The Effect of the Educational Brochure Versus the Video on Disease Knowledge in Juvenile Idiopathic Arthritis Patients: A Randomized Controlled Trial

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Research Article

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Abstract

Background: Juvenile idiopathic arthritis (JIA) is the most common pediatric rheumatic disease. Patient education plays an important role in the management of such chronic disease. Although JIA educational materials are available, patients may not reach them due to limited health literacy or limited access. This study aimed to compare the effectiveness between a brochure and a video in JIA-related knowledge.

Methods: This was a randomized controlled trial study. 100 JIA patients or their caregivers, whose JIA patients were not graduated at least 8thgrade were randomized into two groups with 50 subjects per arms. The intervention groups were reading the brochure (n=50) or watching the content matched video (n=50). Fifteen multiple-choice knowledge questionnaires about JIA were answered before, immediately after intervention and at follow-up 4 weeks later. Demographic data and disease activity were recorded.

Results: In this study, age of patients in the brochure and video group were 13.2 ± 4.6 years and 14.3 ± 5.1 years, respectively. Most of them were female (57%), diagnosed systemic JIA (37%) and were in active disease status (48%). There was no difference in all baseline demographic data. About 70% of patients had low average monthly family income per household. More than 50% of JIA graduated below secondary school. The mean correct score rates prior to the intervention were 51% and 56% in the brochure group and video group, respectively (p-value 0.28). Post-test total knowledge scores showed that participants in the video group had better knowledge than participants in the brochure group (p-value 0.003). In four-week post-test, both groups had statistically significantly lower total knowledge scores (the brochure 73%, the video 78%) when compared to the immediate post-test score. Moreover, there was no significant difference in four-week post-test scores between two groups (p-value 0.141).

Conclusion: The JIA educational video was more effective than the pictorial brochure in improving immediate JIA related knowledge. However, the long-term retention of JIA related knowledge did not show the significant difference between both educational tools. To maintain JIA disease knowledge, patients should be given the knowledge of JIA disease repeatedly.

Trial registration: Thaiclinicaltrials.org 06/03/2020, TCTR20200310004, prospectively registered.

Background

Juvenile idiopathic arthritis (JIA) is the most common rheumatic disease in children (1). Among patients with pediatric rheumatic disease in Thailand, JIA accounted for 60% (2). The course of JIA is chronic and relapsing remitting. Treatment of JIA are often complicated because of complexity of disease and involving long-term medications. Patients need regular review and ongoing information during the course of disease. JIA has a substantial impact on physical and functional disability, including quality of life (3). Disability associated with JIA also leads to negative school performance and unemployment in adulthood (1, 4).

Patient education plays an important role in the management of chronic diseases. Educational programme can improve health outcomes, disease knowledge, health-related behavior and adherence to treatment (5–7). JIA specific knowledge can be delivered by physician-patient communication and educational tools such as a brochure, a comic or a video (8–10). Since there are only 19 pediatric rheumatologists in Thailand, duration that doctors can spend with patients in the clinics might be inadequate to deliver all information about disease and medications. Improving patients' knowledge of JIA in Thailand, educational tools might be developed and approachable. Although knowledge of JIA in the Thai language are well described and can be found on the Paediatric Rheumatology INternational Trials Organisation (PRINTO) website (11), this detailed educational tool might overwhelm young patients or parents with low educational level (9).

Although written materials, such as brochure, can improve patients' knowledge, these might not be useful in patients with low health literacy or low socioeconomic status (12). There are few studies showing that the effectiveness of the video were over the brochure in terms of patient's knowledge (12, 13). However, no studies have been evaluated in JIA patients in Thailand, which is limited resource setting. Also, there is no printed material and educational video about JIA related knowledge in the Thai language in our clinic.

Hence, this study aimed to compare the effectiveness between a brochure and a video in JIA-related knowledge after reading the brochure or viewing the video and at four weeks after the interventions to assess long term retention. If the brochure is as effective as the video in low socioeconomic patients, it can be more suitable to use in Thailand with resource limited setting. In contrast, if the brochure is not effective in Thai patients, the video can offer to be an alternative educational tool to deliver disease knowledge to JIA patients for better outcomes.

Methods

Objective

This study aimed to compare the effectiveness between two different newly developed educational tools; a brochure and a video, in JIA-related knowledge at immediate and four-week post-intervention.

Development of JIA educational tools

The educational brochure and the video were developed by two pediatric rheumatologists. They are comprised of four parts of educational knowledge including 1) general knowledge about JIA and disease etiology, 2) treatment of JIA and adverse effects from medication, 3) selfcare knowledge about physical activities, vaccinations and diet, and 4) knowledge about how to manage when disease relapses. The contents in both brochure and video were similar. The length of a cartoon-designed video was five minutes long. Both materials were reviewed by 10 laypeople to suggest some changes in design and wording.

Revised materials were then applied.

Outcome measures

The JIA knowledge questionnaire was developed and comprised fifteen multiple-choice questions with a choice of five responses. The choice in all questions included not known response to prevent guessing. The purpose of the questionnaire was to assess level of essential knowledge about JIA. The questionnaire included general knowledge (3 items), treatment and drugs complications knowledge (5 items), self-care knowledge (4 items) and disease relapse management (3 items). The correct answers were given one mark and the wrong or non-answered were given zero mark. Knowledge scores ranged from 0 to 15 with lower scores reflecting poorer knowledge about JIA.

In order to evaluate the satisfaction of JIA educational tools, patient satisfaction questionnaire was designed by using a 10-cm visual analog scale. It assessed the overall satisfaction of the educational tools and also addressed five main areas, including usefulness, understanding and clarity of contents, propriety, application and the interest of the educational tools. The scores ranged from 0 to 10 which 0 and 10 indicates not satisfied and the most satisfied, respectively.

Design and participants

This randomized controlled trial study was approved by the Ethics Committee of the Faculty of Medicine Ramathibodi Hospital, Mahidol University. All JIA patients diagnosed by International League of Associations for Rheumatology (ILAR) criteria (14) in the Ramathibodi pediatric rheumatology clinic or caregiver of patients, were enrolled. After need elaboration, informed consent had been obtained. Their caregiver also had provided informed consent if the participant was younger than 18 years. Knowledge and satisfaction questionnaires were answered by patients who graduated at least 8th grade or caregiver of patients who graduated under 8th grade. Patients or caregivers need to be able to read and communicate in the Thai language. Patients living in a nursing facility were excluded. A two-group randomized controlled design by using block size of four was used to compare efficacy of the two intervention groups which were a brochure (n=50) and a video (n=50). All participants answered knowledge questionnaire before (pretest), immediately after the intervention (immediate post-test) and at follow-up four weeks later (four-week post-test). Satisfaction questionnaire was completed immediately after reading the brochure or watching the video. Both groups received the same usual care and treatment based on standard guideline.

Baseline demographics data, including age, sex, disease duration, education level of patients and parents, employment status of parents, geographic region, JIA subtypes, disease activity, and health associated behaviors were collected from medical records and interviewing. Disease activity was assessed by Juvenile Arthritis Disease Activity Score 27 (JADAS-27) (15) and Wallace criteria (16). JADAS-27 score was calculated by summing the scores of four criteria: physician’s global assessment of disease activity (PGA); parents or patients’ global assessment of well-being; number of active joint count; and Erythrocyte sedimentation rate (ESR)(mm/h) using the formula ESR-20/10. The JADAS-27 scores ranged from 0 to 57 where high scores reflected active disease. Wallace criteria was used to define disease status in JIA

patients which can be classified into active disease, inactive disease, clinical remission on medication and clinical remission without medication (16). The criteria of Inactive disease patients are 1. No joints with active arthritis – defined by the American College of Rheumatology (ACR), 2. No fever, rash, serositis, splenomegaly, or generalized lymphadenopathy attributable to JIA, 3. No active uveitis, 4. Normal ESR or C-reactive protein (CRP) and 5. PGA indicates no disease activity. Clinical remission with medication defined as patients, who meet the criteria for inactive disease for a minimum of 6 consecutive months while the patient is taking medication. Clinical remission without medication defined as patients, who meet the criteria for inactive disease for a minimum of 12 consecutive months while the patient is off all anti-arthritis and anti-uveitis medication. Finally, patients who are not met inactive criteria were defined as active disease(16).

Statistical analysis

Continuous parameters were shown as mean and standard deviations and nominal parameters were shown as number and percentages. Nominal parameters were analyzed by chi-square test. Paired t-test was conducted to compare the mean knowledge scores of two time points. Non-normal distribution data were analyzed by Wilcoxon sign test. Differences between two independent groups were evaluated by T-test and Mann-Whitney U test. A statistical difference was set at P-value less than 0.05. SPSS-20 programme was conducted to analyze all data.

Trial registration

Trial registration: Thaiclinicaltrials.org 06/03/2020, TCTR20200310004, prospectively registered.

Results

Demographic data and clinical characteristics of all 100 JIA patients were shown in Table 1. Mean age of patients in the brochure and video group were 13.2 ± 4.6 years and 14.27 ± 5.11 years, respectively. Most of them were female (57%). Systemic JIA was the most common subtype in both groups. The average disease duration was 3.9 years in the brochure group, whereas in the video group was 6.5 years (p-value 0.086). There was no significant difference in all baseline demographic data. Regarding to the assessment of disease activity, patients in the brochure group (median JADAS-27 = 3.4) tended to have more severe disease activity than in the video group (median JADAS-27 = 1.9), but there was no statistical significance. According to educational level, most parents of JIA patients graduated below secondary school with 56% and 60% in the brochure and the video group (p-value 0.91). The average monthly family income per household was similar in both groups, which amounted to below 30,000 Thai baht. Among the participants, 67% answered the questionnaire by themselves and 33% answered by parents. A total of 100 respondents participated the pretest and immediate post-test. At the four-week post-test, there were 90 participants (42 and 48 participants in the brochure and the video group, respectively).

Baseline knowledge and changes after reading the brochure or watching the video was shown in Figure 1. The mean correct score rates prior to the intervention were 51% and 56% in the brochure group and video group, respectively (p-value 0.28). According to pretest knowledge, more than half of the participants had poor knowledge about immunization for JIA patients, how to deal when disease flares and knowledge about steroid usage. Considering disease duration, mean pretest scores were 6.35 ± 3.49 and 8.55 ± 3.36 in patients who had disease duration < 2 years (N=23) and ³ 2 years, respectively (P-value 0.08). Immediate post-test total knowledge scores showed a significant increase in both intervention groups (76% in the brochure with p-value <0.001 and 87% in the video group with p-value <0.001). Moreover, the total knowledge scores in the video group were significantly higher than in the brochure group (p-value 0.003). Also in parents of JIA patients whose educational level are below secondary school, mean immediate post-test scores were higher in video group, which were 10.36 ± 3.48 and 12.53 ± 2.16 in the brochure and the video group, respectively (p-value 0.006).

Immediate post-test knowledge scores in four domains were demonstrated in Table 2. Respondents' general knowledge and self-care about JIA in the video group were significantly better than in the brochure group (p-value <0.001 and 0.001, respectively). Although, knowledge about treatment and drugs complications and disease relapse management knowledge in the video group were better than in the brochure group; they were not statistically significant.

At four-week post-test, participants had better knowledge than pretest in all areas of knowledge. However, both the brochure and the video groups had significantly lower total knowledge scores when compared to the immediate post-test scores (p-value = 0.026 and < 0.001, respectively). There was no significant difference of the four-week post-test scores compared between the brochure and the video groups (p-value 0.141) (Figure 1). In order to evaluate four-week lasting effect in different knowledge domains, mean different scores between immediate and four-week post-test scores in both intervention groups were demonstrated in Table 3. Interestingly, the brochure group could retain the general knowledge at four weeks whereas participants in the video group could not (p-value 0.002). No significant differences in four-week lasting effect in other knowledge domains between both groups. For the detailed of four-week post-test knowledge questionnaire, participants had better knowledge about JIA symptoms. The mean correct answer scores for the question about JIA symptoms in all participants was 35%, 60% and 78% in pretest, immediate post-test and four-week post-test, respectively. In contrast, participants had poorer knowledge at four-week post-test about drug usage and its complication with the mean correct answer score at four-week post-test of 44% for steroid related question and 57% for methotrexate related question.

The satisfaction of the educational tools was demonstrated in Table 4. Participants in both groups were very satisfied with the educational tools. Even though participants in the video group were more satisfied in the usefulness, content clarity, propriety, application and interesting of the educational tool than participants in the brochure group, there were no significance.

Discussion

This study aimed to assess and compare the effect of a newly developed brochure and a video in the Thai language in JIA patients and their caregivers. This study showed that JIA disease knowledge could be improved by both educational tools especially in the video group. This can probably be explained by the video which combined text with animation that could convey JIA information to patients easily, but viewing the brochure did not. Additionally, previous studies demonstrated that the combination of multimedia picture, voice and text had more positive effect on patient's disease knowledge and awareness of disease (12, 13). This is in line with a previous study, which demonstrated that disease knowledge was significantly improved after reading the JIA comic book which combines text and figures and JIA knowledge was also retained after 1 year (9). Our results agreed with Netherlands study that evaluated the effect of a leaflet and a movie in knowledge about Lyme disease (17). Participants in the previous study had better knowledge and greater awareness about prevention of tick bites after both interventions. However, the knowledge was not retained when tested four weeks later in either the leaflet or the movie. Although our study showed that the video and the content matched brochure could not retain knowledge about JIA for longer than four weeks, disease knowledge was better than not receiving both interventions. This can be due to JIA is a complex and heterogeneous disease that needs long term combined therapy and complex care. In addition, our protocol did not allow participants to access the brochure and the video at home. Educational tools should be allowed to access them on demand and the doctor should inform patients in every visit in order to maintain disease related knowledge. Another reason is educational level is associated with health literacy and health related knowledge (18). In our study, level of education in most JIA patients' caregivers were below secondary school which was lower than in western countries (10, 19, 20). Additionally, about 70% of participants had monthly household income lower than Thai average monthly income per household in 2017 (21). This can imply that Thai JIA patients and their caregivers were in low socioeconomic and low educational status. In this context, the simple and combined text, illustration and animation in the educational tool - like video was suitably better for patients or parents with lower health literacy. Because the video can convey JIA related knowledge to patients more effective than the pictorial brochure, in resource-limited setting especially in family members who cannot access the Internet, giving the video to them in order to watching at the clinic might be useful and spending time wisely.

In terms of baseline disease knowledge, participants in our study had good knowledge about JIA. This is similar to the previous study, which revealed only 60% of total correct answer about JIA related questions (10). This might be due to long disease duration of patients in both studies, with mean disease duration from 4 to 6 years. In contrast, pretest scores about the knowledge regarding to immunization and drug therapy, including steroids, and methotrexate and their complications are very poor. This could be explained by the mean age of our patients which are about 13-14 years old which are nearly finished or finished all vaccines in Thai expanded programme on immunization (EPI) 2020 (22) resulting in physicians are not concerned about immunization advise. It will be beneficial if we know which JIA related knowledge area did not retain, so the physician can emphasize in that area.

This study is unable to show long-term knowledge retention. However, it is useful to know, which JIA related knowledge area is not retained after giving the educational tools in order to emphasize doctors to

give more advice in that area. This study showed that knowledge about medications especially steroids and its adverse effects is the poorest among all areas at four weeks. Possible description is that there is very low number of patients in our study who have been on steroids at the time that the study was conducted (only 2% of all patients). As a result, our patients might not be interested in or focus on this topic.

Although this study demonstrated the improvement of JIA related knowledge after receiving both educational tools, it might be more noteworthy if health outcomes and health related behaviors, for example, compliance, and medical adherence could be evaluated. Future research could assess if the brochure or the video helps alleviate poor disease outcome and also treatment adherence.

This study has several limitations. Firstly, we included both newly diagnosed JIA patients and patients who have been diagnosed JIA and followed up at the clinic for a while, so disease duration may affect baseline disease knowledge. Secondly, the four-week posttest questionnaire was given in the clinic and also via line application by using google form in case that patients could not come to the clinic at that time. This could lead to unreliable results since participants might look up answers from other educational resources. Last but not least, power of a statistical test is lower than the beginning of the study because some participants in both groups did not return the answers back by four weeks.

Conclusion

The JIA educational video was more effective than the pictorial brochure in improving immediately JIA related knowledge. This study provided evidence that JIA educational video helps improving JIA related knowledge among low socioeconomic JIA patients. However, the long-term retention of JIA related knowledge did not show the significant difference between both educational tools. Patients should be received the knowledge of JIA disease repeatedly to maintain JIA disease knowledge. Physicians should particularly explain about medication and their usage and vaccination to JIA patients.

List Of Abbreviations

ACR: American College of Rheumatology; cm: centimeters; CRP: C-reactive protein; DMARDs: disease-modifying antirheumatic drugs; EPI: expanded programme on immunization; ESR: Erythrocyte sedimentation rate; ILAR: International League of Associations for Rheumatology; IQR: interquartile range; JADAS-27: Juvenile Arthritis Disease Activity Score 27; JIA: juvenile idiopathic arthritis; NSAIDs: non-steroidal antiinflammatory drugs; PGA: physician’s global assessment of disease activity; PRINTO: the Paediatric Rheumatology INternational Trials Organisation; SD: standard deviation

Trial Registration

Trial registration: Thaiclinicaltrials.org 06/03/2020, TCTR20200310004, prospectively registered.

Declarations

Ethics approval and consent to participate

This randomized controlled trial study was approved by the Ethics Committee of the Faculty of Medicine Ramathibodi Hospital, Mahidol University (ID 595). Informed consent was obtained from participants aged over 18 years and caregivers of participants aged under 18 years. This study has been performed in accordance with the Declaration of Helsinki.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and /or analyzed during the current study will be available from the corresponding author on reasonable request

Competing interest

The authors declare that they have no conflict of interest.

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Not applicable

Author Contribution

SS made substantially contributions to the conception, design, interpretation of data, supervised the results, drafting the manuscript, and manuscript approval. WS was responsible for data collection, perform statistical analysis and drafting the manuscript. SV contributed to the conception, supervised the results, drafting the manuscript.

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Tables

Table1 Baseline and clinical characteristics of 100 participants in the brochure and the video groups

Characteristics	Brochure (N=50)	VDO (N=50)	p-value
Female (n, %)	26 (52%)	31 (62%)	0.419
Age, years (mean, SD)	13.2 (4.55)	14.27 (5.11)	0.270
JIA subtype (n, %)			
Systemic JIA	15 (30%)	22 (44%)	0.33
Polyarticular JIA	14 (28%)	14 (28%)	
Enthesitis related arthritis	12 (24%)	9 (18%)	
Oligoarticular JIA	7 (14%)	5 (10%)	
Others	2 (4%)	0 (0%)	
Mean disease duration, years (median, IQR)	3.9 (2.1, 8.2)	6.5 (2.9, 9.6)	0.086
JADAS-27 (median, IQR)	3.4 (0, 9.2)	1.9 (0, 7)	0.169
Wallace criteria (n, %)			
Active disease	26 (52%)	22 (44%)	0.473
Inactive disease	3 (6%)	3 (6%)	
Clinical remission	21 (42%)	25 (50%)	
Medications			
DMARDs	22 (44%)	20 (40%)	0.301
Biological DMARDs	16 (32%)	10 (20%)	
Steroid only	1 (2%)	3 (6%)	
NSIADs only	2 (4%)	1 (2%)	
No current medications	9 (18%)	16 (32%)	
Patient education level*(n, %)			

Secondary school	29 (91%)	27 (78%)	0.137
College	3 (9%)	8 (22%)	
Grade point average*(n, %)			
Below 3.0	12 (38%)	20 (57%)	0.137
Above 3.0	20 (62%)	15 (43%)	
Parent education level (n, %)			
Below secondary school	30 (60%)	28 (56%)	0.910
Vocational certificate	2 (4%)	3 (6%)	
Above bachelor degrees	18 (36%)	19 (38%)	
Region (n, %)			
Bangkok Metropolitan Region	7 (14%)	15 (30%)	0.053
Family income, THB/month (n, %)			
Below 30,000	34 (68%)	38 (76%)	0.330
Above 30,000	26 (52%)	12 (24%)	
Parents' occupation (n, %)			
Self-employed	17 (34%)	14 (28%)	0.150
Company employee	10 (20%)	21 (42%)	
Housewife	9 (18%)	4 (8%)	
Civil servant	9 (18%)	6 (12%)	
Farmer	5 (10%)	5 (10%)	

*Only in self-answering patients

Table 2 Immediate post-test knowledge mean correct scores in different domains between the brochure and the video groups

Knowledge domain	Mean correct score (%)		p-value
	Brochure (N=50)	Video (N=50)	
General knowledge	69.3	88.6	< 0.001*
Treatment knowledge	76.4	79.6	0.499
Self-care knowledge	78	92.5	0.001*
Relapsed management	79.3	88.7	0.065

All data were presented as N (%)

*p-value < 0.05 was set on significance

Table 3 Mean difference score between immediate and four-week post-test

Knowledge domain	Mean difference score		p-value
	Brochure (N=42)	Video (N=48)	
Total score	-0.68	-1.31	0.130
General knowledge	0.15	-0.36	0.002
Treatment knowledge	-0.49	-0.21	0.206
Self-care knowledge	-0.10	-0.40	0.124
Relapsed management	-0.32	-0.24	0.855

All data were presented as N (%).

* p-value < 0.05 was set on significance

Table 4 Patient satisfaction in the brochure and the video groups

Satisfaction domain	Satisfaction score* (%)		p-value
	Brochure (N=50)	Video (N=50)	
Overall satisfaction	92.4	94.1	0.530
Usefulness	88	91.3	0.290
Understanding and clarity of contents	84.3	89.1	0.200
Propriety	88.5	92.7	0.210
Application	88.6	92.3	0.240
Interesting	89.9	93.	0.350

All data were presented as N (%).

*Score using a 10-cm visual analog scale

** p-value < 0.05 was set on significance

Figures

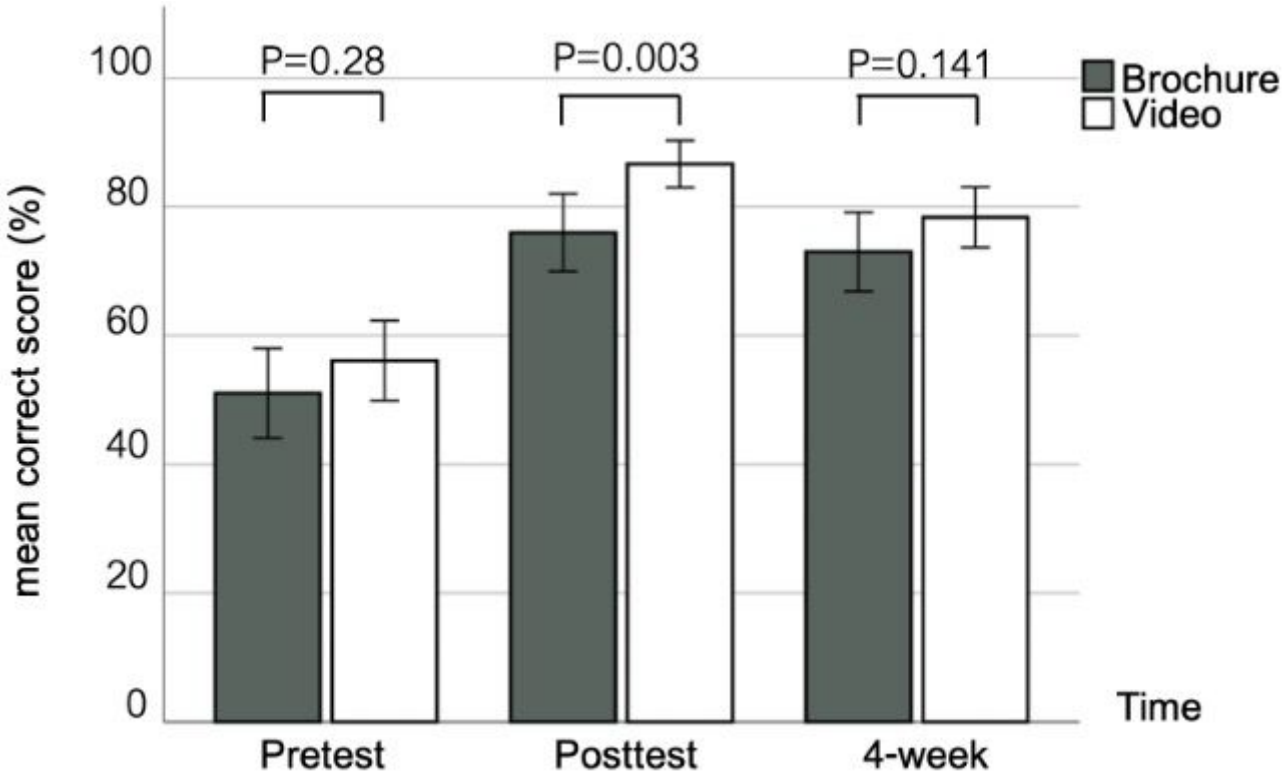

Figure 1

Total knowledge scores before and after reading the brochure or watching the video. *error bar, standard error

Supplementary Files

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