THE STUDY OF WARNING SYMBOL FOR MILD ALLERGY CAUSED BY PARACETAMOL

Nor Aziyana Binti Abd Rahman[1] and **Azhar Abd Jamil**[2]
Universiti Selangor, MALAYSIA, azie@unisel.edu.my
Universiti Teknologi Mara, MALAYSIA, zhrjamil@gmail.com

ABSTRACT

The purpose of this paper is to discover the challenges of designing allergy symbol in visual form using pictograms and symbol rather than text. It is also to create effective sign using pictograms and symbol that would immediately warn the patients about the risk and taking immediate action if the reaction occurs. Data input were collected from the interviews, analysis of auxiliary labels and close-ended questions survey that were answered by the public to interpret the meaning of allergy symbol created based on the data of paracetamol symptom provided by the National Pharmaceutical Bureau. This paper created an allergy sign that is suitable to address the adverse reaction caused by paracetamol and developed a few paracetamol legend using pictograms and symbol to provide sufficient warning communication. The limitation of this research is to design and evaluates the allergy symbol of paracetamol as a warning sign. Perhaps, this paper would also help to build the collaborative effort among pharmacovigilance and graphic designers to effectively deliver medical care information.

Keywords: Warning Symbols, Pictograms, Adverse Drug Reaction, Mild Allergy, Paracetamol

INTRODUCTION

Having good health is a blessing. Everyone crave good healthy body and trying to keep away from any disease. But the problems caused by pollution, the spread of diseases, weather, poisoning and chemical reactions such as the active ingredient to be the main factor of an immune impairment leading to health disorders that require medication and treatment.

Pharmacovigilance and consumers should have a good relationship to ensure the channels of information about health and medicine are properly obtained. As health care providers serve different users backgrounds, they must have an ability to communicate information pertaining to drugs either verbally or in writing. Professionals such as doctors and pharmacists have more understanding of related drugs compared with the consumers understanding. Providing effective communication between pharmacovigilance and collaboration with graphic designers to the patients regarding pharmaceutical care is the key in promoting compliance and ensuring positive patient health outcomes.

PROBLEM STATEMENTS

There is no effective warning such as pictorial symbol to deliver the message of allergy reaction occur by paracetamol on the box. Paracetamol side effect only stated in the package insert in text form but not onto the box. Based on the survey done by providing questionnaire to the random respondent, 60% of them taking the paracetamol liquid without package insert that usually stated the drugs information. Occasionally prescriber giving the medicine with label attached on the bottle together with the plastic bag. While 70% of respondent said that they were not given package insert during taking paracetamol capsule.

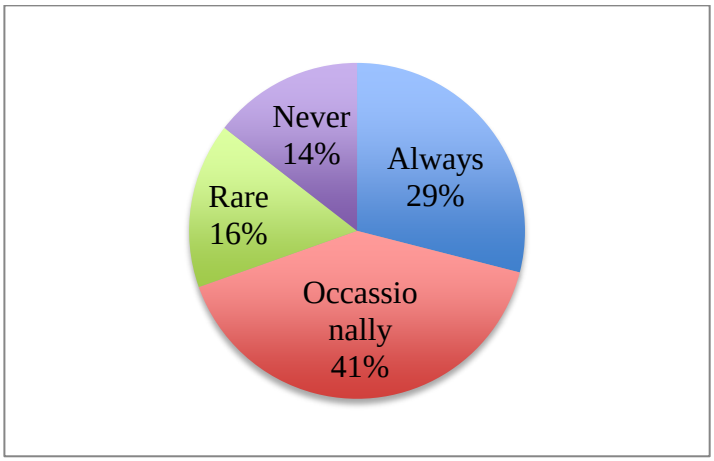


Chart 1: Possibility of Patients to Read Medicine Information stated on medicine box, package insert, label and capsule envelope

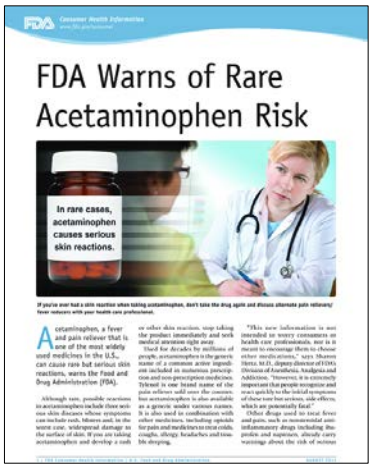
In Chart 1, 41% of the respondent occasionally read the medicine information that is stated on medicine box, package insert, label and capsule envelope. 29% of them reported that they always read the medicine information that is stated on medicine box, package insert, label and capsule envelope. 16% reported that they rarely read the information and only 14% said they never read the medicine information that is stated on medicine box, package insert, label and capsule envelope.

LITERATURE REVIEWS

Acetaminophen / Paracetamol Risk

Figure 1, a recent FDA report (FDA Consumer Health Information, 2008) discover acetaminophen most widely used in the U.S, can cause rare but serious skin reaction. FDA mentioned this seriously and they were looked although acetaminophen reaction is a rare case, but it causes serious skin reactions. There are three serious skin reactions whose symptoms included rash, blister and worst case may damage the surface of skin. Based on that, FDA mentioned that warning about these skin reactions should be added to the labels of all prescription medicines containing acetaminophen especially for OTC medicines.

A proactive action taken by FDA when the word “acetaminophen” suggested appears on the front of package and the word of “active ingredients” was suggested applied on drug facts labels for OTC medicine. For prescription medications, FDA suggested that label should tell the ingredient or using shortened version such as “APAP,” “acet,” “acetamin” or “acetaminoph.”


FDA Warns of Rare Acetaminophen Risk

In rare cases, acetaminophen causes serious skin reactions.

Figure 1: Article Regarding Acetaminophen Risk by FDA

FDA Box Warning

The need guidelines for drug safety communication, (U.S. Department of Health and Human Services, 2011) was prepared a Guidance For Industry regarding warnings and precautions, contraindications, and box warning section of labelling for human prescription drug and biological products. In that guidance highlight drug products or drug that contribute for serious adverse reaction should used “box warning” on their packaging and labelling.

Boxed warning referred to as “black box” warning that been issued by U.S.FDA and it is comply to be used for drug labelling of a prescription drug that associated with serious adverse reaction. The black box warning formatted with black border around the text.


Methylparaben 0.1% w/v as preservative.

This preparation contains PARACETAMOL. Do not take any other PARACETAMOL containing medicines at the same time.

Please refer to enclosed package insert for more information.
Store below 30°C. Protect from light.

MAL19911435X
SIN 10854P
MYN R1204A5414
HK- 47844
VN-9067-09

CONTRAINDICATION:
Contraindicated in patients with nephropathy.

PRECAUTIONS:
It should be given with care to patients with impaired kidney or liver functions. Chronic use should be avoided.

THIS PREPARATION CONTAINS PARACETAMOL. DO NOT TAKE ANY OTHER PARACETAMOL CONTAINING MEDICINES AT THE SAME TIME.

SIDE EFFECTS:
Skin rash and other allergic reactions occur occasionally.

DRUG INTERACTION:
The prothrombinopenic effect of the oral anticoagulants may be increased by chronic administration of full doses of paracetamol.

OVERDOSAGE & TREATMENT :
In non-fatal cases, the hepatic lesions are reversible over a period of weeks or months. Measurement of the plasma half-life of paracetamol during the first day of acute poisoning provides an early indication of the severity of the liver injury. Hepatic necrosis

Figure 2: Black Box Warning Applied On Prescription Drug

Figure 2 showed box warning applied on labelling and leaflet for paracetamol drug. It is used to warn active ingredient used for medicine preparation. Some cases it is used to warn patients who is allergic to paracetamol.

Pharmaceutical Pictograms

Referring to a study conducted by (Mansoor LE & R Dowsee 2012,) at Rhodes University, Faculty of Pharmacy in South Africa, United State of Pharmacopoeial Convention (USPC) identifying, pictogram applied on pharmaceuticals as a standard graphics help reassure consumers on the proper way to use the medicine, drugs measures to maintain the right conditions, as well as warnings about the side effects of a medication. A comprehensive set of pharmaceutical pictograms first appeared in the United State Pharmacopoeia Dispensing Information (USP-DI, 2000) however founded that South African local black with low-literate patients are only poorly comprehend a number of the symbol and concepts used in these pictograms. This problem showed a set of country-specific culturally appropriate material to relay information with the specific population should be used to design the pictograms. The study also shows that the image should be applied into the pharmaceutical symbols must be based on the culture of a community's population, as well as the design concept featuring features easily understandable information. A guideline for medication label that describes the proper way to use drugs already prescribed by FIP Guideline for Good Pharmacy Practice (Tokyo 1993). One of the contents of the guidelines on the medication label touches on aspects of design and readability. According to the information, the labelling should be printed and the instruction using text should be typed. The minimum size of the lettering shall not be less than 2mm, and use a legible font like Arial. Graphic symbols associated with medication instructions should be combined with written instructions.

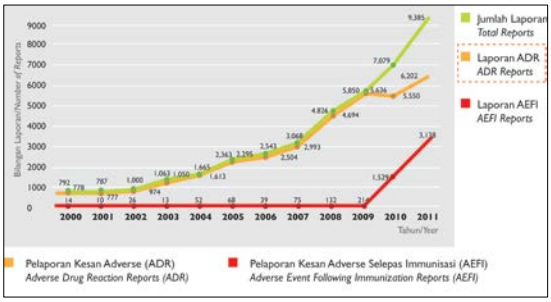
The procedures issued provided by the International Pharmaceutical related Good Pharmacy Practice (Tokyo 1993), highlight the use of medicine in order to comply with rules that set by the FIP Guidelines Prescribes Good labelling of Medicines (GLPM) adopted by all medicine manufacturers for the production of good packaging. Refers to a statement issued by the FIP, one of the guidelines is to emphasis the design and readability of information stated on the packaging. This shows a standard to ensure the labelling designs meet the pharmaceutical standards in accordance with the needs of users. It included the pharmaceutical of labelling design and the use of text to detailing the information.

Regarding (Y.Joshi, P. Kothiyal, 2011) in their recent study regarding pharmaceutical pictograms in a multispeciality Hospital at Dehradun, pictograms in pharmaceutical sector have a potential to improve warning comprehension especially to the patient who has visual or literacy difficulties. They believe pictograms can make patients better recalled and easy to understand the drug instruction. In pharmaceutical, pictograms applied in auxiliary labels on Rx bottle as a method to explain about drug used, drug caution and drug indication. The smaller of pills container was contributed to the wide use of pictograms in medicinal product. It showed that pictograms can be used as other alternative to expand information.

Pictograms also identified to enhance understanding and knowledge for low literacy, to replace written indications and instruction, to express regulatory, warning, mandatory, prohibitory information and caution. People with little education and visual problems also donated to the high usage of pictograms. Recent study regarding use of pictorial aids in medication instruction: A review of the literature (Katz, Kripalani, Barry, 2006) research and psychology and marketing indicate human tended to see picture rather than text. So based on this conclusion, pharmaceutical pictograms have a potential to enhance patient comprehension especially when reading drugs information state on the medicine labelling or leaflet. The use of pictograms in pharmaceutical sector will help to create drug safety communication among healthcare providers and patients.

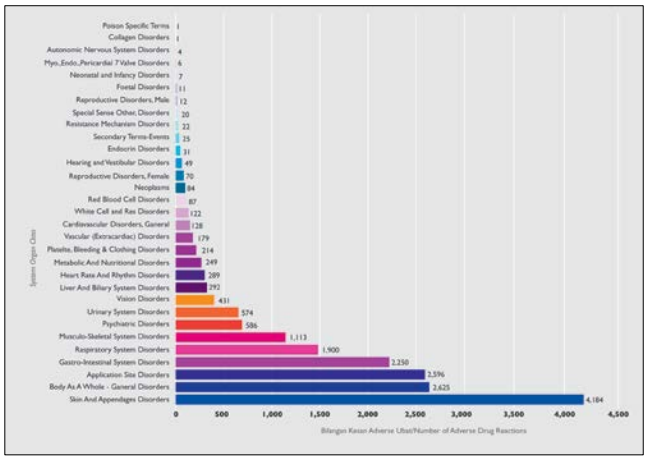
Adverse Drug Reaction Reported In Malaysia

According to the annual report from National Pharmaceutical Control Bureau (NPCB) 2011, in year 2011 showed that a total of 9,385 adverse reaction reports were received which is an increase of 33% from year 2010. A marked was also seen in adverse event following immunization reports (AEFI) reports from the year 2011.

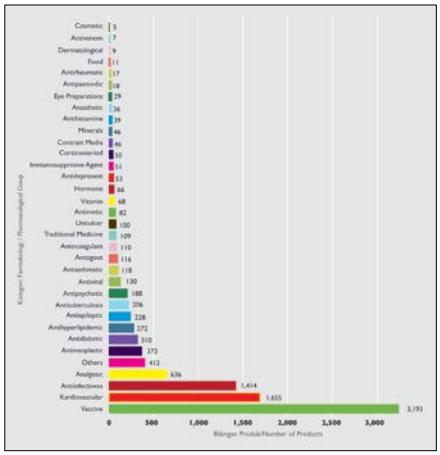


Graph 1: Number of ADR & AEFI Reports (2000-2011)

Based on **Graph 1**, the number of ADR reports slightly increase from year 2010 with number 5,550 and increased with number 6,202 at year 2011. This report shown that the case of adverse drug reaction was critically in Malaysia. Based on the interview held with (Isahak R, 2014) the committee members of Malaysian Adverse Drug Reaction (MADRAC) the number of adverse drug reaction donated many cases such as drug eruption, side effects and allergy that effected the disorder of organ class system as shown in figure 2. In about 31 cases affected the patients internal or external organ class system. Skin And Appendages Disorders showed the highest number of the organ class system affected that lead others with number 4,184 reported in year 2012.



Graph 2: Number of Advers Reactions by System Organ Class (2012)

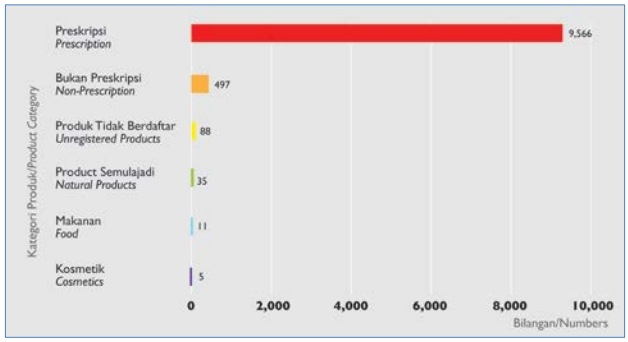


Graph 3: Adverse Reaction Reports by Pharmacological Group (2011)

According to **Graph 2** above, the number of adverse reactions by system organ class (2012) reported Skin and Appendages Disorders contributed to the highest rank with number 4,184 followed by Body as a Whole (General Disorders) with number 2,625 and Application Site Disorders with number 2,596. This graph showed that most of adverse drug reaction affected skin organ class. According to (Rokiah Isahak, 2014) a pharmacovigilance officer at National Pharmaceutical Control Bureau (NPCB), Skin And Appendages Disorders can happened in mile and severe reaction. Mile reaction usually caused by an allergy which is it unpredictable happened. This situation mostly involving with low immune system and most cases patients identified are allergy with the drug given such as allergic to the penicillin or ponstan. Severe reaction is one condition that patient facing with toxicity or long-term drug used.

Based on **Graph 3**, there are 34 adverse reaction reports by pharmacological group in year 2011. The highest pharmacological group donated by vaccine with number 3,193 followed by cardiovascular 1,655, anti infectiveness 1,414 and analgesic 636 number.

According to the interview held with (Rokiah Isahak, 2014) the pharmacovigilance officer at National Pharmaceutical Control Bureau (NPCB), vaccination is only prescribe by the doctors and there is no option provided to prevent adverse from taking vaccination and it is compulsory and followed by cardiovascular and anti infectiveness group of antibiotic. It also showed that antibiotics group is most popular created adverse reaction among patients in Malaysia. Antibiotics are a group of drug that cannot be sold by the pharmacy store and patients only be given the antibiotics prescribed by the doctors. Analgesic is a group of drug for relives painkillers. It have two types of analgesic drug. It includes of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) such as paracetamol, ponstans and others. According to (Rokiah Isahak, 2014) paracetamol and ponstan is constantly used by the patients and public and majority of the consumer will take this medicine for pain reliever. It is different from vaccine, cardiovascular and anti infectiveness group because analgesic drug can be bought at the pharmacy store. Majority of the patient used paracetamol and ponstan to relives pain, flu, fever, headache and migraine.



Graph 4: Number of Adverse Reaction Reports by Product Category 2011

Graph 4 above showed that prescription with number of 9,566 donated for highest adverse reaction followed by non-prescription with 497 rather than other product such as unregistered products, natural products, food and cosmetics. Based on information from the Ministry of Health Malaysia, pharmaceuticals are classified into four sections; which is medicines that containing scheduled poisons, toxins are not scheduled, cosmetics and traditional medicines. In Malaysia there are medicines containing scheduled poison medications that can cause chronic and acute effects. Among the drugs found, paracetamol is a drug that used for painkillers and relives fever. It can be found in paracetamol syrup, tablets and suppository.

Pictograms and Symbol

Nowadays pictograms and symbol played their role in many aspects. It become important in our daily lives when most of it applied in road sign, food and health, pharmaceuticals, poison product and so on. It is used to indicate direction, place, action, information, warning, caution and danger. Pictograms, Icons & Signs (Rayan Abdullah, 2006) in his book mentioned that pictogram is a pictorial representation, Isotype. It is an iconic sign that represents complex fact.

It was designed to convey information and communication not through words or sounds but through visual that carriers of meaning. Common definitions of pictograms are a stylized figurative drawing to indicate an object or to express an idea. Pictogram also is a method to enhance written information. Some people or organization used pictograms to express and highlight certain point that become important. In road sign cases, pictograms used to tell about what drivers should avoid and not to do without using explanation of text. Based on the document of Guideline on the packaging information of medicinal products for human use authorized by the community (2008), optional information under Article 62 of Directive 2001/83/EC/ symbol or pictograms is useful for health education is necessary.

Warning Sign

There were 3 types of warning sign stated on **Figure 3** such as diamond shaped with yellow background and black border, triangular with red border and white background and triangular with red border and yellow background. There were few countries using diamond shaped with yellow background and black border such as China. 3 countries such as New Zealand, Ireland, Japan, Chile, Canada, Indonesia, India, Thailand, Australia, United Kingdom and South Africa. Besides that, there were 7 countries identified used triangular with red border and yellow background such as Bosnia Herzegovina, Serbia, Finland, Greece, Iceland, Republic of Macedonia and Poland.

Figure 3: Type of Warning Sign

METHODOLOGY

Visual Data Analysis

In this case study, the methodology used is qualitative method such as collecting images of pharmaceutical symbols between Europe and Japan and collecting packaging, label and package insert of paracetamol medicine. Analyzing the European auxiliary label is a method to gather information regarding the colours used, proportion of visual, and the size of text placed on the label.

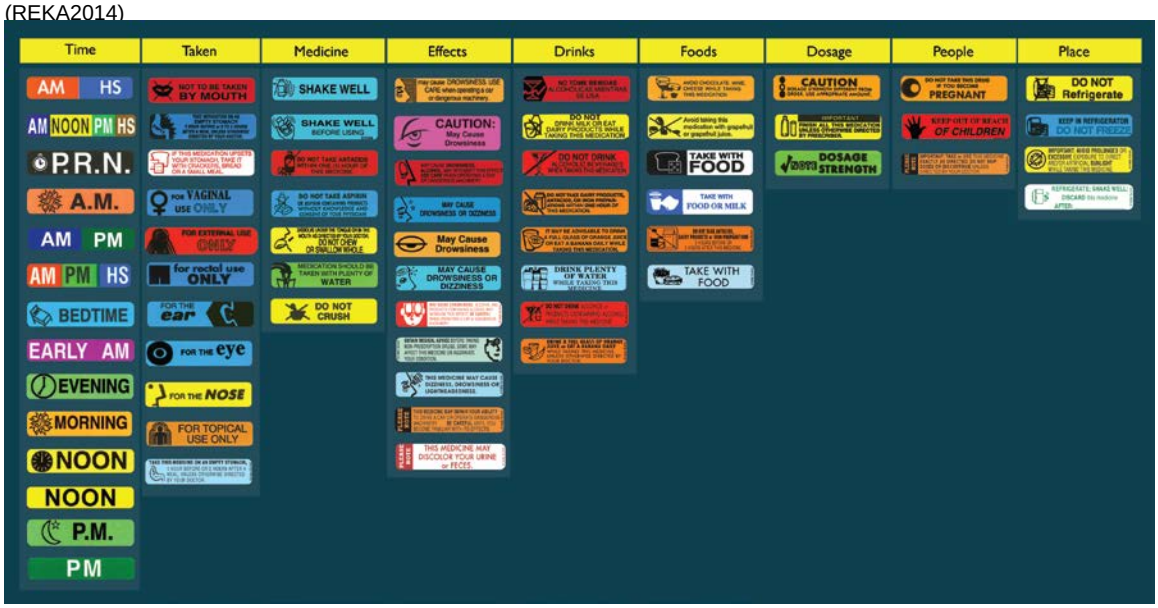


Figure 4: Europe Auxiliary Labels

Figure 4 shows that there are nine categories were identified on the European auxiliary labels when prescribing medicine to the patients using Rx bottle such as time taken, how to take the medicine, the thing should avoiding during taking the medicine, the effect of the medicine, the drinks and food should avoiding during taking the medicine, the dosage strength, people are suppose cannot take the medicine and how to place and store the medicine in the right ways. Overall analysis, 70% colour application identified is bright colour. 93% type of letter to highlight warning is capital letter. 90% category of text used is sans serif and 78% of pictograms style used is in free style form.

RESULTS

Testing and Evaluation for Mild Allergy Pictograms

Figure 5: Pictograms design for mild allergy using thin line, thick line and positive negative approach.

Figure 5 showed pictorial symbols have the characteristics of a symbol designed independently without such background. It is designed by using lines or strokes to create the look. In addition, this free form uses the strength and subtle line thickness for highlighting a look. The unit point can measure thickness and line smoothness.

Normally, the finest lines are on the unit as well as the thickness of the 0.25 point line can be up to 100 units on an appropriate point. Several criteria were taken into consideration when drawing up the allergies pictograms. Visualizing of allergy symptom is developed by looking at type of symptom and the appearance of allergies. This includes body part view such as top, bottom, side, front and back.

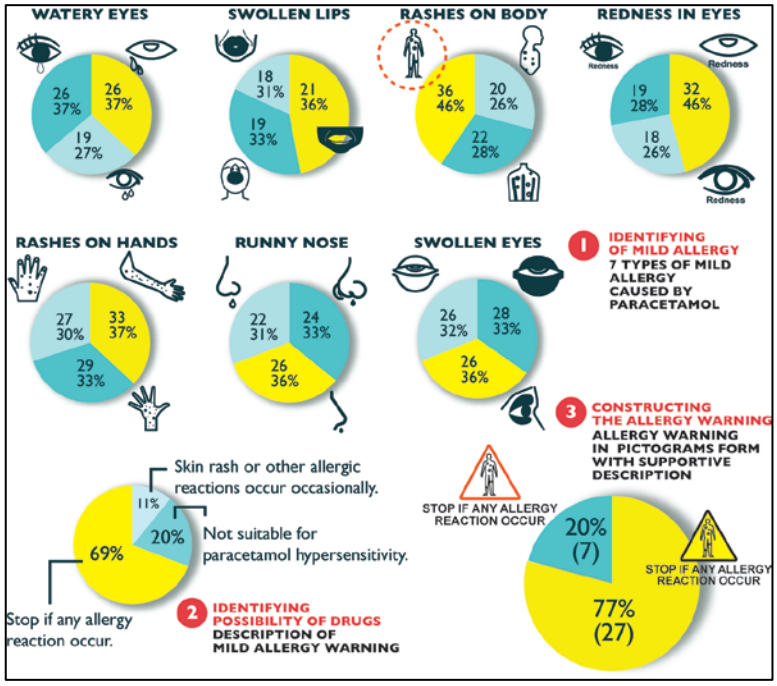
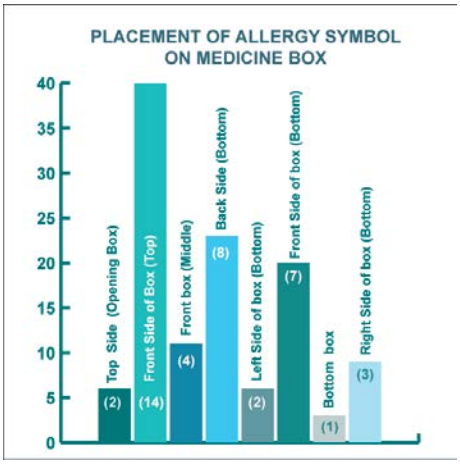


Figure 6: The percentage of pictograms chosen to indicate mild allergy caused by paracetamol and the description most suitable to indicate drugs reaction.

Based on **Figure 6,** 36 respondents choose allergy pictograms with thick line in full body to describe allergy reaction rather than half body or half side body pictograms. This showed the effectiveness of pictograms design can be measured through a variety of line sizes used. This is evident in the thinner lines used, the weaker the appearance of the image projected the thicker the lines used, the stronger the appearance of the projected image. 77% of the respondents preferred to choose warning form in triangular shape with yellow background and black border and 20% of them choose warning form in triangular shape with white background and red border. These striking colours play their role to highlight warning and alert from a far distance. 69% of respondents choose “Stop if any allergy reaction occur “as identification of drugs reaction.

Figure 7: Design Mock-up

Figure 7 shows a product sampling that stated eight allergies warning applied with different position for post-test.



Graph 5: Placement of Allergy Symbol on Medicine Box

Figure 8: Allergy Warning Applied on Baracol Product

Based on **Graph 5**, 40% of the respondents preferred to allocate allergy warning on the front top of the box and 24% of the respondents preferred to allocate the allergy warning on the back side of a medicine box.18% of them preferred to allocate the allergy warning on the front side bottom of medicine box. Five respondents from healthcare providers such as doctors, pharmacists and prescribers participated in this post-test. All of them preferred to allocate the allergy warning on the backside bottom of the medicine box. Based on their practice, most of the warning information was allocated near to product detail. **Figure 8**, The public's and professional healthcare providers agreed that allergy warning in pictograms symbol have the potential to alert and caution the consumer of drug reaction issues. The placement of allergy warning should be easier to see from a far distance. Most of them also agreed that the size of allergy warning must be allocated according to the size of box, label, package insert and capsule envelope. The type of text used for further action was finally decided as bold and capital letter.

CONCLUSIONS

Based on overall finding gathered, allergy in form of pictograms has a potential to be a system for adverse drug reaction sign (ADR Sign) for the next future especially in pharmaceutical sector. Appropriate allergy warning will help to increase patient reading especially for those who are poor reading or unfamiliarity with the language used state on the packaging, label or leaflet of the product bought. Designer and professional healthcare should create a teamwork to create a (ADR Sign) that can be used for the pharmaceutical sector yet help to create more effective medium regarding drug education and awareness among public in Malaysia. My recommendation allergy warning should expand their functions to communicate drugs warning not only on the medicine box, package insert and capsule envelope but it can be used toward drug medicine advertisement in TV Commercial and print ad too. This new platform will help to increase drug education and awareness effectively. This result shows that the thicker line used to create pictograms image, the faster eyes coordination focus on the image. The thinner the line used, the less focus on the image captured by eyes. The fastest information delivered to the eye and brain is actually based on how the pictograms constructed.

REFERENCES

Thames & Hudson, (2006).*Pictograms Icons & Sign: A guide to information graphic.* United Kingdom, London: Thames & Hudson Ltd

Lester, P.M. (1995). *Visual Communication.* United States, America: Wardsworth Publishing

U.S. Department of Health and Human Services. (2011).Guidance For Industry. Warning and Precautions, Contraindication, and Boxed Warning Sections of Labelling for Human Prescription Drug and Biological Products. U.S: Author.

Joshi, Y., Kothiyal, P. (2011). A pilot study to evaluate pharmaceutical pictograms in a multispeciality hospital at Dehradun. *Journal of Young Pharmacist: 3(2),* 163-166. doi: 10.4103/0975-1483.8006

Erena J., Gazarian M., Grant P., Graudins L., Kath H., Wainstein B. (November, 2006).Allergy and adverse drug reaction (ADR) definitions.Retrived from http://www.sch.edu.au/health/professional/nimc/nimc_adr_allergy_definitions.pdf

Ardern-Jones MR., Friedmann PS. (2011). Skin manifestation of drug allergy. 71(5), 672-683.doi: 10.1111/j.1365-2125.2010.03703.x. Retrieved from http:www.ncbi.nlm.nih.gov/pmc/articles/PMC3093073/

Kalpaklioglu A.F., Kalkan I.K., Akcay A., Reisli I., Can D., Uzuner N., Yuksel H., Kirmaz C., Gulen F., Ediger D. (2011). (Un) awareness of allergy.*PMC Journal*. 4(11), 170-178.Doi: 10.1097/WOX.0b013e31823842bc

Amberbir A., Medhin G., Hanlon C., Brotton J., Davey G., Vann A. (2014). Effects of early life paracetamol use on the incidence of allergic disease and sensitization: 5 years follow up of an ethopian birth cohort. 9(4), doi 10.1371/journal.pone.0093869. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3981735/

International Council of Communication Design. (2013). Icograda and the development of pictogram standards: 1963-1986. Retrieved March 1, 2013, from http://iridescent.icograda.org/journal/journal70.php

European Commission Enterprise and Industry Directorate-General. (2008). *Guideline on the packaging information of medicinal products for human use authorized by the community .*Brussel, Belgium: Author

Dowse, R., Ehlers, MS. (2004). Pictograms for conveying instructions: comprehension in various South African language groups. *South African Journal of Science, 59-60.*

LaporanTahunan (2012), *Biro FarmaseutikalKebangsaan Malaysia*

LaporanTahunan (2011), *Biro FarmaseutikalKebangsaan Malaysia*