

Evaluation of Knowledge, Attitude, and Perception of Pictograms in Improving Understanding of Foreign Medicine Packages and Leaflets among Malaysians

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Abstract: Access to foreign medicines is now more prevalent due to globalization and international travel. However, understanding the labels and content of these medications can be challenging due to the language barrier. Pictograms are visual representations of words or phrases, that can be used on foreign medicinal packages and leaflets to ensure the correct usage of the medications. This study aims to explore the knowledge, attitude, and perception of pictograms in improving the understanding of foreign medicine packages and leaflets among the Malaysian population. Methods: This was a cross-sectional study with stratified random convenience sampling. A total of 397 Malaysian respondents participated in this study. A set of questionnaires was distributed using the Google Forms platform. The scores on knowledge, attitude, and perception were assessed based on previous studies by Bloom's cut-off point criteria. SPSS version 28.0 was used to analyze the data. Results: Analysis of the respondent's sociodemographic data features found that area of living ($\chi^2=21.868, p<0.001$), educational level ($\chi^2=43.146, p<0.001$) and monthly family income ($\chi^2=24.173,$

p=<0.001) had a significant association with knowledge of pictograms. From all the respondents, the mean scores of 22.00 ± 5.50 and 22.17 ± 5.60 were obtained for attitude and perception, respectively, based on the maximum score of 30. Conclusion: Malaysian population especially the younger population showed a moderate knowledge, attitude, and perception toward pictograms.

Keywords: Medicinal packages, Leaflets, Pictogram.
more the students use E-learning, the better their academic performance. This study would benefit online institutions, online / distance instructors, decision-makers at all higher education levels, and online students. The

INTRODUCTION

In the early years of the 21st century, tourism became one of the popular sectors, exerting substantial influence on the economic growth and development of numerous countries across the globe (Hall, 2021). Apart from that, access to foreign medicines has become increasingly common as people travel internationally and diverse pharmaceutical products are imported into various countries. During travel to a foreign country, communication and language barrier is common especially when accessing the healthcare sector (Al Shamsi et al., 2020). Therefore, most people usually practise self-medication using over-the-counter (OTC) drugs to treat minor ailments such as headache, fever, cough, and more as they are available at any convenience store (Doomra & Goyal, 2020; Kebodeaux, 2019).

However, understanding the contents and instructions of these foreign medicine packages and leaflets can often pose a significant challenge, particularly when they are not available in one's native language (Tesfamariam et al., 2019). Therefore, the use of pictograms has gained attention as a potential solution to enhance comprehension and at the same time, ensure the safe usage of medicines (Figuerola et al., 2023; Nualdaisri et al., 2021).

A pictogram is an illustration of a picture or symbol that represents a word or a phrase (Sletvold et al., 2020). Pictograms are used in all domains of our daily lives and can be found in many settings such as hospitals, airports, zoo,

gardens, schools and universities, museums and libraries, and many more (Adir et al., 2021; Choi & Choi, 2021). For instance, they are commonly used to quickly convey important information such as prohibitions or warning signs on the road or safety hazards in the lab (Roca et al., 2018; Rossete & Ribeiro, 2021). In the context of medication, pictograms are used to represent the essential details of the medication including indications, dosage, side effects, and special warnings (Merks et al., 2018).

In a healthcare setting, research has demonstrated that the use of pictograms can enhance patients' understanding, memory retention, and adherence to prescribed medications (Chanzy et al., 2023). The use of a visual approach can likely improve the medication labelling and the usability of the leaflets (Van Beusekom et al., 2018). Understanding the medicinal packages and leaflets is crucial in ensuring the proper usage of the medications. A lack of understanding of the information on the labels and leaflets can cause medication errors that lead to negative health outcomes such as injury or adverse events (M. Kim et al., 2022).

This study aims to explore the knowledge, attitude, and perception of pictograms in improving the understanding of foreign medicine packages and leaflets among the Malaysian population. Understanding the Malaysian population's perception and attitude towards pictograms in the context of foreign medicine packages and leaflets is crucial for developing effective communication strategies. It will help identify potential barriers, such as cultural differences, literacy levels, and visual literacy skills, that may impact the successful utilization of pictograms. Furthermore, this research will shed light on the potential for improving the design and implementation of pictograms to enhance comprehension and ensure the safe and effective use of foreign pharmaceutical products.

2. MATERIALS AND METHODS

Ethics approval (REC (PH)/UG/073/2023) was issued by the Research Ethics Committee (REC) of Universiti Teknologi MARA (UiTM). This was a cross-sectional study with stratified random convenience sampling. The target respondents were among the Malaysian population across the states. The sample size of the population was determined by Raosoft Sample

Size Calculation at 95% confidence interval, 5% margin of error, and 50% response distribution. A total of 397 Malaysian respondents participated in this study.

The research was structured to gather the respondents' information via bilingual questionnaires in English and Malay. The questionnaires consisted of four sections. Section A consisted of seven questions related to the sociodemographic data of the respondents. Section B comprised seven questions related to knowledge of pictograms while section C contained six items related to attitude towards pictograms. Lastly, section D assessed the perception of respondents toward pictograms with six items. From sections B to D, all items were measured using a five-point Likert scale (1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5= Strongly Agree). The scores of knowledge, attitude, and perception were graded based on previous studies (Akalu et al., 2020; Alzahrani et al., 2022) and Bloom's cut-off point criteria as good (80% to 100%), moderate (60% to 79%), and poor (less than 60%) knowledge.

The questionnaires were incorporated into an online survey platform, Google Forms, before being disseminated to the respondents through formal email, Telegram, and WhatsApp. The sampling process was conducted from March to May 2023. Prior to statistical analyses, a preliminary test using Cronbach's alpha was conducted to check for the reliability of the data. The Statistical Package for the Social Science (SPSS) software version 28.0 was used for the statistical analyses in this study. The Kolmogorov-Smirnov test was performed to test for the data normality distribution. Descriptive statistics were used to describe the demographic profile of respondents, while inferential statistical analysis such as Pearson's Chi-square test was carried out to associate the demographic variables with knowledge, attitude, and perception of respondents towards pictograms. The analysis of variance (ANOVA) test was used to examine the effect of demographic characteristics on participants' attitudes and perception scores. Post-hoc Tukey's HSD test was conducted to determine the difference between groups. A p-value < 0.05 was considered the cut-off level for statistical significance.

3. RESULTS

The study received a total of 400 responses throughout the online survey- out of which, three were excluded because one of them was less than 18 years old and the other two did not agree to participate in the study. Therefore, only 397 responses were considered eligible in this study. The distribution of the respondents across 14 states in Malaysia is presented in Fig 1. The majority of the respondents come from Kelantan (29%). In contrast, the fewest respondents are from Perlis (1%).

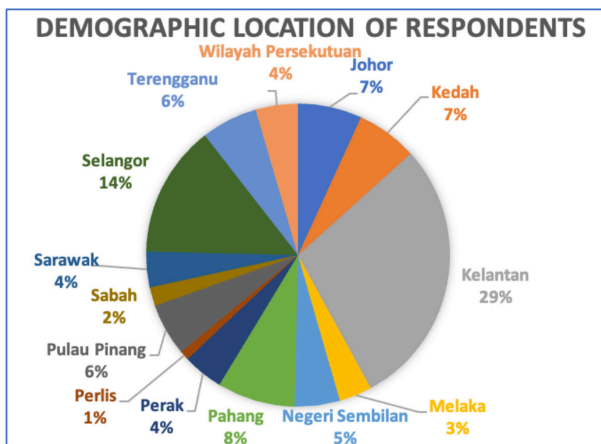


Fig 1: Demographic location of respondents

The present study shows that 152 of the respondents live in urban areas, while 131 and 114 of them live in sub-urban and rural areas, respectively. The respondents consist of 264 females, and the remaining 133 are males. The majority of respondents are aged between 18 and 25 (56.2%), while 21.2% of the respondents are categorized between 26 and 35 years. A total of 13.9% of the respondents are aged between 36 and 45, while 8.1% of respondents are categorized between 46 and 55 years. Only 0.8% of the respondents are aged above 55 years old. A total of 253 respondents are single (64.7%) and 144 of them are married (36.3%).

Education wise, more than half of the respondents possess bachelor's degrees (231), followed by 82 of them as having gone through secondary education, 31 having gone through primary education, 18 have master's

degrees and only 3 of them have PhDs. In addition, most of the respondents have a monthly family income of above RM7000 (36%) and only 2.3% respondents have less than RM1000 monthly family income.

Table 1 describes the association between demographic data and the knowledge of the Malaysian population towards pictograms. It was found that area of living ($\chi^2=, 21.868, p<0.001$), educational level ($\chi^2=, 43.146, p<0.001$), and monthly family income ($\chi^2=, 24.173, p<0.001$) had significant associations with knowledge of pictograms.

Table 1: Association between demographic data and knowledge of the Malaysian population towards pictograms

Variable	Knowledge of pictograms n (%)			χ^2	p-value
	Poor	Fair	Good		
Area of Living				21.868 ^a	< 0.001*
Urban	29 (28.7)	60 (37.0)	63 (47.0)		
Sub-urban	26 (25.7)	61 (37.7)	44 (32.8)		
Rural	46 (45.5)	41 (25.3)	27 (20.1)		
Gender				2.265 ^a	0.322
Male	40 (39.6)	51 (31.5)	42 (31.3)		
Female	61 (60.4)	111 (68.5)	92 (68.7)		
Age (Years Old)				8.706 ^a	0.368
18-25	51 (50.5)	100 (61.7)	72 (53.7)		
26-35	20 (19.8)	32 (19.8)	32 (23.9)		
36-45	17 (16.8)	20 (12.3)	18 (13.4)		
46-55	11 (10.9)	9 (5.6)	12 (9.0)		
Above 55	2 (2.0)	1 (0.6)	0 (0.0)		
Marital Status	0.448 ^a	0.799			
Single	62 (61.4)	106 (65.4)	85 (63.4)		
Married	39 (38.6)	56 (34.6)	49 (36.6)		
Educational level	43.146 ^a	<0.001*			
Primary Education	18 (17.8)	10 (6.2)	3 (2.2)		
Secondary Education	26 (25.7)	28 (17.3)	14 (10.4)		
Diploma	8 (7.9)	21 (13.0)	17 (12.7)		
Bachelors	49 (48.5)	96 (59.3)	86 (64.2)		
Masters	0 (0.0)	6 (3.7)	12 (9.0)		
Doctor of Philosophy (PhD)			0 (0.0)	1 (0.6)	2 (1.5)
Monthly Family Income (RM)				24.173 ^a	<0.001*
Less than RM1000	5 (5.0)	2 (1.2)	2 (1.5)		
RM1000 – RM3999	47 (46.5)	52 (32.1)	31 (23.1)		
RM 4000 – RM6999	26 (25.7)	51 (31.5)	38 (28.4)		
Above RM7000	23 (22.8)	57 (35.2)	63 (47.0)		

^a Based on Pearson’s Chi-Square

*Statistically significant at p-value < 0.001

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The findings show that regardless of area of living, a majority of respondents (40.8%) have fair knowledge of pictograms while 33.8% and 25.4% of them displayed good and poor knowledge respectively. In general, respondents who lived in urban areas are prone to have good knowledge (47%) of pictograms, while rural respondents contributed about 45.5% towards poor knowledge. Other than that, the results also showed that respondents with a bachelor’s educational level had the highest percentage (64.2%) of “good knowledge towards pictogram” compared to respondents with other educational levels. Respondents that had a monthly family income of above RM7000 had an obvious “good knowledge towards pictogram” (47%), in contrast with respondents with an income range of less than RM1000 (1.5%).

The attitudes towards pictograms among the Malaysian population were also investigated. The majority of respondents have a moderate attitude towards pictograms (44.3%). The frequency distribution of the respondent’s attitudes regarding pictograms is depicted in Fig 2. There was a total of six statements to evaluate the attitude of respondents. The total maximum score for attitude is 30. By referring to Fig. 2, the mean attitude score for all respondents was 22.00 ± 5.50 .

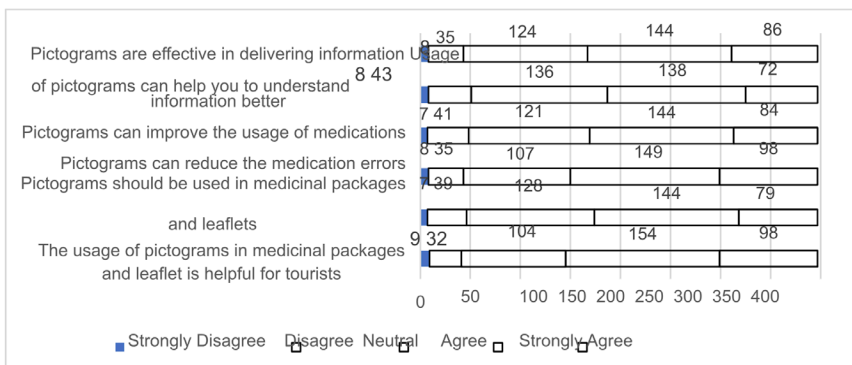


Fig 2: Attitude of Malaysian Population towards pictograms.

There were 86 (21.7%) respondents who strongly agreed that pictograms are effective in delivering information, while only 8 (2.0%) respondents strongly disagreed with it. On the other hand, a total of 210 respondents (52.9%) either agreed or strongly agreed that using pictograms can help them understand the information better. Other than that, about 57.4% of the respondents (n=228) either agreed or strongly agreed that pictograms can improve the usage of medications and only 1.7 % (n=7) strongly disagreed with this statement. Moreover, about 62.2% of the respondents either agreed or strongly agreed that pictograms can reduce medication errors. More than half of the respondents, 223 of them (56.2%) either agreed or strongly agreed that pictograms should be used in medicinal packages and leaflets. Lastly, a total of 252 respondents (63.5%) either agreed or strongly agreed that the usage of pictograms in medicinal packages and leaflets is helpful for tourists. It is noteworthy to mention that, many of the respondents in the present study remained undecided or skeptical about pictograms, thus fluctuating between neutral, disagree, and strongly disagreed responses.

Table 2 depicts the frequency distribution of respondents' perceptions towards the pictograms. The mean attitude score was 22.17 ± 5.60 out of a maximum score of 30. A total of 243 respondents (61.2%) either agreed or strongly agreed that the pictogram is beneficial for the Malaysian population. Approximately 57.2% of the respondents (n=227) either agreed or strongly agreed that pictograms can be easily understood by the Malaysian population. A total of 238 (59.9%) and 224 (56.4%) respondents either agreed or strongly agreed that pictograms are more easily processed at a distance than textual information, and, can potentially be interpreted more accurately and quickly than words, respectively. Most of the respondents (61.2%, n=243) either agreed or strongly agreed that pictograms make warnings more noticeable or attention-grabbing, while 11.2% (n=41) either disagreed or strongly disagreed with this statement. Lastly, a total of 234 (58.9%) respondents either agreed or disagreed, that pictograms can improve communication. It is important to note that many of the respondents in the present study remained neutral on their perception toward pictograms.

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Table 2: Perception of Malaysian population towards pictograms

Perception	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
	n (%)				
Pictograms are beneficial for the Malaysian population.	8 (2.0)	33 (8.3)	113 (28.5)	140 (35.3)	103 (25.9)
Pictogram can be easily understood by the Malaysian population.	9 (2.3)	33 (8.3)	128 (32.2)	144 (36.3)	83 (10.9)
Pictograms are more easily processed at a distance than textual information.	11 (2.8)	34 (8.6)	114 (28.7)	137 (34.5)	101 (25.4)
Pictograms are potentially interpreted more accurately and quickly than words.	8 (2.0)	41 (10.3)	124 (31.2)	144 (36.3)	80 (20.2)
Pictograms make warnings more noticeable or “attention grabbing”.	10 (2.5)	37 (9.3)	107 (27.0)	134 (33.8)	109 (27.5)
Pictograms can improve in communication better.	11 (2.8)	36 (9.1)	116 (29.2)	136 (34.3)	98 (24.7)

The difference in perception of pictograms as attention-grabbing between the age groups was analyzed using ANOVA and it was found to be significant ($F(4) = 13.543, p = 0.001$). Further analysis using a post-hoc test indicated that respondents aged between 18 to 25 years group have different perceptions compared to respondents from those aged above 55 years group.

DISCUSSION

The analysis of the sociodemographic data features in relation to the respondents’ knowledge of pictograms has revealed that respondents’ educational level had an influence on their knowledge of the pictogram. In the present study, respondents with higher education, particularly those with bachelor’s degrees, demonstrated a better knowledge of pictograms compared to individuals with other educational backgrounds. This finding can be attributed to the composition of the surveyed population, which predominantly consisted of bachelor’s students. Students are likely to have a higher level of familiarity

with pictograms due to their routine exposure to visual tools in educational settings (Guaicha et al., 2020). For instance, students had been introduced to pictograms that were used in the laboratory such as the warning sign of chemical hazards and also the laboratory apparatus (Wu et al., 2021). People with lower educational levels had lower knowledge of pictograms due to a low level of familiarity.

The present findings on respondents' attitudes towards pictograms provide valuable insights on their perception of the effectiveness and potential benefits of using pictograms, in delivering information on medicinal packages and leaflets. In all statements, the majority of respondents expressed agreement or neutrality, while a smaller proportion strongly agreed or strongly disagreed. Overall, the mean attitude score suggested a moderate attitude towards pictograms among the respondents. Most of the respondents agreed that pictograms are effective in delivering information, and firmly believed that pictograms successfully convey information and facilitate understanding. This indicates that pictograms are seen as a reliable and valuable communication tool (Dowse, 2021b). However, there was also a high number of respondents who expressed a neutral stance regarding the effectiveness of pictograms, likely due to differences in preference and variations in visual literacy skills. Different individuals may interpret pictograms differently based on their visual literacy abilities (Dowse, 2021a). Hence, the effectiveness of pictograms in conveying information may vary among different respondents. In addition, several studies also emphasize that pictograms are more effective in delivering information when used in conjunction with text, rather than when used alone (Algabbani et al., 2022; Heyns et al., 2021). Furthermore, it is evident that a majority of the respondents agreed that pictograms can improve the usage of medications. This finding aligns with the results reported by Mahmoud et al. (2018), where over half of the respondents (68%) also agreed that pharmaceutical pictograms aid in the proper usage of medication (Mahmoud et al., 2018). Pictograms play a crucial role in helping consumers understand medication instructions and significantly influence the proper use of medications, especially for individuals with low health literacy (Ng et al., 2017). For instance, a study showed that there was a significant improvement in the usage of asthma technique inhalers in the group with the pictogram compared to the control group (Almmani et al., 2018). In addition, most of the respondents in the present study agreed that the usage of pictograms can reduce medication errors, which aligns with a study conducted by Patidar et al. (2020). This study demonstrated that pictogram interventions reduced dosing errors among mothers with poor health literacy when administering liquid medication to children by approximately 48 to 54% and improved the mothers' understanding of dosing (Chan et al., 2015; Patidar et al., 2021). Therefore, pictograms are being utilized in patient counselling within pharmacy settings to enhance compliance and medication safety (Merks et

al., 2021; Vaillancourt et al., 2019). Overall, the present results revealed that the majority of the respondents agreed that pictograms should be used in medication packages and leaflets. This finding is similar to a study conducted by Boisadan et al. (2020), which reported that approximately 93.3% of the respondents believed that pictograms should be included in medication labels (Boisadan et al., 2020). This is due to the capability of pictograms that can enhance the readability of packages and leaflets, thereby improving medication prescription (Deepak & Gaur, n.d.; Phimarn et al., n.d.; Zheng et al., 2022). However, it is important to note that pictograms should not be used alone to avoid potential misinterpretation (Y. S. Kim et al., 2023).

The present study revealed that the respondents had a moderate perception towards pictograms. A significant portion of the respondents agreed that pictograms make warnings more noticeable or attention-grabbing. This finding aligns with a study conducted by Vallance et al. (2018), where the respondents showed positive feedback when the pictograms were used on the container of the alcohol to give the guideline regarding the standard dose (Vallance et al., 2018). In comparison to the other study, Fukuda et al. (2019) revealed that the awareness of pictograms as driving warning signs is low in Japan (Fukuda et al., 2019). Further analysis showed variations in the results between the younger and elderly groups. Younger respondents perceived pictograms as more attention-grabbing compared to the elderly. This could be attributed to the fact that older respondents faced more difficulties in interpreting pictograms correctly compared to their younger counterparts (Saremi et al., 2020). The older group usually displayed poor performance in interpreting the pictograms due to a decline in abstraction ability compared to the younger group (Beaufils et al., 2014). Additionally, cognitive

decline and vision impairment among the elderly might hinder their ability to draw attention toward visual pictograms, unlike the younger respondents (Fortuna, 2020).

Overall, most of the respondents agreed that pictograms are beneficial to the Malaysian population. The recognition of the benefits of pictograms suggests that respondents perceive them as valuable aids in conveying information, particularly in situations where language proficiency or literacy levels may pose challenges (Malhotra et al., 2022). Incorporating pictograms

into various communication platforms, such as medication packaging and healthcare settings, can significantly improve understanding, enhance safety, and facilitate better overall communication within the Malaysian population.

CONCLUSION

In conclusion, the Malaysian population, specifically the younger population, shows a moderate knowledge, attitude, and perception toward pictograms and there is a positive recognition of the potential benefits and effectiveness of pictograms in various domains. The findings suggest widening the research to include the general population, including the elderly and children, in order to obtain more valuable insights into the knowledge, attitudes, and perceptions towards pictograms among Malaysians.

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