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Short communication

Development of pictograms for patients with diabetes at a teaching hospital in northern Sri Lanka – A pilot study

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ABSTRACT

Purpose: Diabetes is a noncommunicable disease with a rapid increase of prevalence in low- and middle-income countries during the last decade. Pictograms can be utilized to convey information regarding the management of diabetes. This study was conducted to develop and evaluate the comprehension level of pictograms regarding lifestyle modifications and medication use in diabetes.

Methods: A mixed-method study was conducted through two phases which included the Delphi technique and a pilot study. Systematic sampling was used to select the 288 participants. Nineteen pictograms were developed and they were evaluated for their comprehension level by diabetic patients attending a teaching hospital in northern Sri Lanka. The criterion for acceptance of a pictogram was at least 85% of participants correctly interpreting the pictogram. Microsoft Excel 2019 was used to analyse data and descriptive statistics were used to present the data.

Results: Out of 19, 18 pictograms were correctly interpreted (more than 85%) by diabetic patients. A pictogram representing the prevention of hypoglycaemic attacks was not interpreted by most patients.

Conclusion: The developed pictograms could be used effectively to convey information regarding lifestyle modifications and medication usage to patients with diabetes. Further studies are needed to evaluate the comprehension level of the developed pictograms among diabetic patients in other parts of Sri Lanka.

Keywords

Pictograms, Diabetes, Sri Lanka

INTRODUCTION

Diabetes is a chronic metabolic disease characterized by low secretion of insulin and the development of insulin resistance (1). The global prevalence of diabetes was 9.3% which is nearly half a billion in 2019 and is expected to be increased to 10.2% (578

million) by 2030 and 10.9% (700 million) by 2045. (2) In Sri Lanka, there is a rapid increase in diabetic patients in the past 20 years. The prevalence of diabetes was 10.3% in a study conducted from 2005 to 2006 among the adult population of Sri Lanka. (3) The pharmacological approach is partly effective in the management of diabetes. (4) Lifestyle characteristics are important factors that influence the progression of the disease. (5) Lifestyle modification along with the pharmacological approach is crucial for the effective management of diabetes. (4,6)

The global health literacy crisis affects both developing and developed nations. According to a recent review, several studies concluded that poor health literacy has been associated with poor treatment adherence among patients with chronic diseases. (7) Low health literacy among diabetic patients has been associated with poor glycaemic control. (8) Pictograms can be an effective alternative to written information for patients with low literacy. (9) Pharmaceutical pictograms are defined as "standardized graphic images that help convey medication instructions, precautions and/or warnings to patients and consumers". (10) Pictograms are useful to persons who cannot read printed verbal messages because of inadequate reading skills or unfamiliarity with the language used in the message. (11) This study aimed to develop and evaluate comprehension level of culturally specific pictograms among patients with diabetes attending a teaching hospital in northern Sri Lanka.

METHODS

A mixed-method study was conducted through two phases which included the Delphi technique and a pilot study. The Delphi technique utilized an iterative technique which was designed with group communication sessions. (12) It was conducted as a brainstorming discussion phase to develop the first draft of pictograms and subsequently as a refinement phase in which pictograms were finalized.

The pilot study was conducted among patients with diabetes attending the diabetic centre in a teaching hospital in northern Sri Lanka. The study was conducted from November 2020 to November 2021. Ethical clearance for this study was obtained from the ethics review committee of the Faculty of Medicine, University of Jaffna.

Delphi technique: Brainstorming discussion

A brainstorming discussion was conducted with the participation of selected experts. The discussion was aimed to identify the key areas or concerns to be addressed by the pictograms for medication usage and lifestyle modification and for the initial development of pictograms. Members in this discussion were 15 undergraduate pharmacy students, three pharmacy academics, three hospital pharmacists, two general physicians, an endocrinologist, a community physician and five expert patients with diabetes.

An one hour group discussion was held through the zoom platform. A brief introduction about the research was given to the experts.

Delphi technique: Refinement phase

The first draft of 19 pictograms representing lifestyle modifications and medication use messages were developed based on the focus group discussions. Then these pictograms were refined and improved by the Delphi technique with three rounds during phase II of the study. A panel of five expert patients attending the Diabetes Centre, teaching hospital, Jaffna, Sri Lanka was presented

with the pictograms. They were asked to rank the pictograms from their most preferred to least preferred pictograms and to provide comments on how to improve them. After refinement, a new set of pictograms were presented to another group of five expert patients for another round. After refinement of pictograms from round 2, a new set of pictograms were presented to another group of five expert patients for a third-round to modify the pictograms further and to finalize them (Figures 1 and 2).

Figure 1. Pictograms (1-14) for lifestyle modification

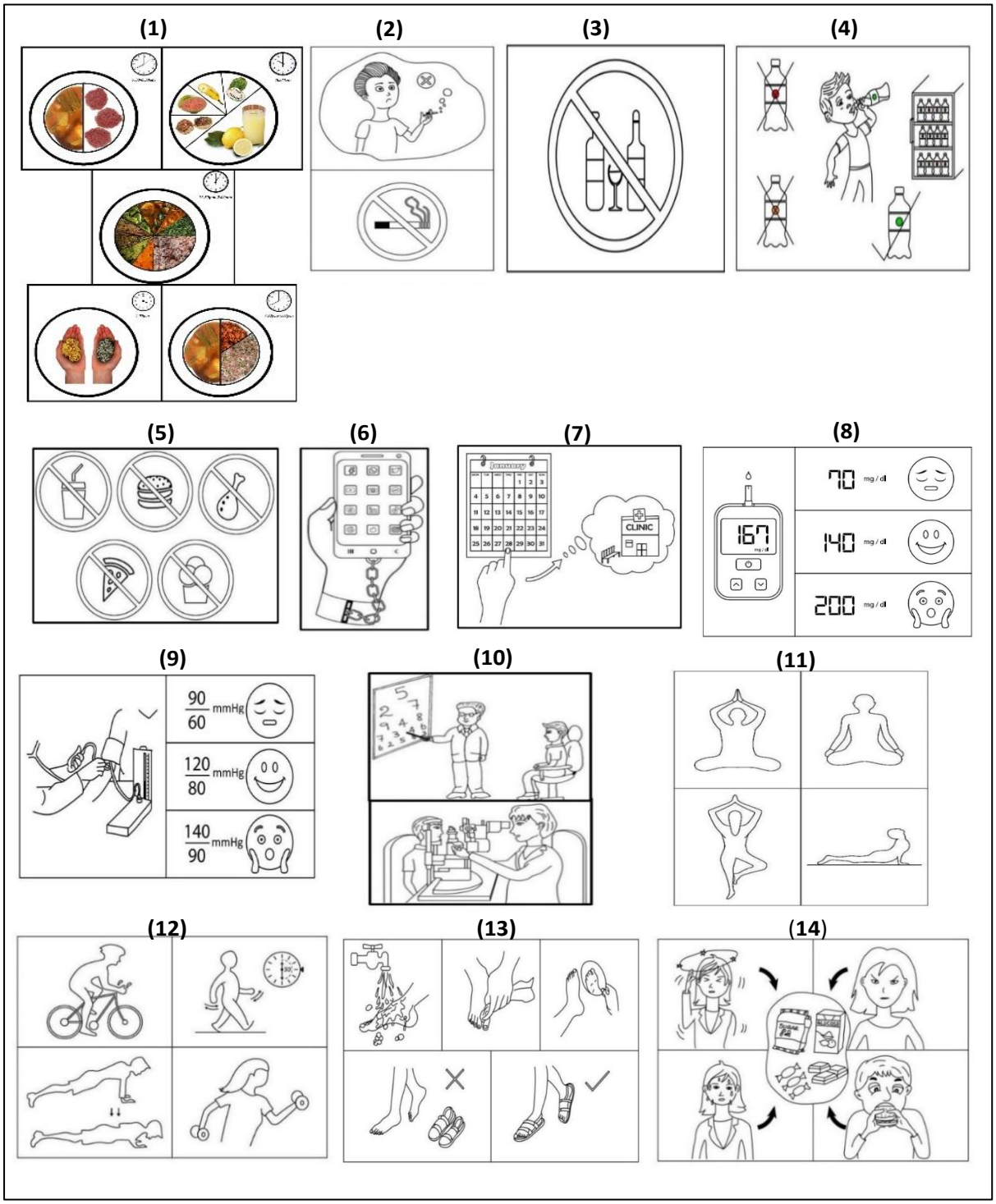
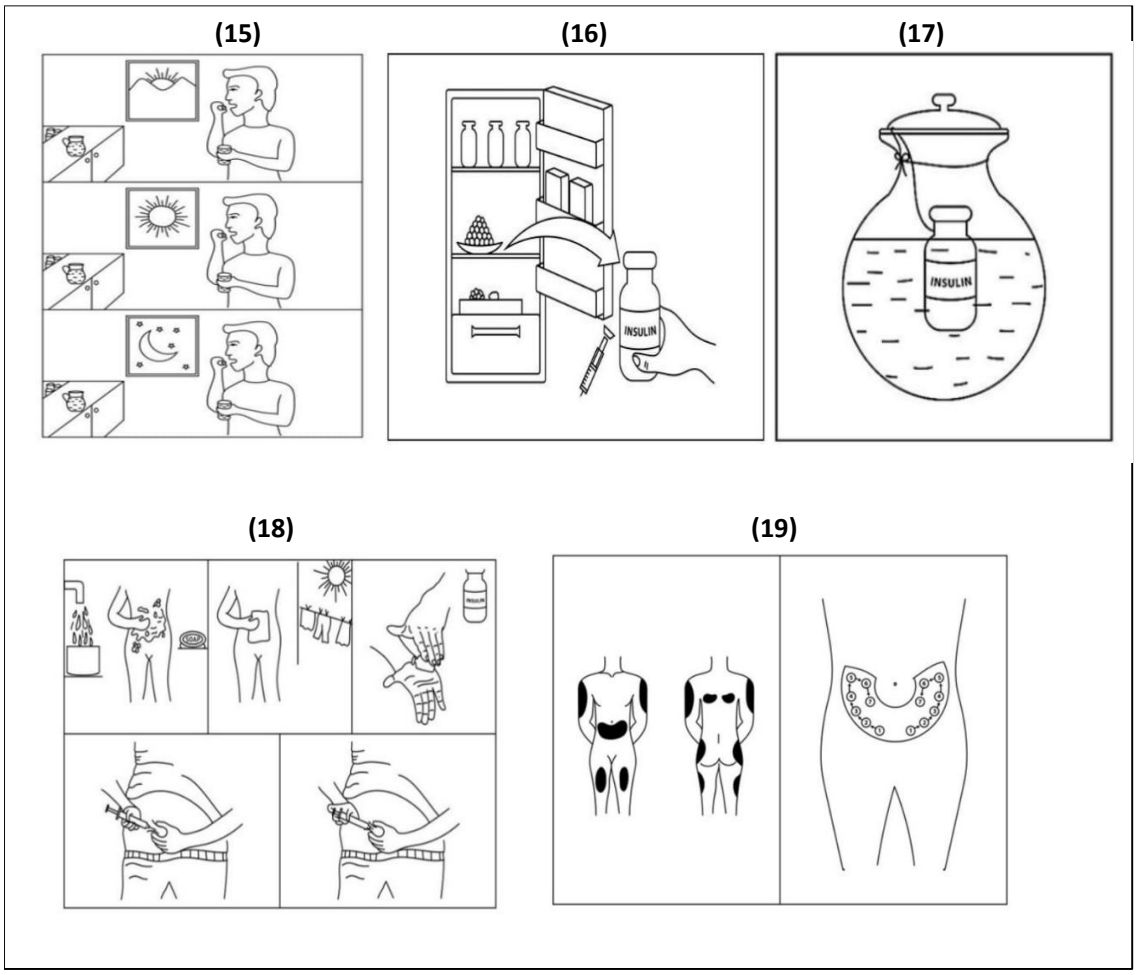


Figure 2. Pictograms (15-19) to improve medication use



Pilot study

A pilot evaluation of pictograms was conducted among diabetic patients at the diabetic clinic, teaching hospital Jaffna. The sample size was determined as 426 (P=0.5 was used and 10% was estimated as non-respondents for this calculation).

A systematic sampling technique was performed to collect the data from 426 diabetic patients who were attending the diabetic clinic of teaching hospital, Jaffna. Around 30 patients attend the diabetic clinic per day. Total number of clinic days were 5 per week. Therefore, a total estimated number of 600 patients attended the clinics per month. Therefore, the calculated sampling interval was 2 (600/384=2). One patient among the first two patients selected randomly was assigned as the first patient. Then, every second patient was included in the study. Patients were asked to interpret the meaning of the pictograms developed.

American National Standards Institute (ANSI) standard on criteria for safety symbols was used to assess the comprehension level of pictograms. The ANSI score was calculated as a percentage of the number of participants correctly identifying the meaning of the pictogram, based to the intended definition, divided by the total number of participants. An 85 % comprehension rate was considered the minimum cut-off value for acceptability of a pictogram. (13) Data were analysed with MS Excel 2019. Descriptive statistics were used to present the results.

RESULTS

The brainstorming discussions identified healthy diet, regular exercise, regular check-ups, stress management, avoiding smoking, avoiding alcohol intake, foot care, self-monitoring of blood glucose concentrations, self-monitoring of blood pressure, regular eye check-ups and prevention of hypoglycaemic attacks for pictograms regarding lifestyle changes.

The identified areas to develop pictograms to improve medication usage were regular intake of medicines, storage of insulin, proper administration of insulin and insulin injection sites.

The pictograms developed based on Delphi technique were used to evaluate the comprehension level of the pictograms by diabetic patients. A total of 288 patients responded to the study with the response rate of 67.6%. Comprehension level of pictograms by patients are shown in Table 1. More than 80% of participants correctly interpreted 13 pictograms out of 14 which were related to lifestyle modification. More than 80% of participants achieved correct interpretation of all 5 pictograms for improvement of medication use. The percentage of comprehension of pictograms regarding prevention of hypoglycaemic attack was very low (11.8%) among patients.

DISCUSSION

The present study developed and evaluated the comprehension level of pictograms related to lifestyle modifications and improvement of medication use by patients with diabetes. Culturally specific pictograms are important to improve the comprehension level of patients and thus information could be effectively conveyed to the patients with low literacy to manage their disease. A total of 19 pictograms for lifestyle modification and medication usage were developed through the Delphi technique and they were evaluated among patients with diabetes.

Out of 19, 18 pictograms were correctly comprehended by patients with diabetes. Only one pictogram related to the symptoms of hypoglycaemic attacks was not interpreted by most of the patients. It could be due to unawareness of patients regarding symptoms of hypoglycaemia. This finding was supported by a previous study in which more than half of the patients were not aware of hypoglycaemic symptoms. (14) Pictograms regarding diet and exercise were comprehended by all patients. This finding was further supported by the qualitative study in which most of the patients knew the importance of diet and exercise. (15)

Pictograms alone did not improve the knowledge of diabetes management and educational training is also needed for the patients to understand the pictograms. (16) Proper counselling of patients with the aid of pictograms could improve patients' knowledge on pharmacological and non-pharmacological therapies of diabetes and their effective control. Usage of pictograms along with written or oral information could improve the adherence to medications especially in patients with a high-risk of non-adherence. (17)

According to our finding, more attention should be taken to educate the patients on hypoglycaemic symptoms which could increase the risk of admission to hospitals and mortality. Also, it revealed that first educating the patients regarding management of diabetes and then using of pictograms will be helpful to improve comprehension level of patients on pictograms.

Table 1. Distribution of participants' ability to understand the developed pictograms

Pictogram number	Topic	Number of correct interpretations	ANSI Score
Pictogram 1	Eat healthy diet	288	100.0%
Pictogram 2	Avoid smoking	269	93.4%
Pictogram 3	Avoid alcohol intake	282	97.9%
Pictogram 4	Drink soft drinks with less sugar content	254	88.1%
Pictogram 5	Avoid eating junk food	264	91.6%
Pictogram 6	Avoid excess use of social media	253	87.8%
Pictogram 7	Follow your monthly check-ups	267	92.7%
Pictogram 8	Monitor your blood glucose level	272	94.4%
Pictogram 9	Monitor your blood pressure	283	98.2%
Pictogram 10	Check your eyes regularly	279	96.8%
Pictogram 11	Do yoga regularly	284	98.7%
Pictogram12	Do exercise regularly	288	100.0%
Pictogram 13	Protect your feet	274	95.4%
Pictogram 14	Prevent hypoglycaemic attack	34	11.8%
Pictogram 15	Take your medicines regularly on time	247	85.7%
Pictogram 16	Keep the insulin vial in the fridge	230	97.8%
Pictogram 17	Keep the insulin vial in the pot	226	96.1%
Pictogram 18	Administer your insulin properly	230	97.8%
Pictogram 19	Insulin injection sites	230	97.8%

*ANSI score: American National Standards Institute

The limitation of this study was that the sociodemographic characters of patients and associated factors were not studied. Further studies are needed to evaluate the comprehension level of pictograms among diabetic patients in the other part of the country.

CONCLUSION

Eighteen developed pictograms regarding lifestyle modifications and medication use were well comprehended by patients with diabetes in the northern Sri Lanka. It could be used effectively among the patients with diabetes to convey information regarding lifestyle modifications and medication usage. Further studies are needed to evaluate the comprehension level of the developed pictograms among the patients with diabetes in the other parts of the Sri Lanka.

Author's declaration:

The authors declare that all persons listed as authors have read and given approval for the submission of this manuscript.

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Competing interests:

The authors declare that they have no competing interests to disclose.

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