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Short communication

Online, game-based education for melanoma recognition: A pilot study

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ABSTRACT

Objective: To evaluate the effectiveness of a game-based learning (GBL) intervention, Tapamole, in improving recognition of the features of melanoma (MM) compared to a written education intervention.
Methods: Tapamole, an online education intervention, was developed using GBL. Participants were voluntarily recruited from the Dermatology waiting room and randomized to three groups: game, pamphlet, and no intervention. Participants completed a pre-intervention survey, post-intervention survey, and test on MM recognition. Clustered binary data equations were used to calculate sensitivity, specificity, and accuracy for each group and GEE model with log link was used to compare measures between groups.
Results: Sixty participants were recruited. The sensitivity for MM recognition in the game group was 100% compared to 95% for the pamphlet group. The specificity (40.8% vs 53.3%) and accuracy (60.6% vs 67.2%) of the game and pamphlet groups were similar. Participants in the game group reported higher enjoyment than those in the pamphlet group.
Conclusion: GBL was as effective as the written intervention in identifying features of MM.
Practice implications: With increasing use of the Internet for health information, it is critical to have effective online education interventions. GBL education tools are effective, enjoyable, and should be used to improve MM patient education.

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1. Introduction

Malignant melanoma (MM) is associated with significant mortality and health care expenditures [1]. Over the past several years, the incidence of MM has continued to increase [1], making it a serious public health concern. Given that the majority of MMs are discovered by patients and family members [2,3], education to improve early detection is critical. Lack of awareness about the disease leads to a delay in diagnosis [2]. Although MM allows for visual detection of lesions at early stages [4], patients are unfamiliar with the features of MM [2,5]. Patients who experienced changes in color, size, or elevation of a pigmented lesion waited approximately a year before seeing a physician [2,6]. Without improvement in educational strategies to improve awareness and increase familiarity with features of MM, it will continue to be a significant clinical and economic burden.

It has been suggested that online education tools may be more effective in educating patients about early detection of MM [7]. Game-based learning (GBL) is emerging as an effective educational strategy in medicine [8,9]. GBL incrementally introduces concepts and encourages learners to work towards an end goal by incorporating competition, points, and incentives [10]. By fostering an active learning experience, GBL increases retention, engagement, and motivation to learn [11]. The aim of our study is to assess the effectiveness of a GBL intervention, Tapamole, in improving recognition of the features of MM compared to a written education intervention.

2. Materials and methods

2.1. Intervention design

Tapamole was developed by a team of instruction design specialists, multimedia programmers and a dermatologist (AS) from Mayo Clinic. During the game, the user is instructed to select an MM image from a set of images that also contain benign nevi images. Selection of the MM images rather than benign nevi images allows users to progress through the game. The MM images were retrieved from a Mayo Clinic image database and had confirmed MM pathology. Benign nevi images were selected based on clinical and dermoscopic appearance. In total, Tapamole has 25

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Table 1
Background information and Demographics.

	Game Group (N = 20)	Pamphlet Group (N = 20)	Non-intervention Group (N = 20)	Total (N = 60)	p value
Age					0.7003
Mean (SD)	56.7 (18.1)	60.4 (16.9)	60.2 (11.2)	59.1 (15.5)	
Median	62	66.5	63	63	
Range	(20.0–80.0)	(26.0–90.0)	(36.0–73.0)	(20.0–90.0)	
Personal Hx of Skin Cancer					0.6051
No	13 (65.0%)	11 (55.0%)	14 (70.0%)	38 (63.3%)	
Yes	7 (35.0%)	9 (45.0%)	6 (30.0%)	22 (36.7%)	
Personal Hx of Melanoma					1.0000
No	19 (95.0%)	18 (90.0%)	19 (95.0%)	56 (93.3%)	
Yes	1 (5.0%)	2 (10.0%)	1 (5.0%)	4 (6.7%)	
Family Hx of Melanoma					NA
No	20 (100.0%)	20 (100.0%)	20 (100.0%)	60 (100.0%)	
Education Level					0.3503
Some high school/high school	6 (30.0%)	2 (10.0%)	3 (15.0%)	11 (18.3%)	
Some college	8 (40.0%)	7 (35.0%)	6 (30.0%)	21 (35.0%)	
College or beyond	6 (30.0%)	11 (55.0%)	11 (55.0%)	28 (46.7%)	
Internet Usage					0.7662
No	2 (10.0%)	1 (5.0%)	0 (0.0%)	3 (5.0%)	
Yes	18 (90.0%)	19 (95.0%)	20 (100.0%)	57 (95.0%)	
Internet Usage Frequency					0.1857
None	2 (10.0%)	1 (5.0%)	0 (0.0%)	3 (5.0%)	
At least once a day	15 (75.0%)	18 (90.0%)	19 (95.0%)	52 (86.7%)	
3–4 times a week	3 (15.0%)	1 (5.0%)	0 (0.0%)	4 (6.7%)	
Once a month	0 (0.0%)	0 (0.0%)	1 (5.0%)	1 (1.7%)	
Forms of internet usage – Desktop/Laptop					0.7495
No	4 (20.0%)	4 (20.0%)	2 (10.0%)	10 (16.7%)	
Yes	16 (80.0%)	16 (80.0%)	18 (90.0%)	50 (83.3%)	
Forms of internet usage – Smart Phone					1.0000
No	5 (25.0%)	4 (20.0%)	5 (25.0%)	14 (23.3%)	
Yes	15 (75.0%)	16 (80.0%)	15 (75.0%)	46 (76.7%)	
Forms of internet usage – iPad/Tablet					0.6218
No	9 (45.0%)	10 (50.0%)	7 (35.0%)	26 (43.3%)	
Yes	11 (55.0%)	10 (50.0%)	13 (65.0%)	34 (56.7%)	
Search for medical information online among patients who use internet	**N = 18**	**N = 19**	**N = 20**	**N = 57**	0.4543
No	1 (5.6%)	4 (21.1%)	3 (15.0%)	8 (14.0%)	
Yes	17 (94.4%)	15 (78.9%)	17 (85.0%)	49 (86.0%)	
Search for skin cancer online among patients who search medical information online	**N = 17**	**N = 15**	**N = 17**	**N = 49**	0.5270
No	10 (58.8%)	10 (66.7%)	8 (47.1%)	28 (57.1%)	
Yes	7 (41.2%)	5 (33.3%)	9 (52.9%)	21 (42.9%)	
Seen images of melanoma online among patients who search for skin cancer online	**N = 7**	**N = 5**	**N = 9**	**N = 21**	0.4186
Maybe	1 (14.3%)	0 (0.0%)	3 (33.3%)	4 (19.0%)	
No	0 (0.0%)	0 (0.0%)	1 (11.1%)	1 (4.8%)	
Yes	6 (85.7%)	5 (100.0%)	5 (55.6%)	16 (76.2%)	
Knowledge of someone with melanoma					0.2326
No	13 (65.0%)	14 (70.0%)	9 (45.0%)	36 (60.0%)	
Yes	7 (35.0%)	6 (30.0%)	11 (55.0%)	24 (40.0%)	
Know what melanoma looks like					0.2213
Maybe	6 (30.0%)	6 (30.0%)	4 (20.0%)	16 (26.7%)	
No	8 (40.0%)	4 (20.0%)	11 (55.0%)	23 (38.3%)	
Yes	6 (30.0%)	10 (50.0%)	5 (25.0%)	21 (35.0%)	
Average Confidence of melanoma recognition (1 to 5)					0.4825
Mean (SD)	2.4 (1.2)	2.4 (1.2)	2.0 (0.9)	2.3 (1.1)	
Median	2.5	2	2	2	
Range	(1.0–4.0)	(1.0–5.0)	(1.0–3.0)	(1.0–5.0)	
Interest in learning about melanoma					1.0000

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