazardous to safety and health are also mentioned (Michael, 1996).

### **Section 3: Physical and chemical properties.**

Physical data are listed in this section and may be of value in identifying the product as for examples are color and odor, or in predicting potential hazards. For example, materials with a high vapor pressure and a low boiling point tend to evaporate more quickly. Substances with a specific gravity less than 1.0 will float on a pool of water. A chemical with a vapor density greater than 1.0 is heavier than air and will accumulate near the floor, whereas a chemical with a vapor density of less than 1.0 will rise. Such information is useful in determining possible respiratory hazards. This section of the CSDS also contains the product's melting point, freezing point, evaporation rate and degree of water solubility, all of which can aid the emergency personnel (Michael, 1996).

### **Section 4: Hazard identification.**

This section must identify the hazardous components of the product by both scientific and common names. Components that are carcinogens must be listed if they constitute 1% or more of the mixture. All hazardous component chemicals

must be identified with the exception of the so-called trade secret. This section also must delineate information regarding worker exposure limits. Standards may be expressed as maximum exposure limits or short-term exposure limits. These limits should be shown for each listed component of a chemical mixture and for the mixture as a whole if the information is available (Donald, 2001).

#### **Section 5: First Aid measures.**

First aid measures should be carefully explained. Situations where immediate medical attention is required should be described and the necessary measures indicated. Where appropriate, the need for special arrangements for specific and immediate treatment should be emphasized (Michael, 1996).

#### **Section 6: Fire fighting measures.**

This section contains information regarding the flash point and flammability of a given product. The flash point is the temperature at which a product begins to create a flammable vapor directly above a liquid pool. Flammability limits are based on a low to high scale of 0 to 4 and include both a lower and an upper flammability limit for the product. This section may also include information regarding appropriate firefighting equipment to use against a fire, specific firefighting procedures for extinguishing burning materials as for examples; water,



dry chemical, foam and any unusual fire or explosive hazards that may occur during the course of fighting a fire (Charles, 1999).

### **Section 7: Accidental release measures.**

Information should be provided on the action to be taken in the event of an accidental release of the chemical. The information included are health and safety precautions, removal of sources of ignition, provision of sufficient ventilation, provision of suitable personal protective equipment, environmental precautions, keeping away from drains, need to alert the emergency services. There are also include the methods for making safe and cleaning up, use of suitable absorbent materials, avoiding production of gases or fumes by water or other diluents, use of suitable neutralizing agents. It is also include warnings such as advice against reasonable foreseeable hazardous actions (Donald,2001).

### **Section 8: Handling and storage.**

Information should be given about conditions recommended by the supplier for safe storage and handling, including design and location of storage rooms or vessels, separation from workplaces and occupied buildings, incompatible materials, condition of storage such as temperature and humidity. In this section, the information includes are avoidance of sunlight, avoidance of sources of ignition, including particular arrangements to avoid static build-up, provision of

local and general ventilation. There are also recommended methods of work and those to be avoided in this section (Michael, 1996).

### **Section 9: Exposure control and personal protection.**

Information should be given on the need for personal protective equipment during handling of chemical, and on the type of equipment that provides adequate and suitable protection. Where appropriate, a reminder should be given that the primary controls should be provided by the design and installation of any equipment used and by other engineering measures, and information provided on useful practices to minimize the exposure of workers.

Specific control parameters such as occupational exposure limits such as permissible exposure limit, threshold level value and other exposure limits or biological standards should be given, along with recommended monitoring procedures (Akihiko, 2000).

### **Section 10: Stability and reactivity.**

This section addresses the reactivity of the chemicals in question. It should list other chemicals that, when mixed with the product, it will produce a chemical reaction. If the product reacts with water, that fact should be stated in this section. Hazardous decomposition products, such as gases produced during combustion or chemical reactions should also be listed in this section (Donald, 2001).

## **Section 11: Toxicological information.**

This section will give information on the effects on the body and on potential routes of entry into the body like through respiratory or lungs, skin and oral route. Reference should be made to acute effects both immediate and delayed, and to chronic effects from both short and long-term exposure. Reference should also be made to health hazards as a result of possible reaction with other chemicals including any known interactions, for example, resulting from the use of medication, tobacco and alcohol. Another important term must first be defined here is Lethal Dose, 50% Mortality(LD<sub>50</sub>). This is the dose of a substance that will kill 50% of the animals administered a single dose. Different means of administration are used, such as oral, intraperitoneal which is certain amount of the chemical was injected into the lining of the abdominal cavity, subcutaneous which injected under the skin, and applied to the surface of the skin. The LD<sub>50</sub> is usually expressed in milligrams (mg) of substance per kilogram (kg) of animal weight. The lower the value of LD<sub>50</sub> the more toxic the substance. It is assumed that the toxicity in humans will be similar (Rosanne, 1997).

## **Section 12: Ecological information.**

The most important characteristics likely to have an effect on the environment will be described. The detailed information required will depend on the national laws

and practice applying at the employer's workplace. Typical information that should be given include the chemical's persistence and degradability, bioaccumulative potential and aquatic toxicity, and other data relating to ecotoxicity such as effects on water treatment works (Jonathan, 2002).

### **Section 13: Disposal information.**

Safe methods of disposal of the chemical and of contaminated packaging, which may contain residues of hazardous chemicals, should be given. However, the methods for disposal of particular substances should be refer to the national laws and practices on the subject according to the Ministry of Environment (Donald, 2001).

### **Section 14: Transport information.**

Information should be given on special precautions that employers and users should be aware of or take while transporting the chemical on or off their premises (Michael, 1996).

### **Section 15: Regulatory information.**

Information required for the marking and labeling of the chemical should be given. This is also refers to requirements of national laws and practices (Donald, 2001).

## **Section 16: Other information.**

This section, other information which may be important to users and workers' health and safety, should be included. Examples are training advice, recommended uses and restrictions, references, and date of compiling of the MSDS (Michael, 1996).

## CHAPTER 3

### **Materials and Methods.**

In Kelantan there are 10 districts under supervision of *Jabatan Pelajaran Negeri Kelantan* which are Kota Bharu, Pasir Puteh, Bachok, Pasir Mas, Jeli, Tumpat, Gua Musang, Kuala Krai, Machang and Tanah Merah. However, this survey was conducted only in Kota Bharu district at the Kubang Kerian area.

### **3.1 Materials**

In this survey, we used standardized questionnaires base on CPL Regulation 1997 to all the chemistry teachers in secondary schools in Kubang Kerian without any bias. The respondents were asked the same questions that was reviewed and approved by the Ministry of Education (MOE), Malaysia and Department of Education, Kelantan. The answers given by the respondent were filled by the interviewer for further use.

## **3.2 Methods**

### **3.2.1 The population samples**

In this project we select only ordinary government schools and excluded private schools, boarding schools and religious schools in Kubang Kerian, Kota Bharu. Systematic sampling technique were applied to the chemistry teachers in each secondary schools in Kubang Kerian which offer science stream with chemistry subject and the practical done in the specific chemistry laboratories. There are only five schools were involved in this study which means only six chemistry teachers are included in this project. The schools list was obtained from the *Jabatan Pelajaran Negeri Kelantan* which are Sekolah Menengah Kebangsaan (SMK) Panji, SMK Long Gafar, SMK Raja Sakti, SMK Kubang Kerian 1 and SMK Kubang Kerian 2. Participation in the study was voluntary and all participants provided written informed consents.

Application letter was sent to the MOE at Putrajaya for approval to carry out the research to be done in schools in Kota Bharu, Kelantan(Appendix 2). After the permission given by the MOE from Putrajaya(Appendix 3), then another application letter was sent to the *Jabatan Pelajaran Negeri Kelantan* to run the survey in schools in Kota Bharu, Kelantan(Appendix 4).

### 3.2.2 Data collection

Data collection was started on January and February 2006 even though the approval was given earlier by the ministry because of the end of the year school holidays. In this study, face to face interview were used to obtain information, understanding or knowledge of CSDS among chemistry teachers despite the questionnaire can be understood by the person.

The questionnaires were developed by Mr. Jahangir Kamaldin, a lecturer at School of Health Sciences which are based on the Classification, Packaging and Labeling (CPL) Regulation 1997 and were divided into 2 sections which include section A and section B.

Section A is specific about the purpose of carrying the research, name of the researcher, benefits for carried out the study, names of the supervisors, ethical consideration and followed by the permission given by the Ministry of Education and the respondent signature. The respondents are voluntarily and they can quit at anytime they want. In this section, there are also stated about the privacy or confidentially information obtained from the survey and the researcher will not expose the media or public and data will not mentioned the respondent individually.

For section B, there are another 3 sub-division which are section I, section II and section III. In section I, there are 10 questions which included background of the



respondent, formal education level in institutions, informal information from reading or mass media and through practical experience in the course of their work, specific training on safety, working experience as a teacher, and the worst laboratory incidence experienced. Whereas in section II, there are 5 questions on knowledge in chemical hazards according to the CPL Regulation 1997 such as classification of hazardous chemicals base on the physicochemical and health effects and where to get complete information about the specific chemical substances. For section III, there are another 10 questions on attitude and practice in using MSDS/CSDS in detail according to the section in the CSDS. The respondents are allowed to refer to the CSDS in their records if available.

The wording in the questionnaire and accompanying explanatory information was designed to be in simple language either in *Bahasa Malaysia* or in English Language with the meaning of each question clarified by simple explanation by the researcher. This approach was also designed to facilitate a response by respondents who might have a low level of literacy. The survey was drawn as concretely as possible in order to seek factual information and avoid individual perceptions.

Appointment with the particular teacher via phone was made three days before the interview conducted. This is to make sure that the teacher is around and they can spend a time for the research. Instead, the permission to run the survey was get from the school principals earlier before meeting with the chemistry teachers.

Then, the principals will introduce us to the chemistry teachers concern and the survey will be made in chemistry laboratory because some of the questionnaires are related to the environment in the laboratory.

### **3.3 Data Analysis**

In the analysis, the data collected was coded and the score given to the individual answers numerically. The answers given by the respondents should be as same as mentioned in the CPL Regulation 1997. For example, in classification of hazardous chemicals in term of physicochemical, the answers should be explosive, oxidizing, extremely flammable, highly flammable and flammable. However in term of health effects, the answers are very toxic, toxic, harmful, corrosive and irritant. Subsequently, all the results were analyzed using descriptive statistics.

## **CHAPTER 4**

### **Results**

The survey was started in January and February 2006 because the school holidays fall on November and December 2005 which include the chemistry teachers as well. This study was completed with full participation from the chemistry teachers which the schools involved. None of the respondents quit or withdraw from the survey. Instead, the schools authorities including the respondents were very please and warm coming for the study. There are six respondents from the schools involved which are four of them are female.(Table 1).

#### **4.1 Background of respondents**

All of the chemistry teachers (100%) are graduated with first degree and diploma in education from local universities but only four of them (67%) are major in chemistry whereas another two (33%) are major in microbiology and botany. Five of them graduated in late eighties and one of them graduated in 2003. However, none of the respondents attend in any specialized course or workshop on safety. For working experience, five of the respondents (83%) have more then ten years experience in teaching chemistry subject including practical sessions in chemistry laboratory and only one person (17%) has between 3 to 5 years

experience in teaching chemistry.(Table 1). However, none of them got any experience on worst lab incidence like burns or any injuries during practical class.

Respondent's demographic data (n=6)		Freq	%
<b>Gender</b>			
Female		4	67
Male		2	33
<b>Experience (years)</b>			
3-5		1	17
>10		5	83
<b>Specify field</b>			
Chemistry		4	67
Others	(Microbiology)	1	17
	(Botany)	1	17

**Table 1: Respondent's demographic data**

## **4.2 Knowledge on chemical hazards**

In section II, all of the respondents (100%) answers that chemical substances are hazardous.

### **4.2.1 Knowledge on classification of hazardous chemicals (physicochemical)**

However, in classification of hazardous chemicals according to physicochemical, results shows that the respondent's answers are not according to the CPL regulation 1997, which is explosive chemicals, oxidizing chemicals, extremely flammable chemicals, highly flammable chemicals and flammable chemicals. But for explosive chemicals and oxidizing chemicals, all of the participants answer correctly. For extremely flammable chemicals and highly flammable chemicals, none of the participants can give the response correctly and five persons (83%) answers accurately about flammable chemicals. (Figure 1)

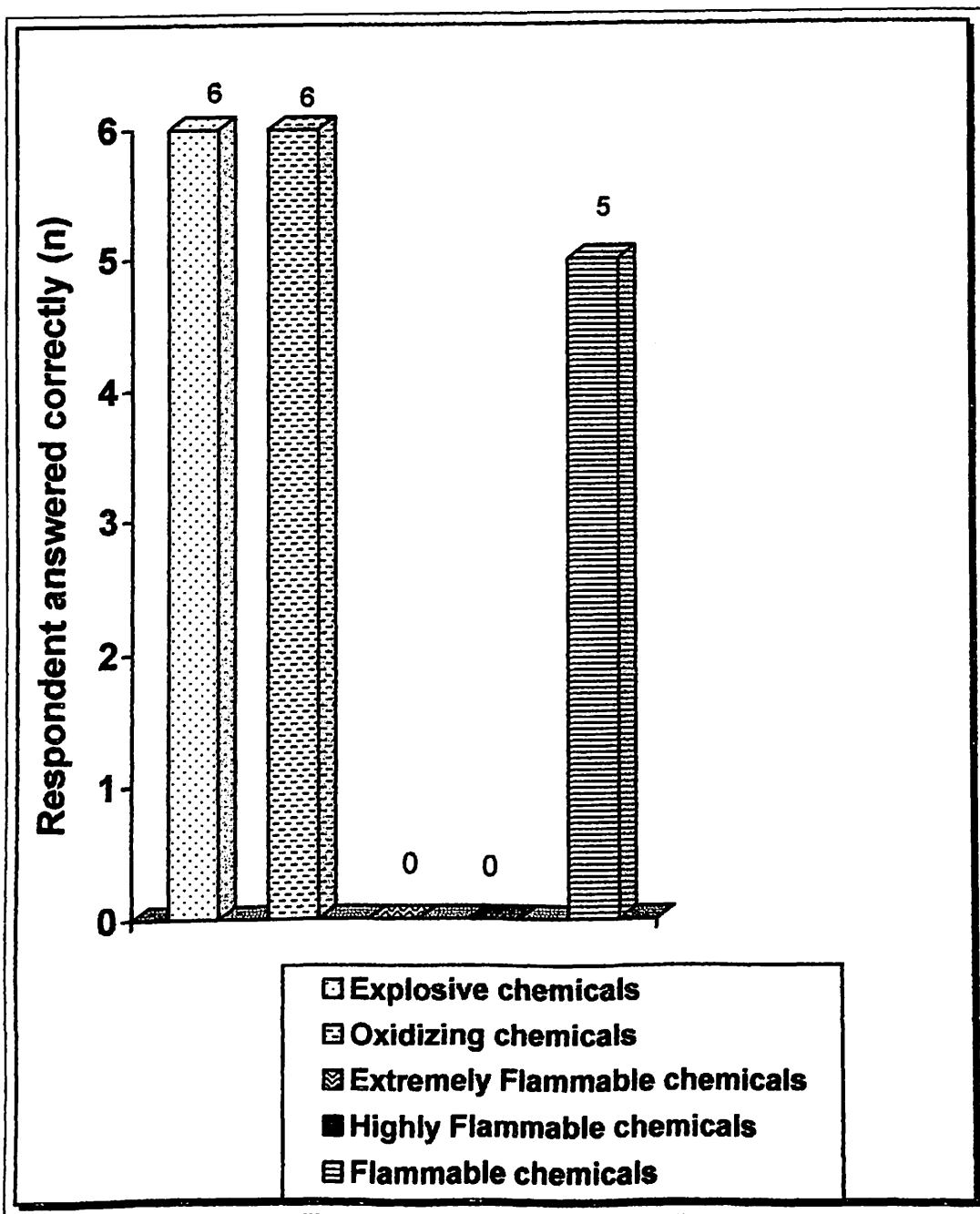


FIGURE 1: Knowledge on classification of hazardous chemicals (physicochemical) based on CPL Regulation 1997

#### **4.2.2 Knowledge on classification of hazardous chemicals (health effect)**

Whereas for classification of hazardous chemicals according to health effects, which is very toxic chemicals, toxic chemicals, harmful chemicals, corrosive chemicals and irritant chemicals, none of the respondents knows about very toxic chemicals and only one respondents knows about irritant chemicals and harmful chemicals. There are two participants answers, toxic chemicals and corrosive chemicals. (Figure 2)



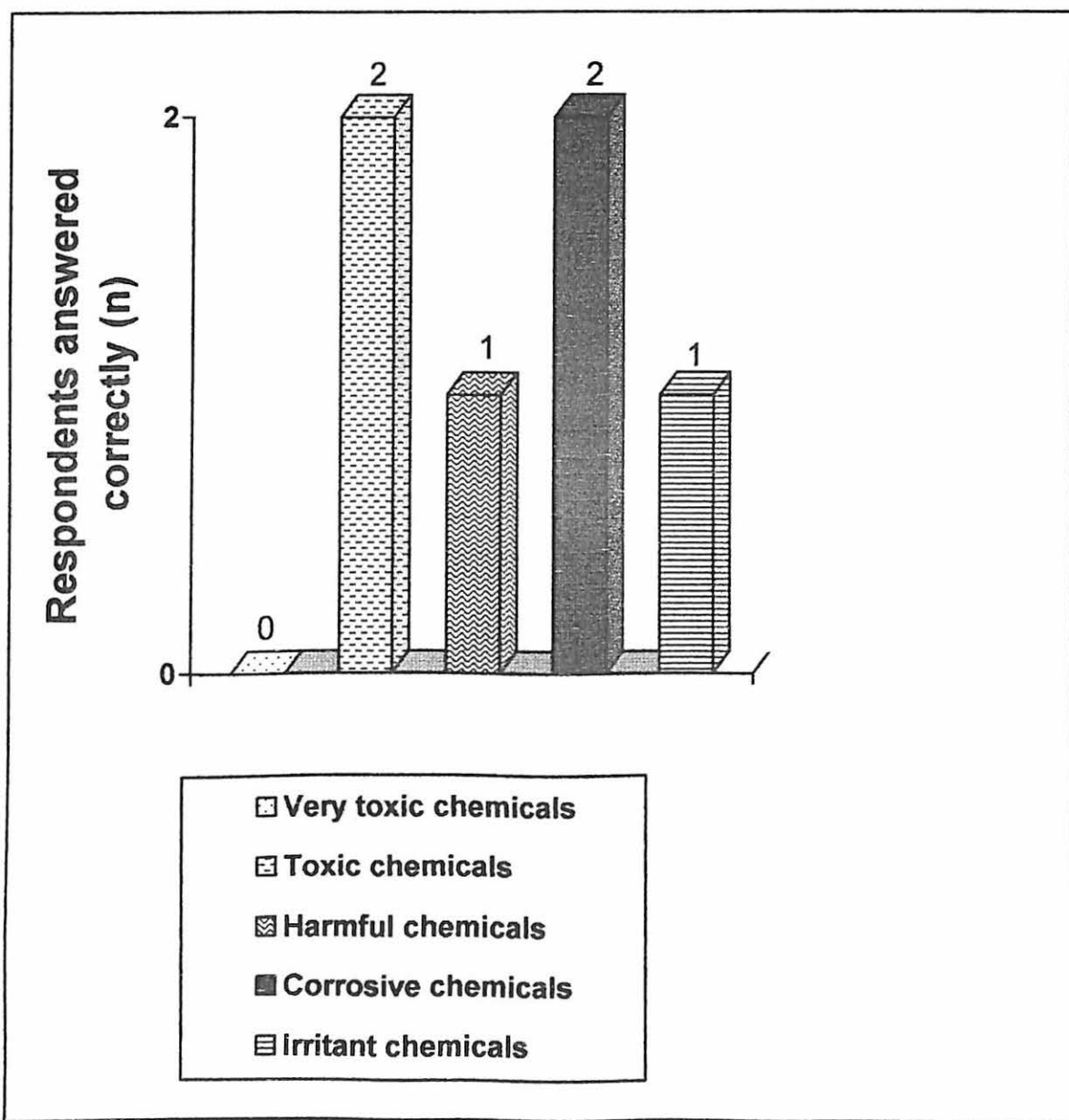


Figure 2: Knowledge on classification of hazardous chemicals (health effect) based on CPL Regulation 1997.

### **4.2.3 Ability to describe the symbols of chemical hazards (physicochemical)**

Identifying the chemical hazards by physicochemical symbols according to CPL regulation 1997, only 2 chemistry teachers can identify the symbols of explosive chemicals and flammable chemicals. None of the participants can answer correctly for extremely flammable chemicals and highly flammable chemicals. For oxidizing chemical there is only one teacher (17%) can identify the symbols.(Figure 3).

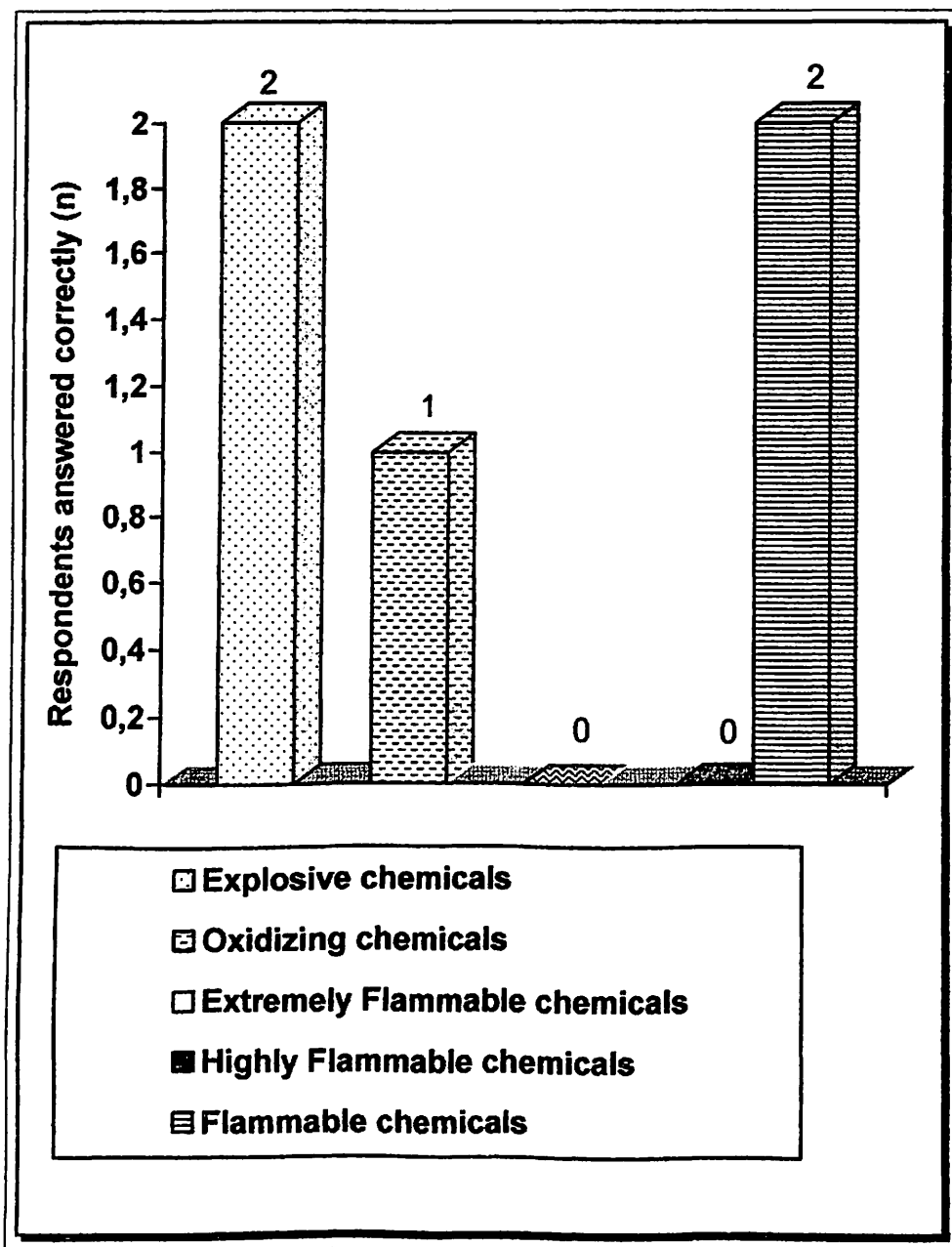


Figure 3: Ability to describe the symbols of chemical hazards (physicochemical) based on CPL Regulations 1997.

#### **4.2.4 Ability to describe the symbols of chemical hazards (health effects)**

None of the respondents can describe the symbols of very toxic chemicals and harmful chemicals. However, 5 teachers (83%) can response correctly for toxic chemicals. For corrosive chemicals, 3 response correctly (50%) and 2 answers correctly (33%) according to the scheme.(Figure 4).

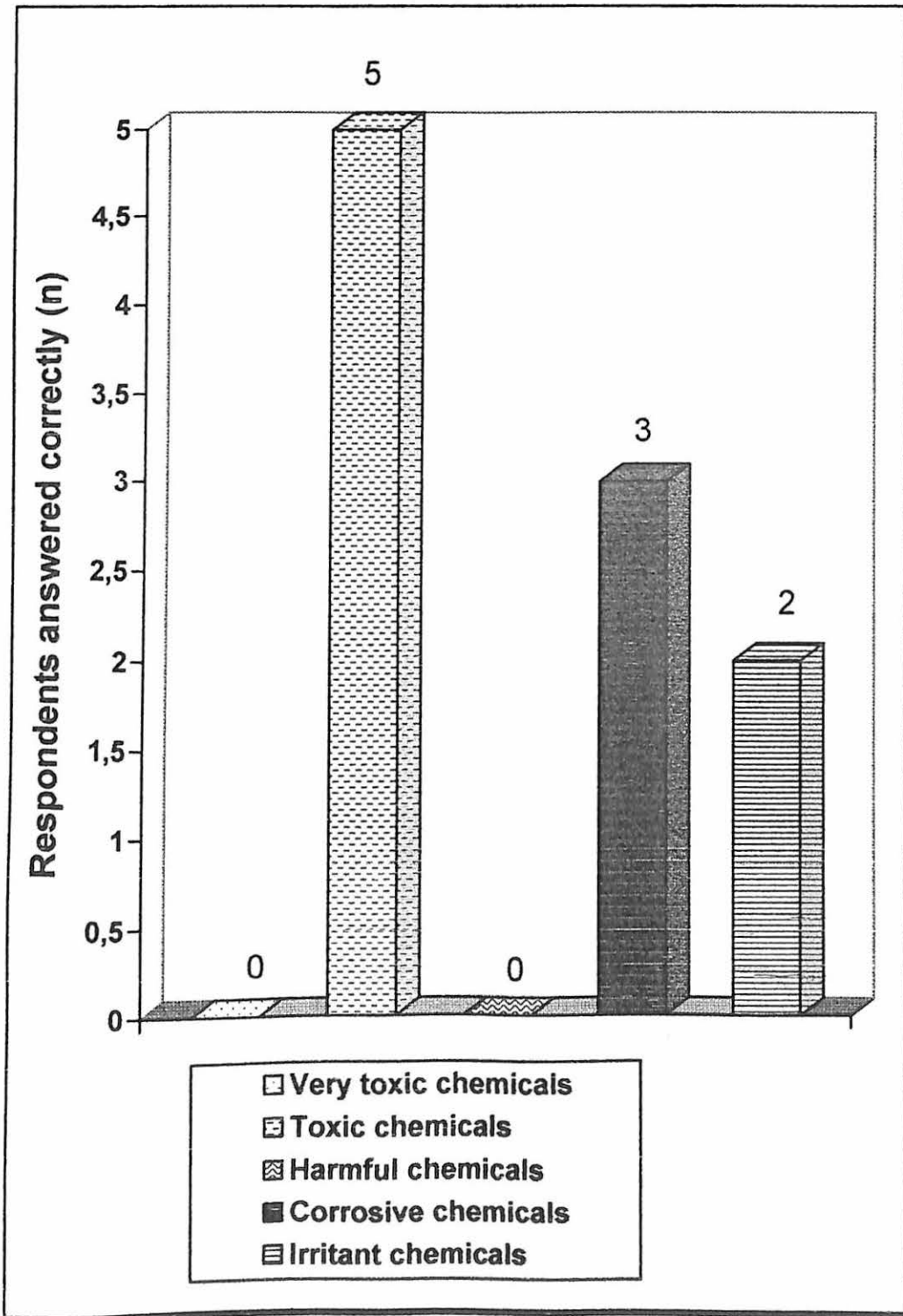


Figure 4: Able to describe the symbols of chemical hazards (health effects) base on CPL Regulation 1997.

### **4.3 Practice in using CSDS/MSDS**

In this section none of the chemistry teachers knows about CSDS/MSDS. There are no evidence of the CSDS kept in the laboratory.

## CHAPTER 5

### Discussion

This study shows that most of the chemistry teachers were graduated more than fifteen years back and none of them went for specific training on safety management since they are working as a chemistry teacher. Cohen (1987) emphasized that prevention of the unwanted incidence in laboratory depends on accurate knowledge of the occupational background of the worker or teacher and an effort to modify or change the causal factors such as injuries or occupational accidents. Therefore, it is important for the teachers to have an access to up to date knowledge and right to know laws such as OSHA 1994 and CPL regulation 1997 and accurate usage on how to handle chemicals in order to avoid exposure including among the schoolchildren.

Koch (2001) emphasized that the critical factors in the management of chemical hazards accidents are knowledge of hazards present in different fields, knowledge of suitable protection and awareness of CSDS. Holnes and Nethercott (1991) raised the possibility that further efforts directed at the end users for chemistry teachers as in this survey, such as training, seminar and courses on safety might improve the outcome of awareness among them. Lack of awareness in potential health hazards may contribute towards a more tolerant attitude towards exposure to hazards on health effects.

## **CHAPTER 6**

### **Conclusion**

Within the limitations of this study and to the extent to which the data and findings were valid and reliable even though the sample size is small which only covers Kubang Kerian schools population. The need to have indicators that relatively reliable explain the level of safety and health in workplace and in particularly, in chemistry laboratory in schools is widely recognized to be used. Statistics on occupational accidents and diseases answer only a few questions and even more importantly, these are often inadequate or non-existing especially in schools. A similar situation is common in many if not most countries in the world reducing the outputs of development programs in order to improve working conditions and environment including chemical safety.(Takala,1996).



## **CHAPTER 7**

### **Recommendation**

From the information in the survey, some improvement can be made by conducting training on safety management, provision of CSDS by centered organization according to the chemistry syllabus in secondary schools, and transfer of knowledge and up to date information by the authorities. Considerable measures, as mentioned above, must be taken to make the best use of the CSDS system in order to secure the safety of schools laboratory.

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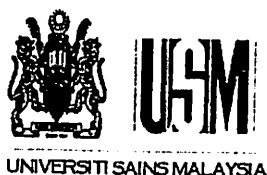
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## **PUSAT PENGAJIAN SAINS KESIHATAN**

**KAMPUS KESIHATAN  
UNIVERSITI SAINS MALAYSIA**

### **PROTOKOL TEMURAMAH PROJEK PENYELIDIKAN PELAJAR TAHUN AKHIR PROGRAM BIOPERUBATAN**

Tajuk:

Satu tinjauan temuramah: Pengetahuan Berkenaan CSDS  
Di Kalangan Guru Kimia  
Di Sekolah Menengah di Kota Bharu, Kelantan.

*Title:*

*An Interview Survey: Knowledge On CSDS  
Among Chemistry Teachers  
At Secondary Schools In Kota Bharu, Kelantan.*

Dokumen ini dibahagi kepada:

Bahagian A (BORANG MAKLUMAT DAN KEIZINAN PESERTA KAJIAN)

dan

Bahagian B (SOALAN TEMURAMAH).

SIDANG AKADEMIK 2005/2006

## BAHAGIAN A: BORANG MAKLUMAT DAN KEIZINAN PESERTA KAJIAN

**Penyertaan Dalam Kajian**

Tuan/Puan dipelawa untuk menyertai kajian ini secara sukarela. Tuan/Puan perlu membaca dan memahami borang ini sebelum bersetuju untuk menyertai kajian ini. Borang ini menerangkan tajuk, pengenalan, tujuan, kaedah, kelayakan penyertaan, keizinan, manfaat, risiko, bayaran dan kerahsiaan kajian ini. Tuan/Puan berhak menarik diri daripada kajian ini pada bila-bila masa tanpa sebarang impak negatif. Penyertaan dalam kajian ini tidak akan mendatangkan apa-apa kemudaratannya kepada perkhidmatan tuan/puan. Sekiranya bersetuju menyertai kajian ini, tuan/puan akan menerima satu salinan borang ini untuk simpanan peribadi. Penggunaan sebarang kandungan borang ini tertakluk kepada hakmilik harta intelektual.

**Tajuk Kajian**

Satu tinjauan temuramah: Pengetahuan Berkenaan CSDS Di Kalangan Guru Kimia Di Sekolah Menengah di Kota Bharu, Kelantan.

*An Interview Survey: Knowledge On CSDS Among Chemistry Teachers At Secondary Schools In Kota Bharu, Kelantan.*

**Pengenalan**

Keselamatan makmal sains di sekolah adalah satu aspek penting yang perlu diberi perhatian oleh pengurusan sekolah terutamanya guru kimia yang mengajar para pelajar menjalankan eksperimen. Risiko kecederaan di makmal adalah tinggi sekiranya melibatkan penggunaan bahan kimia berbahaya oleh para pelajar semasa kelas amali. Oleh itu, maklumat berhubung pengendalian secara selamat kimia berbahaya adalah penting. Maklumat tersebut terkandung dalam dokumen yang dinamakan sebagai Lembaran Data Keselamatan Kimia dan lebih dikenali sebagai CSDS (*Chemical Safety Data Sheet*)

Kesemua 32 buah sekolah menengah di Kota Bharu yang menawarkan aliran sains telah kenalpasti untuk kajian ini. Guru Kimia yang paling kanan di setiap sekolah tersebut akan dipilih untuk ditemuramah.

**Tujuan**

Persoalannya yang ingin dikaji adalah berkenaan kecukupan pengetahuan mengenai CSDS di kalangan guru kimia sekolah bagi membolehkan mereka melaksanakan tugas mencegah kemalangan kimia di makmal. Sekiranya tidak memadai, apakah bentuk latihan yang perlu disediakan oleh Kementerian Pelajaran Malaysia. Input tersebut juga dapat digunakan untuk mengenalpasti sumbangan teknikal yang dapat disalurkan oleh pihak Kampus Kesihatan, Universiti Sains Malaysia kepada sekolah terbabit.

Kajian ini bukan bertujuan mencari kelemahan staf, sekolah ataupun pihak kementerian. Sebaliknya bertujuan membantu pihak kementerian mengenalpasti keperluan latihan (*training needs analysis*) daripada aspek dokumen CSDS di makmal sekolah. Proses ini adalah sebahagian daripada keperluan klausa 6.2 piawaian ISO9001:2000. Maklumat yang bakal diperolehi akan dikongsi bersama dengan pihak kementerian bagi tujuan tersebut. Namun begitu, nama dan maklumat peribadi akan dirahsiakan bagi menjaga kepentingan tuan/puan.

**Kaedah**

Temuramah bersemuka di dalam bilik atau ruang tertutup dengan menggunakan soalan yang telah ditetapkan. Soalan tersebut disenaraikan pada bahagian B. Setiap temuramah dijangka mengambil masa 60 minit.

## **Nama Penemuramah/Penyelidik**

Saudara Abdul Basir Bin Haji Ahmad dan saudara Muhammad Rusydi Bin Abdul Rahman. Mereka adalah pelajar tahun akhir di Pusat Pengajian Sains Kesihatan, Kampus Kesihatan, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan.

## **Kelayakan Penyertaan**

Penemuramah akan menerangkan kepada tuan/puan kelayakan untuk menyertai kajian ini. Tuan/puan layak menyertai kajian ini sekiranya bertugas sebagai guru kimia yang paling kanan di sekolah berkenaan.

## **Keizinan Menjalankan Kajian**

Kesesuaian kajian daripada segi etika dinilai terlebih dahulu oleh Jawatankuasa Etika di Kampus Kesihatan, Universiti Sains Malaysia. Selepas itu kebenaran membuat kajian di sekolah dimajukan kepada Ketua Pengarah, Bahagian Perancangan Penyelidikan dan Dasar Penyelidikan, Kementerian Pelajaran Malaysia. Sebaik saja memperolehi izin pihak kementerian, Pejabat Pelajaran Daerah Kota Bharu dihubungi bagi memaklumi pengetua sekolah menengah yang terlibat. Akhir sekali, izin daripada guru kimia akan diperolehi sebelum mereka ditemuramah.

## **Manfaat**

Sebagaimana yang telah dijelaskan pada bahagian tujuan, hasil kajian ini dijangka dapat:

1. Memberi input kepada pihak Kementerian Pelajaran bagi mengenalpasti keperluan latihan untuk guru kimia di sekolah.
2. Meningkatkan kesedaran di kalangan guru kimia yang ditemuramah berkenaan kepentingan CSDS dalam cara selamat mengendalikan kimia berbahaya.
3. Membuka peluang kepada para guru kimia di sekolah untuk mengikuti latihan tambahan dalam bidang keselamatan makmal.

## **Risiko**

Setakat pengetahuan kami, kajian ini tidak membawa sebarang risiko kepada tuan/puan.

## **Ganjaran**

Tuan/puan yang memberi komitmen dan kerjasama yang baik bagi menjayakan kajian ini akan diberikan sijil penghargaan. Pihak pengkaji tidak menyediakan sebarang bayaran upah dan tiada perlindungan insuran untuk tuan/puan yang menyertai kajian ini.

## **Kerahsiaan**

Maklumat yang tuan/puan berikan akan dirahsiakan oleh penemuramah dan tidak akan dedahkan secara umum melainkan jika ia dikehendaki oleh undang-undang.

Data yang diperolehi daripada kajian ini tidak akan mengenalpasti tuan/puan secara perseorangan apabila dihantar kepada pihak penaja, penyunting, penerbit dan sebagainya.

## **Pertanyaan**

Sekiranya tuan/puan mempunyai sebarang soalan mengenai kajian ini atau hak-hak tuan/puan sebagai peserta kajian, sila hubungi:

1. Encik Jahangir Kamaldin (Penyelia utama kajian ini, telefon: 09-7663967)
2. Puan Rogayah Abd. Rahim (Penyelia bersama kajian ini, telefon: 09-7663841)

**Tandatangan**

Dengan menandatangani borang ini pada halaman ini, tuan/puan bersetuju untuk menyertai kajian ini dan membenarkan data yang diperolehi daripada temuramah tersebut diteliti, dianalisa, disimpan, dilapor dan diterbitkan mengikut keperluan dari masa ke semasa.

<b>TANDATANGAN PERSETUJUAN</b>
--------------------------------

**Tajuk Kajian:**

Satu tinjauan temuramah: Pengetahuan Berkenaan CSDS Di Kalangan Guru Kimia Di Sekolah Menengah di Kota Bharu, Kelantan.

**Perakuan Persetujuan:**

Dengan ini saya mengesahkan bahawasanya:

- Saya telah membaca semua maklumat pada Borang Maklumat dan Keizinan Peserta Kajian.
- Saya telahpun diberi masa yang mencukupi untuk mempertimbangkan maklumat tersebut.
- Semua pertanyaan saya telah dijawab dengan memuaskan.
- Saya secara sukarela bersetuju menyertai kajian penyelidikan ini.
- Saya bersedia untuk berkerjasama dan mematuhi arahan kajian.
- Saya akan memberi maklumat yang diminta oleh penemuramah/penyelidik.
- Saya boleh menamatkan penyertaan saya dalam kajian ini secara beretika pada bila-bila masa.
- Saya telahpun menerima satu salinan Borang Maklumat dan Keizinan Peserta Kajian untuk simpanan peribadi.

Nama Penuh Tuan/Puan:	Tarikh (HH/BB/TT):
No. Kad Pengenalan (baru):	No. Telefon:
Jawatan:	Alamat Sekolah:
Tandatangan:	Cop (sekiranya ada):

---tamat bahagian A---



## BAHAGIAN B: SOALAN TEMURAMAH (kegunaan penemuramah sahaja)

Soalan disediakan dalam bahasa inggeris. Walaubagaimanapun, temuramah boleh dijalankan dalam bahasa inggeris atau bahasa melayu atau campuran mengikut pilihan peserta.

**Section I: Background .**

1) Gender:			Male	Female		
2) Highest Education	PhD	Year:	Specify field:			
	Masters	Year:	Specify field:			
	Degree	Year:	Specify field:			
	Diploma	Year:	Specify field:			
	STPM	Year:	Specify field:			
	SPM	Year:	Specify field:			
	Others	Year:	Specify qualification:			
3) Place of Education	PhD	Name & place of institution:				
	Masters	Name & place of institution:				
	Degree	Name & place of institution:				
	Diploma	Name & place of institution:				
	STPM	Name & place of institution:				
	SPM	Name & place of institution:				
	Others	Name & place of institution:				
4) Training specific to safety	<b>Course/Workshop/Seminar/etc</b>	<b>Year</b>	<b>Days</b>	<b>Organizer</b>		
5) Working Experience (years)		0	1 - 2	3 - 5	6 - 10	> 10
6) Teaching Science (years)		0	1 - 2	3 - 5	6 - 10	> 10
7) Teaching Chemistry (years)		0	1 - 2	3 - 5	6 - 10	> 10
8) Favorite TV Program:						
9) Favorite Newspaper Column:						
10) Worst lab incidence:						

**Section II: Knowledge in chemical hazards**

1) Is chemical hazardous?		Yes	No		
2) Why hazardous?					
3) Classification of hazardous chemicals?					
<i>Physicochemical:</i>	Explosive	Oxidizing	Extremely Flammable	Highly Flammable	Flammable
<i>Health effects:</i>	Very Toxic	Toxic	Harmful	Corrosive	Irritant
4) How to identify the chemicals hazards?					
<i>Physicochemical Symbols:</i>	Explosive	Oxidizing	Extremely Flammable	Highly Flammable	Flammable
<i>Health effects Symbols:</i>	Very Toxic	Toxic	Harmful	Corrosive	Irritant
5) Where to get information on how to handle hazardous chemicals?				Knows MSDS/CSDS	Does Not Know MSDS/CSDS

**Section III: Practice in using CSDS/MSDS**

1) What is CSDS/MSDS?		
2) Who provides CSDS?	Correctly answered: manufacturer	Incorrect answer
3) Is it compulsory to make available CSDS?	Correctly answered: Yes	Incorrect answer
4) Does your lab keeps CSDS?	Yes	No
5) Could you show us the CSDS?	Yes, there is	No, none
6) Have you read any of the CSDS?	Yes	No
7) Number of sections in the CSDS?	Correctly answered: 15 or 16 sections	Incorrect answer
8) Which section in the CSDS tells us about the hazards of a chemical?	Correctly answered: Section 3	Incorrect answer
9) Section 4 in the CSDS tells us about?	Correctly answered: First Aid	Incorrect answer
10) Section 7 in the CSDS informs us on?	Correctly answered: Safe Handling & Storage	Incorrect answer

---tamat bahagian B---



BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN  
KEMENTERIAN PELAJARAN MALAYSIA  
ARAS 1-4, BLOK E8  
KOMPLEKS KERAJAAN PARCEL E  
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN  
62604 PUTRAJAYA

Telefon : 03-88846000  
Faks : 03-88846439  
Laman Web : <http://161.142.144.5>

**Rujukan Kami : KP(BPPDP) 603/5 Jld.10 (671)**  
**Tarikh : 27 Oktober 2005**

En. Jahangir Bin Kamaldin  
Pusat Pengajian Sains Kesihatan  
Kampus Kesihatan, Universiti Sains Malaysia  
16150 Kubang Krian  
Kelantan

Tuan/Puan,

***Kebenaran Untuk Menjalankan Kajian Di Sekolah, Maktab Perguruan, Jabatan Pelajaran Negeri Dan Bahagian-Bahagian Di Bawah Kementerian Pelajaran Malaysia***

Adalah saya dengan hormatnya diarah memaklumkan bahawa permohonan tuan/puan untuk menjalankan kajian bertajuk :

1. " **Pengetahuan Berkenaan CSDS Di Kalangan Guru Kimia Di Sekolah Menengah Di Kota Bharu, Kelantan** "
2. " **Pengetahuan Bahaya Kimia Di Kalangan Staf Makmal Sains Di Sekolah Menengah Di Kota Bharu, Kelantan.** " diluluskan.

2. Kelulusan ini adalah berdasarkan kepada cadangan penyelidikan dan instrumen kajian yang tuan/puan kemukakan ke Bahagian ini. **Kebenaran bagi menggunakan sampel kajian perlu diperolehi dari Ketua Bahagian/Pengarah Pelajaran Negeri yang berkenaan.**

3. Sila tuan/puan kemukakan ke Bahagian ini senaskah laporan akhir kajian setelah selesai kelak. Sayugia dimaklumkan tuan/puan hendaklah **mendapat kebenaran terlebih dahulu** daripada Bahagian ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak dibentangkan di mana-mana forum atau seminar atau untuk diumumkan kepada media massa.

Sekian untuk makluman dan tindakan tuan/puan selanjutnya. Terima Kasih.

**"BERKHIDMAT UNTUK NEGARA"**

Saya yang menurut perintah,

**(DR. AMIR BIN SALLEH @ MOHD SALEH)**  
Timbalan Pengarah, Sektor Penyelidikan Dasar  
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan  
Kementerian Pelajaran Malaysia



57/11/05(4PP)



**PUSAT PENGAJIAN SAINS KESIHATAN**  
SCHOOL OF HEALTH SCIENCES

Kepada:

Tuan Hj. Ismail bin Mohd Noor  
Pengarah Pelajaran Negeri Kelantan  
Jabatan Pelajaran Negeri Kelantan  
Jalan Doktor  
15000 Kota Bharu, Kelantan



Rujukan Kami:

USMKK/PPSK/JBK/05(5)

Tarikh:

16hb November 2005

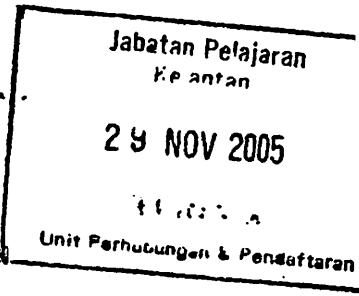
Melalui:

Profesor Dr. Zainul F. Zainuddin  
Dekan  
Pusat Pengajian Sains Kesihatan  
Kampus Kesihatan  
Universiti Sains Malaysia  
16150 Kubang Kerian, Kelantan

*Brooking apanggih*

*[Signature]*  
**PROFESOR ZAINUL F. ZAINUDDIN**

Dekan  
Pusat Pengajian Sains Kesihatan  
Universiti Sains Malaysia  
Kampus Kesihatan  
16150 Kubang Kerian  
Kelantan



Tuan/Puan,

Memohon Kebenaran Menggunakan Sampel Kajian Di Sekolah Menengah (Aliran Sains) Di Kota Bharu, Kelantan

Dengan segala hormatnya merujuk kepada perkara di atas .

2. Sukacita memaklumkan tuan bahawa Pusat Pengajian Sains Kesihatan sedang giat menjalankan kajian dalam bidang Keselamatan & Kesihatan Pekerjaan selaras dengan pelaksanaan Akta 514: Keselamatan & Kesihatan Pekerjaan. Sehubungan dengan itu, kami berhasrat menjalankan dua kajian jangka pendek untuk menilai tahap pengetahuan tenaga pengajar dan kakitangan makmal sains di semua sekolah menengah di Kota Bharu, Kelantan daripada aspek keselamatan kimia di makmal.
3. Kajian tersebut akan menyediakan input yang penting kepada kami dan Kementerian Pelajaran Malaysia khususnya dalam merangka program pembangunan sumber manusia untuk mempertingkatkan keselamatan kimia di sekolah menengah. Input tersebut adalah sebahagian daripada keperluan sistem pengurusan kualiti ISO9001:2000.
4. Untuk makluman tuan, Bahagian Perancangan & Penyelidikan Dasar Pendidikan, Kementerian Pelajaran Malaysia telah meluluskan permohonan ini. Bersama ini dilampirkan salinan surat kelulusan tersebut. Pertimbangan dan kerjasama tuan ke atas permohonan ini amat kami hargai.

Sekian, terima kasih.

“BERKHIDMAT UNTUK NEGARA”

Saya yang menjalankan tugas,

*[Signature]*

**JAHANGIR BIN KAMALDIN**  
Pensyarah  
Pengurusan Makmal (Kualiti & Keselamatan)

*Ku Perhubungan*

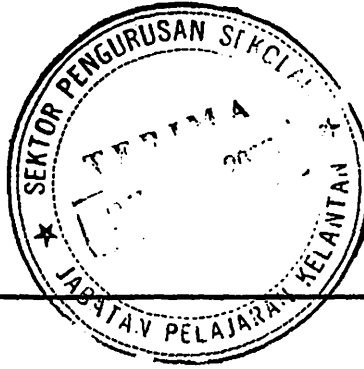
*[Signature]*

**HAJI ISMAIL BIN MD, NOOR A.M.N., A.S.K.**  
Ketua Sektor  
Sektor Pengurusan Sekolah  
Jabatan Pelajaran Kelantan

30/11/05

58/11/05 (UPP)

Abdul Basir bin Haji Ahmad  
Pusat Pengajian Sains Kesihatan  
Kampus Kesihatan  
Universiti Sains Malaysia  
16150 Kubang Kerian, Kelantan



Tuan Hj. Ismail bin Mohd Noor  
Pengarah Pelajaran Negeri Kelantan  
Jabatan Pelajaran Negeri Kelantan  
Jalan Doktor  
15000 Kota Bharu, Kelantan

27 November 2005

Tuan,

**Memohon Kebenaran Menggunakan Sampel Kajian Di Sekolah Menengah (Aliran Sains) Di Kota Bharu, Kelantan**

Adalah dengan hormatnya merujuk perkara di atas.

2. Sukacita memaklumkan tuan bahawa saya berhasrat menjalankan satu kajian jangka pendek untuk menilai tahap pengetahuan kakitangan makmal sains di semua sekolah menengah di Kota Bharu, Kelantan daripada aspek keselamatan kimia di makmal. Berikut adalah nama tajuk penyelidikan tersebut:-

Pengetahuan Berkenaan CSDS Di Kalangan Guru Kimia Di Sekolah Menengah Di Kota Bharu, Kelantan

Penyelidik: Abdul Basir bin Haji Ahmad (700429-07-5249)  
Tempoh kajian: 2 bulan (Jan - Feb 2006).

3. Senarai sekolah-sekolah yang terlibat dalam kajian tersebut disertakan seperti di lampiran.

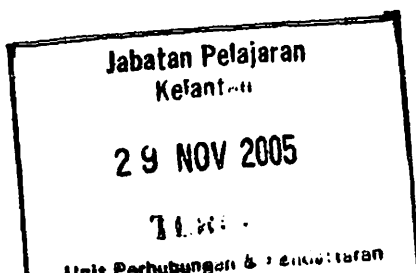
Sekian terima kasih.

Yang benar,

ABDUL BASIR BIN HAJI AHMAD  
Bioperubatan Tahun 3  
Pusat Pengajian Sains Kesihatan  
Universiti Sains Malaysia

Ker Perhubungan

HAJI ISMAIL BIN MD. NOOR A.M.N. A.S.K.  
Kerua Sektor  
Sektor Pengurusan Sekolah  
Jabatan Pelajaran Kelantan.





جایتن فلاجرز کلنت  
 JABATAN PELAJARAN KELANTAN  
 JALAN DOKTOR  
 15000 KOTA BHARU  
 KELANTAN DARUL NAIM  
 TELEFON PEGARAH: 09-7418001  
 FAKS: 09-7482554



PEJABAT AM: 09-7418000/7418020/7418080/7418090

Ruj. Kami: PPKn.(UPP)5048/15/Jld. 22( 135  
 Tarikh : 30.11.2005

En. Jahangir b. Kamaldin  
 .....Pusat Pengajian Sains Kesihatan  
 Kampus Kesihatan  
 .....Universiti Sains Malaysia.....  
 16150 Kubang Kerian  
 .....Kelantan.....

(Up. Abdul Basir b. Haji Ahmad)  
 Tuan/Puan,

**KEBENARAN BAGI MENJALANKAN KAJIAN/PENYELIDIKAN  
 KE SEKOLAH-SEKOLAH DI NEGERI KELANTAN**

Surat permohonan tuan/puan bertarikh 27.11.2005 adalah dirujuk.

2. Surat kebenaran dari Pengarah Bahagian Perancangan & Penyelidikan Dasar Pendidikan, Kementerian Pelajaran Malaysia Rujukan : KP(BPPDP) 603/5/Jld. 10 ( 671 ) bertarikh: 27.10.2005 ada kaitan.
3. Adalah saya diarah untuk memaklumkan bahawa Jabatan Pelajaran Kelantan tiada apa-apa halangan bagi tuan/puan menjalankan kajian/penyelidikan seperti tajuk berikut:
  1. Pengetahuan Berkenaan SSDS Di Kalangan Guru Kimia Di Sekolah Menengah Di Kota Bharu, Kelantan.
  2. Pengetahuan Bahaya Kimia Di Kalangan Staf Makmal Sains Di Sekolah Menengah Di Kota Bharu, Kelantan.
4. Kelulusan ini adalah dihadkan berdasarkan kepada tajuk kajian/penyelidikan yang dikemukakan ke jabatan ini bagi tempoh: Januari sehingga Februari 2006.
5. Sekolah-sekolah yang terlibat adalah seperti di Lampiran 'A'
6. Tuan/Puan dinasihatkan supaya terlebih dahulu menemui dan berbincang dengan Pengetua/Guru Besar sekolah-sekolah berkenaan sebelum kajian / penyelidikan dijalankan.

Sekian, terima kasih.

**"BERKHIDMAT UNTUK NEGARA"**

Saya yang menurut perintah

**MOHD. ADNAN B. HASSAN NORDIN**  
 Penolong Pendaftar Sekolah Dan Guru  
 b.p. Ketua Pendaftar Sekolah Dan Guru  
 Kementerian Pelajaran Malaysia.

s.k.

i. Pengarah, Bahagian Perancangan & Penyelidikan  
 Kementerian Pelajaran Malaysia.

ii. Pegawai Pelajaran Daerah :



iii. Pengetua / Guru Besar  
 Lampiran A