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Evaluating Pictogram-based Patient Information Leaflet among Children Attending Kindergarten

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ABSTRACT

This preliminary research is aimed at evaluating the effectiveness of pictogram-based patient information leaflet leaflets among kindergarten students from the rural and the urban areas. Three pre-schools were selected for each area, whereby the target respondents evaluated the suitability of pictograms. The interview was conducted face-to-face and survey data was assessed using Likert scale (1=agree, 2=not sure, and 3=disagree). Chi-Square test was used to analyse data and the significant difference was set at $p < 0.05$. Three out of 10 questions showed significant differences while six questions presented with no significant differences ($p>0.05$). It is suggested that the level of understanding between the rural and the urban kindergarten students are quite discriminant towards the pictogram. At the age of six, the major difficulty faced by the students was reading. Findings showed that pictogram pictogram-based patient information leaflets aided the students' understanding of medical instruction.

Keywords: Pictogram, medical leaflet, rural, urban

INTRODUCTION

Medical information leaflet is one of the most important tools in improving patient understanding of their prescribed drugs.

According to Harvey and Plumridge (1991), leaflets and other printed materials such as brochures and pamphlets can increase a patient's knowledge and understanding effectively especially when accompanied with verbal instructions. Several points are considered when designing the leaflets, including the way of information is organised, writing style, font size, the length of sentences, and the design of the prospectus (Secker, 1997).

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A pictogram is a visual aid, used as a substitute for written text to convey information more efficiently among the elderly and low-literate population (Dowse & Ehlers, 2001). It is found that the use of pictograms can increase patient understanding of drugs, ensuring their compliance. Additionally, children can easily understand pictogram-based leaflets and may encourage them to adhere to their medication (Hämeen-Anttila, Kemppainen, Enlund, Bush Patricia, & Marja, 2006). Shankar, Krishna, Reddy, Mahendiran, Hussain, and Parthasarathy, (2015) suggested that pictograms play a vital role in educating patients and an effective counselling aid among the low-literacy groups.

The use of symbols in leaflets should be informative. Pictograms which are simply decorative may distract the information being conveyed (Secker, 1997). Therefore, the quality and effectiveness of pictogram should be first assessed so that it is positively accepted by the public or target population. Montagne (2013) suggested that pictograms produce low levels of comprehension, and their impact on improving medical knowledge is inconsistent. Barros, Alcântara, Mesquita, Santos, Paixão, and Lyra, (2014) reported that one of the risk factors that may predispose the patient to their non-adherence of medication is the fact they retain very little related verbal information from their doctors. Hence, use of pictograms in the information leaflet is believed to transmit relevant medical information in a clear, expeditious, and simple manner. Therefore, this preliminary research is intended to evaluate the effectiveness of pictograms used in patient information leaflets among kindergarten students from the rural and the urban areas.

METHODOLOGY

This preliminary study was conducted among 60 kindergarten students, aged six at selected schools. . There were 10 respondents, both male and female, from each school; in total there were 30 respondents from the urban area and 30 from the rural area. The three preliminary schools that represent the urban areas were from Petaling Jaya, Shah Alam and Gombak districts while the rural schools were from Ijok, Janda Baik and Kluang.

A face-to-face interview was conducted using a modified validated questionnaire (Hämeen-Anttila et.al, 2004). The instrument developed by the researchers in this study was reviewed and validated by an expert panel followed by a pilot study conducted within a select group of 30 kindergarten children in Subang, Selangor. Thirty respondents were chosen because a general rule of thumb is to take 30 or greater as an estimation parameter (Browne, 1995). Results from the pilot study showed Cronbach alpha was satisfactory, demonstrating the validity and reliability of the questionnaire used.

The questionnaire consisted of Part A and Part B. Part A consists of 10 questions on suitability of pictograms used in the leaflet. Part B contained questions on anthropometry and demography (respondent's profile). Data

was assessed and scored using the Likert scale (1=agree, 2=not sure, and 3=disagree).

Statistical Packages for Social Science (SPSS) version 23.0 was used to analyse data. Chi-square test was used to compare the level of understanding of the students. Demographic data was analysed in the form descriptive statistics and the significance level was set at $p < 0.05$.

RESULTS AND DISCUSSION

There were 38.3% of male respondents compared with 61.7% of female respondents. About 63.3% and 60.0% of female respondents were from urban and the rural areas respectively while 36.7% and 40.0% of males came from urban and rural areas respectively.

Malays were the majority followed by Indians, Chinese, and others accounting for 65%, 20%, 10% and 5% respondents respectively. Muslims accounted for 65% of the respondents while Buddhist, Hindus and Christians amounted to 16.7%, 10% and 8.3% respectively. The distribution of respondents according to different category is shown in Table 1.

The Malay respondents accounted for the majority, both in the urban (53.3%) and the rural area (76.7%) followed by the Chinese, 26.7% and 13.3% representing the urban and rural areas respectively. The Indians accounted for 10% of the respondents, both in the urban and the rural areas. The 'others' were the minority, n = 3, where all of them were from the urban area. The Muslims were the majority, both in the urban (53.3%) and the rural area (76.7%) followed by the Buddhist, whereby 20.0% were from the urban area and 13.3% from the rural area. The Hindus accounted for 10% both in the urban and the rural area while the Christians accounted for 8.3% of the total respondents.

Table 1
Demographic characteristics of the kindergarten children (n=60)

Variables (n=60)		Frequency (%)
Location	Urban	30 (50)
	Rural	30 (50)
Gender	Male	23 (38.3)
	Female	37 (61.7)
Race	Malay	39 (65)
	Chinese	12 (20)
	Indian	6 (10)
	Others	3 (5)
Religion	Islam	39 (6)
	Buddhism	10 (16)
	Hinduism	6 (10)
	Christianity	5 (8.3)
	Others	0 (0)

Chi Square analyses revealed that there were three pictograms used in the medical information sheet and there were significant differences based on the respondent's location. Figure 1 shows that the symbols were not understood by the participants. Question 4, however, was not subjected to any statistical testing because all the respondents from both locations answered 'agree' to the question. Figure 2 further described the pictograms that have been used during the interview session. During the interview session, printed cardboards were displayed and direct scoring were recorded.

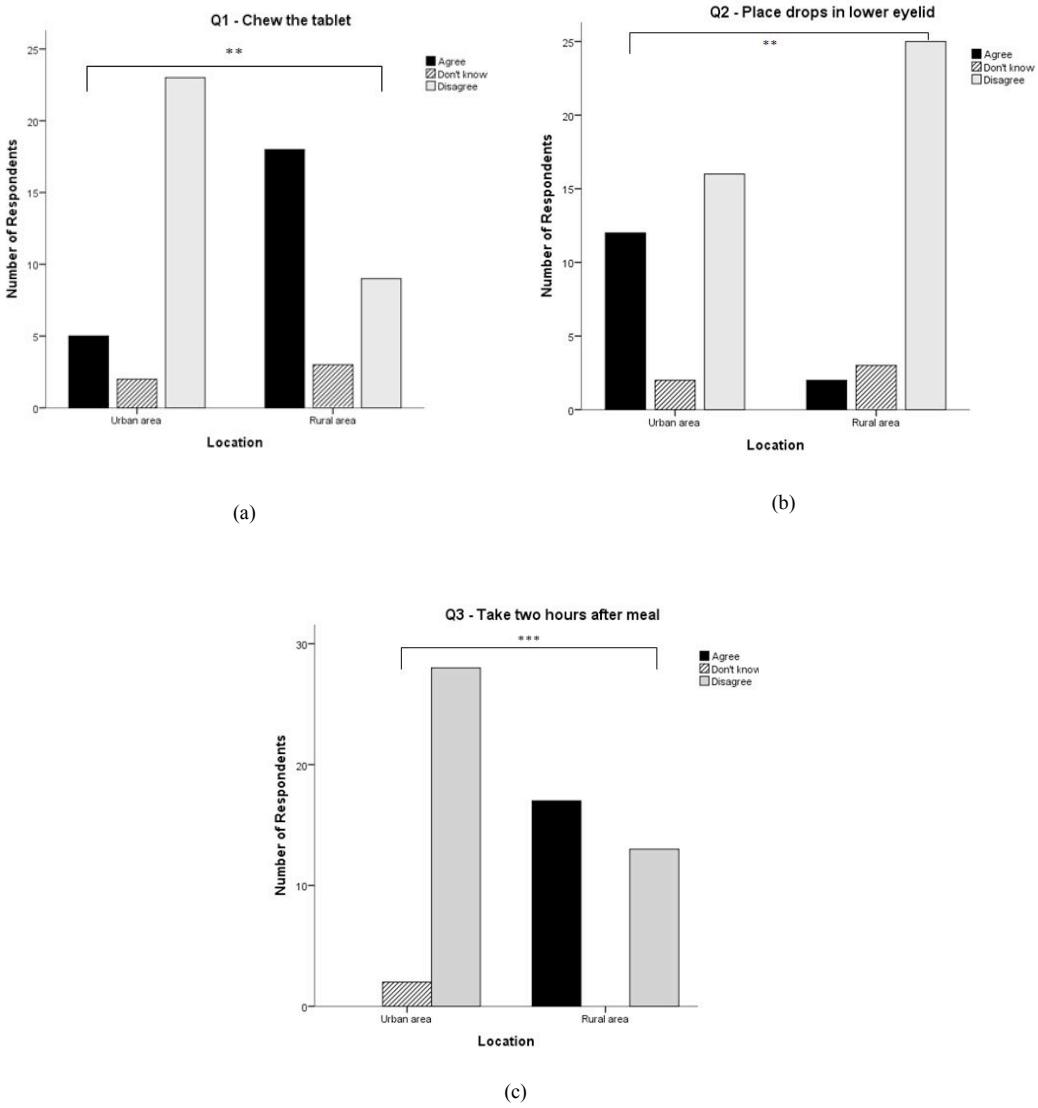

Figure 1. Pearson's Chi Square ($\chi 2$) value for (a) Question 1; (b) Question 2; and (c) Question 3

For each parameter, a value with the asterisk signifies $p<0.05$ and vice versa. *P* value less than 0.01 was designated with two (**) asterisks. *P* value less than 0.001 was designated with three (***) asterisks. *P* value less than 0.0001 was designated with four (****) asterisks.

In contrast, Table 2 shows that there were no significant differences for pictograms from Question 5 until Question 10. It indicates that the respondents from both the urban and rural locations could understand and interpret these symbols very well.

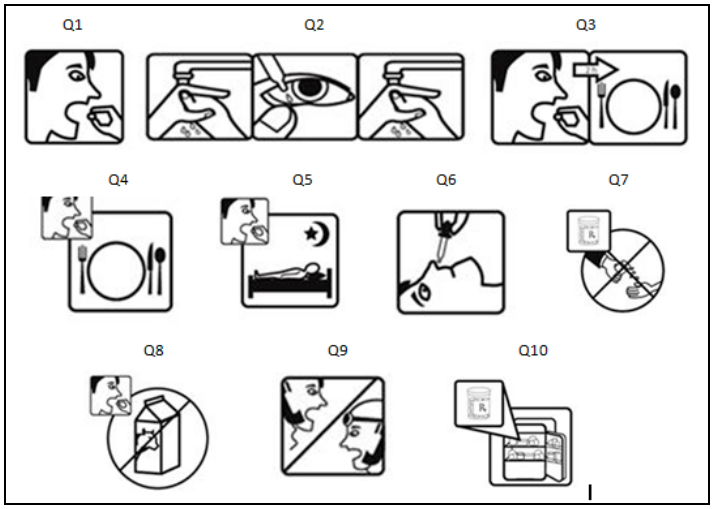

Figure 2. Pictograms that were used according to the modified validated questionnaire (Hameen-Anttila et al., 2004)

Table 2
Demographic characteristics of the kindergarten children (n=60)

Statement	Agree *n* (%)	Not sure *n* (%)	Disagree *n* (%)	Chi Square (χ^2)
Q1 - Chew tablet	23 (38.3)	5 (8.3)	32 (53.3)	0.001**
Q2 – Place drops in lower eyelid	14 (23.3)	5 (8.3)	41 (68.3)	0.009**
Q3 – Take 2 hours after meal	17 (28.3)	2 (3.3)	41 (68.3)	0.000***
Q4 – Take with meal	60 (100)	0 (0)	0 (0)	Not conducted
Q5 – Take in lying position	44 (73.3)	6 (10)	10 (16.7)	0.685
Q6 – Place drops in nose	53 (88.3)	7 (11.7)	0 (0)	0.688
Q7 – Do not give medicine to others	46 (76.7)	3 (5)	11 (18.3)	0.148
Q8 – Do not take with milk or other dairy products	50 (83.3)	3 (5)	7 (11.7)	0.757
Q9 – Call the doctor if symptoms persist	46 (76.7)	2 (3.3)	12 (20)	0.352
Q 10 – Store in the cupboard	38 (63.3)	0 (0)	22 (36.7)	0.284

For each parameter, a value with the asterisk signifies $p < 0.05$ and the absence of asterisk indicates otherwise. *P* value less than 0.01 was designated with two (**) asterisks. *P* value less than 0.001 was designated with three (***) asterisks. *P* value less than 0.0001 was designated with four (****) asterisks.

Empirical studies point to numerous factors that lead to non-compliance. This is common among children with n chronic diseases or serious behaviour problem (Drugli, Larsson, Fossum, & Mørch, 2011; Eyberg, Nelson, & Boggs, 2008; Sukhodolsky, Gorman, Scahill, Findley, & McGuire, 2013). However, among all, child neglect was described as the most prevalent form of maltreatment (Paula & Linda, 1986). An understanding of these factors is essential for health professionals in establishing a proper treatment and intervention programme.

In Malaysia, the doctor and pharmacist prescribe drugs verbally. The medications are also labelled. Somehow, these can be quite intimidation among the low-literate population, the children and the elderly. In addition, evidence suggests that parents and caregivers make frequent errors when administering medication to children. Inaccurate dosage and non-adherence to medication regimens can increase morbidity and mortality risk among children (Henretig, Selbst, Forrest, & Kearney, 1989; Matsui, 1997; Phillips, Beam, Brinker, Holquist, & Honig, 2001; Rivera-Penera, Gugig, Davis, & McDiarmid, 1997; Sawyer & Aroni, 2003).

The issues have created public alarm and call for greater awareness and education among children, and one of the best methods is by using the wordless pictogram. Takasaki and Mori (2007) reported that pictograms are a universal form of communication that breaches language barriers. In fact, a pictogram-based intervention that was used in a randomised controlled trial helped in decreasing errors while improving adherence among the participants (Yin, Dreyer, & Schaick, 2008).

With limited reading capabilities, a simple pictogram can yet be understood by the children that help them to discipline themselves to comply with the routine medication regime. This study has identified six pictograms in which these symbols were found to be not significant between the urban and rural respondents.

The non-significant findings show that basic interpretation of the kindergarten participants was equivalent, and the pictograms can be accepted as it was generally understood. These pictograms were in Question 5 (take in lying position) p=0.685, Question 6 (place drops in nose) p=0.688, Question 7 (do not give your medicine to others) p=0.148, Question 8 (do not take with milk or other dairy product) p=0.757, Question 9 (call the doctor if symptoms persist) p=0.352 and Question 10 (store in cupboard) p=0.284. A study in Japan also confirmed that preschool children have the capabilities in understanding the pictograms very well (Lin, Chang, & Liu, 2015).

However, based on the response, the children in this study might have wrongly interpreted the pictogram for Question 5 as the real instruction is to take the drugs at night. This interpretation might be missed because the symbol also indicated bed and it tallied with the provided instruction that is 'take in lying position'. Therefore, it is recommended that there should be improvisation for that pictogram as it created different meanings. A study by Hanson and Hartzema (1995) also indicated that about 54% of the pictograms were misinterpreted by their elderly respondents.

A refinement to Question 1, 2, and 3 are also suggested based on the Pearson's Chi-Square test that showed significant differences between the tested areas. Based on the analyses, Question 1 (chew the tablet) resulting p=0.001, Question 2 (place drops in lower eyelid) p=0.009, and Question 3 (take 2 hours after a meal) p=0.000. Different understanding among respondents towards pictogram is not advisable as these might create variations. Therefore, further construction on the standard pictograms should be done to improve the message delivery via the pictograms that suit the general public, especially in the Malaysia context.

Pictograms can help in improving communication barrier between the consumers and pharmacist, doctors or other healthcare providers. It is also found that medical leaflets can serve as future references to improve the recall process.

This paper has presented findings from the perspectives of kindergarten children in selected locations and has not considered the perspectives of teachers, parents and the community at large. Hence the findings here may be only the tip of the iceberg and lurking below may be more disturbing facts and figures as to the true picture of how well children understand pictograms in medical information leaflets.

CONCLUSION

Based on the findings, it is recommended that the pictograms should be incorporated and standardised in all of the medical leaflets since it can enhance understanding. Besides, it is believed to increase compliance among patients, in particular among the children, elderly and low literate people. Therefore, we strongly recommend that longitudinal studies in this cohort be carried out on annual basis to confirm whether the pictograms alone, or in combination with written instructions, are more effective and preferable among them.

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