مرکز آموزش عالی علوم پزشکی وارستگان

Efficacy of educational video game versus traditional educational apps at improving physician decision making in trauma triage: randomized controlled trial

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مشخصات ژورنال

- **British Medical Journal (BMJ)**
- Indexing: ISI, Scopus, PubMed ,DOAJ
- Published in 2017
- Impact Factor (2017) : 23.562
- Categories:

  - Medicine: Q1

لغات

Triage

Undertriage

Trauma

Non-traumatic

مقدمه و بیان مساله

تشخیص نیازمند جمع‌آوری و ادغام اطلاعات

صحت تشخیص نیازمند تجربه

در صورت عدم دقت قضاوت اشتباه درباره بیماری

بالا بودن میزان اشتباهات در ارجاع بیماران تروما

هدف کلی

توسعه یک بازی ویدئویی برای بهبود تصمیم گیری (کاهش خطا) پزشکان اورژانس در تریاژ مراکز غیر تروما و مقایسه اثر بخشی این بازی ویدئویی با اپ های آموزشی برجسته

روش اجرا

- **نوع مطالعه: RCT (کارآزمایی کنترل شده تصادفی)**
- **مکان مطالعه:** ایالات متحده آمریکا

- طراحی بازی
- جمع آوری اطلاعات پزشکان
- بررسی میزان رضایت پزشکان از کار با Ipad mini2
- ارسال ایمیل برای ۱۰۰ نفر در هر گروه پس از شش ماه

روش اجرا (ادامه)

مدل مفهومی

۱. بررسی علل خطا در تشخیص بیماران تروما

مشارکت کنندگان

۲. مشخص کردن موارد "representative" و "non-representative"

شیوه انجام مطالعه

روش اجرا (ادامه)

مدل مفهومی

مشارکت کنندگان

۱. پزشکان مراکز تروما III/IV

۲. آزمایش عاملی ۲X۲

۳. استفاده از Sata 13 برای تصادفی کردن نمونه

شیوه انجام مطالعه

روش اجرا (ادامه)

مدل مفهومی

مشارکت کنندگان

شیوه انجام مطالعه

۱.کارکردن با IPad

۲.پرشسنامه اطلاعات دموگرافیک

۳.پرسشنامه بررسی کیفی میزان استفاده از مداخله

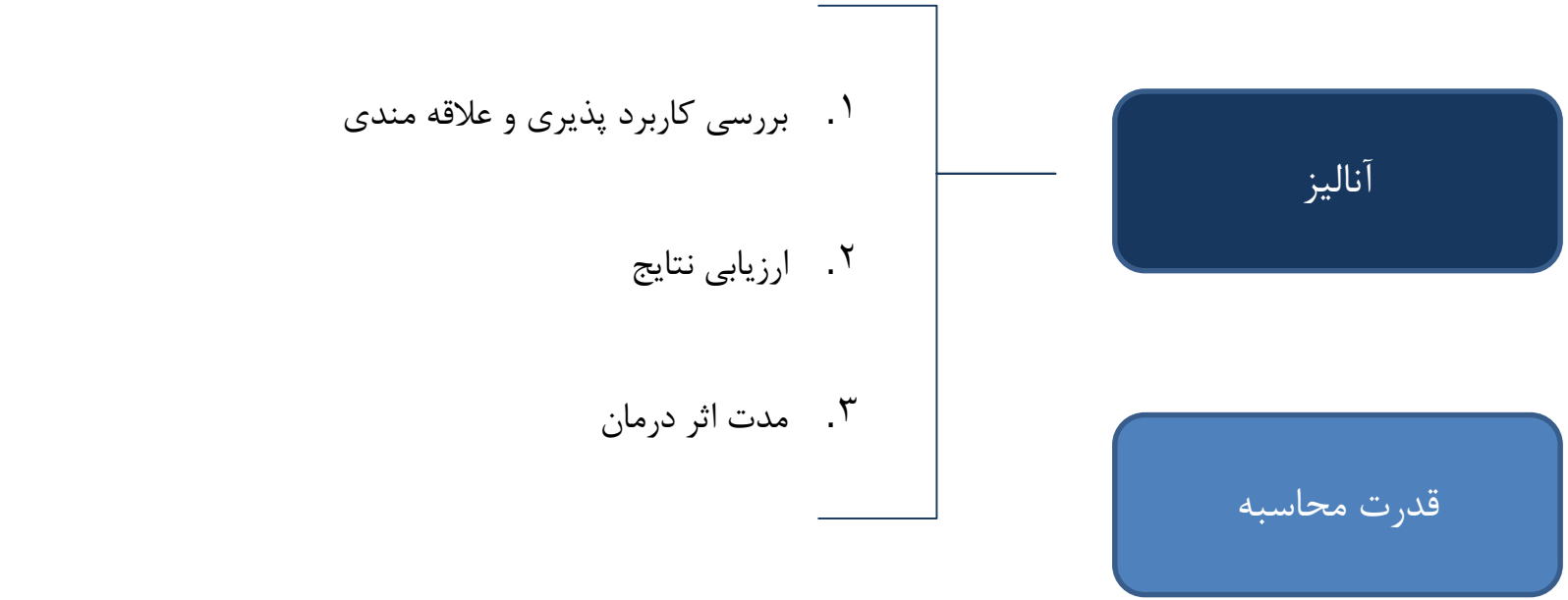
۴.گروه بازی محور

۵.گروه آموزش محور

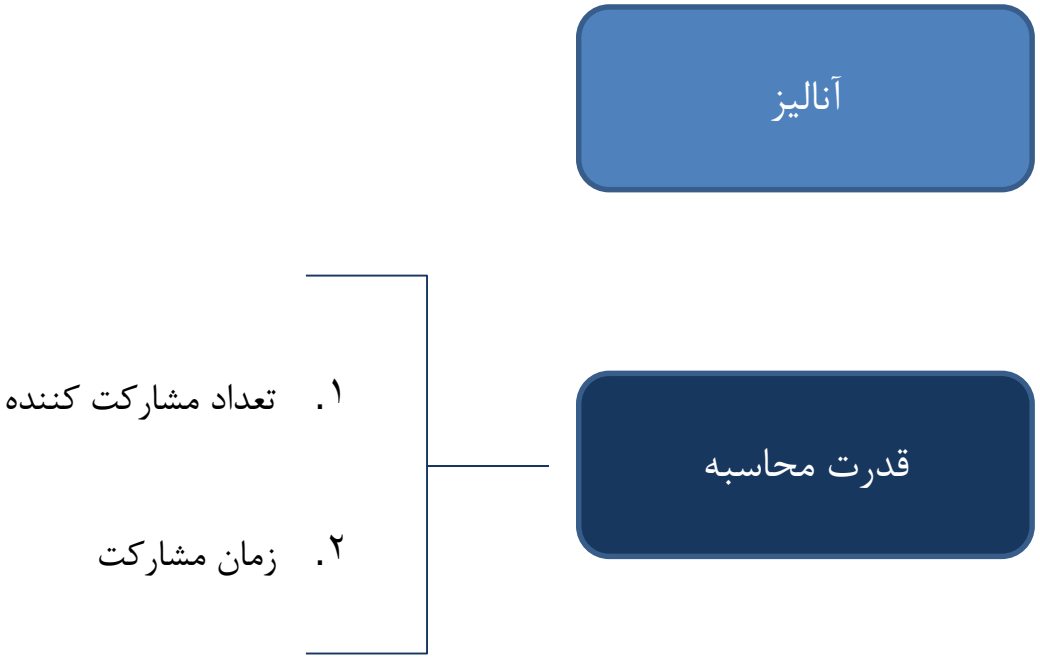
۶.ارزیابی نتایج

۷.ارزیابی مدت اثر درمان

روش اجرا (ادامه)



روش اجرا (ادامه)



روش اجرا (ادامه)

شیوه مطالعه

- ✓ صرف یک‌ساعت زمان با Ipad
- ✓ ورود به وب سایتی ایمن برای پاسخ به پرسشنامه ها
- ✓ بررسی اطلاعات دموگرافیک و اطلاعات مربوط به تجربه افراد
- ✓ بررسی کیفی کاربرد پذیری و علاقه مندی

روش اجرا (ادامه)

شیوه مطالعه (ادامه)

بازی ویدئویی

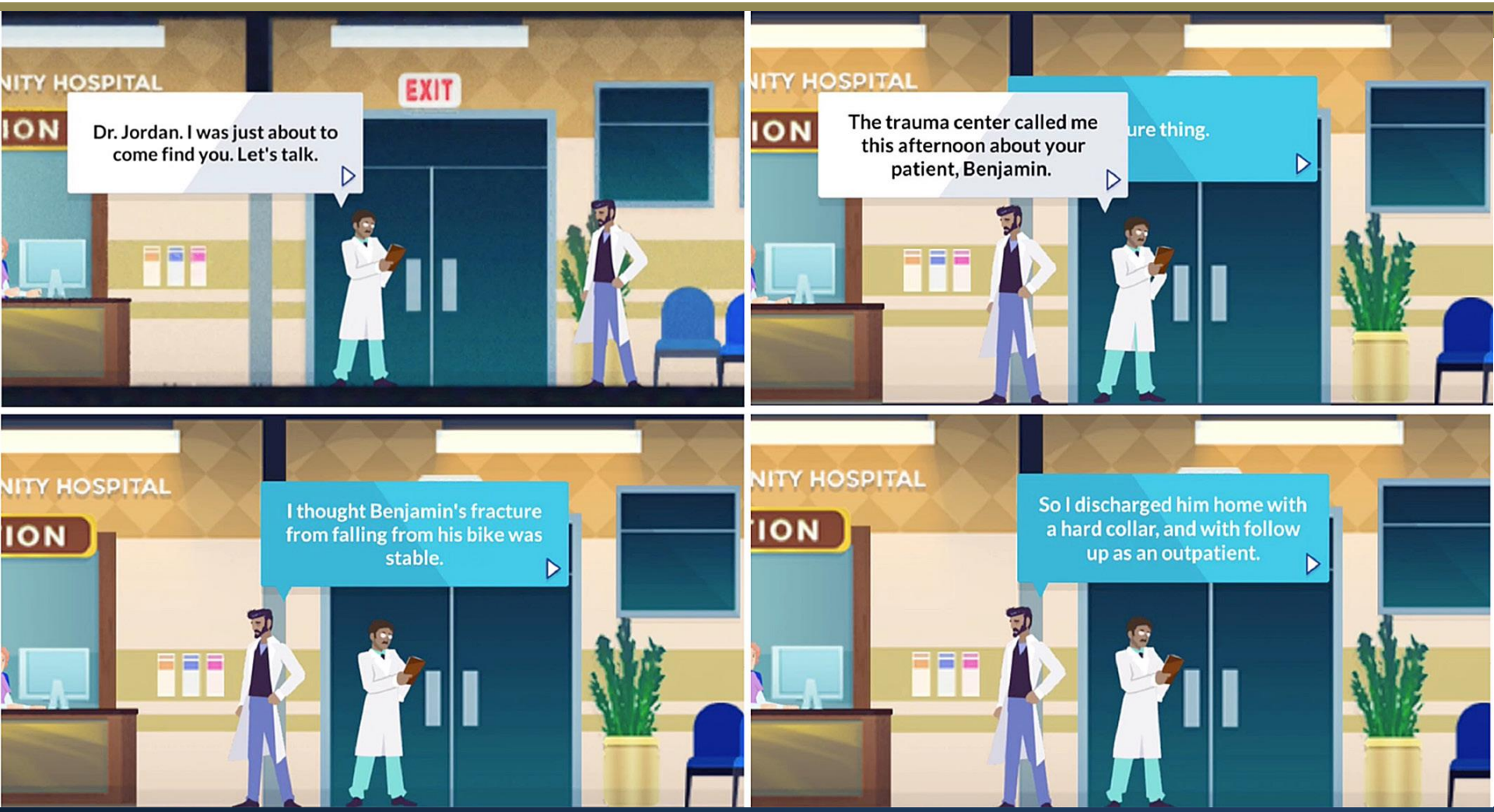
✓ میزان آسیب دیدگی سه گروه همواره «شدید» تلقی می شود مگر این که خلاف آن ثابت گردد:

۱. بیماران بالای ۷۰ سال

۲. افرادی که بیش از یک ناحیه‌ی بدن درگیر آسیب شده

۳. افرادی که از شکستگی دنده یا شکستگی باز یک استخوان بلند رنج می برند

روش اجرا (ادامه)



روش اجرا (ادامه)

شیوه مطالعه (ادامه)

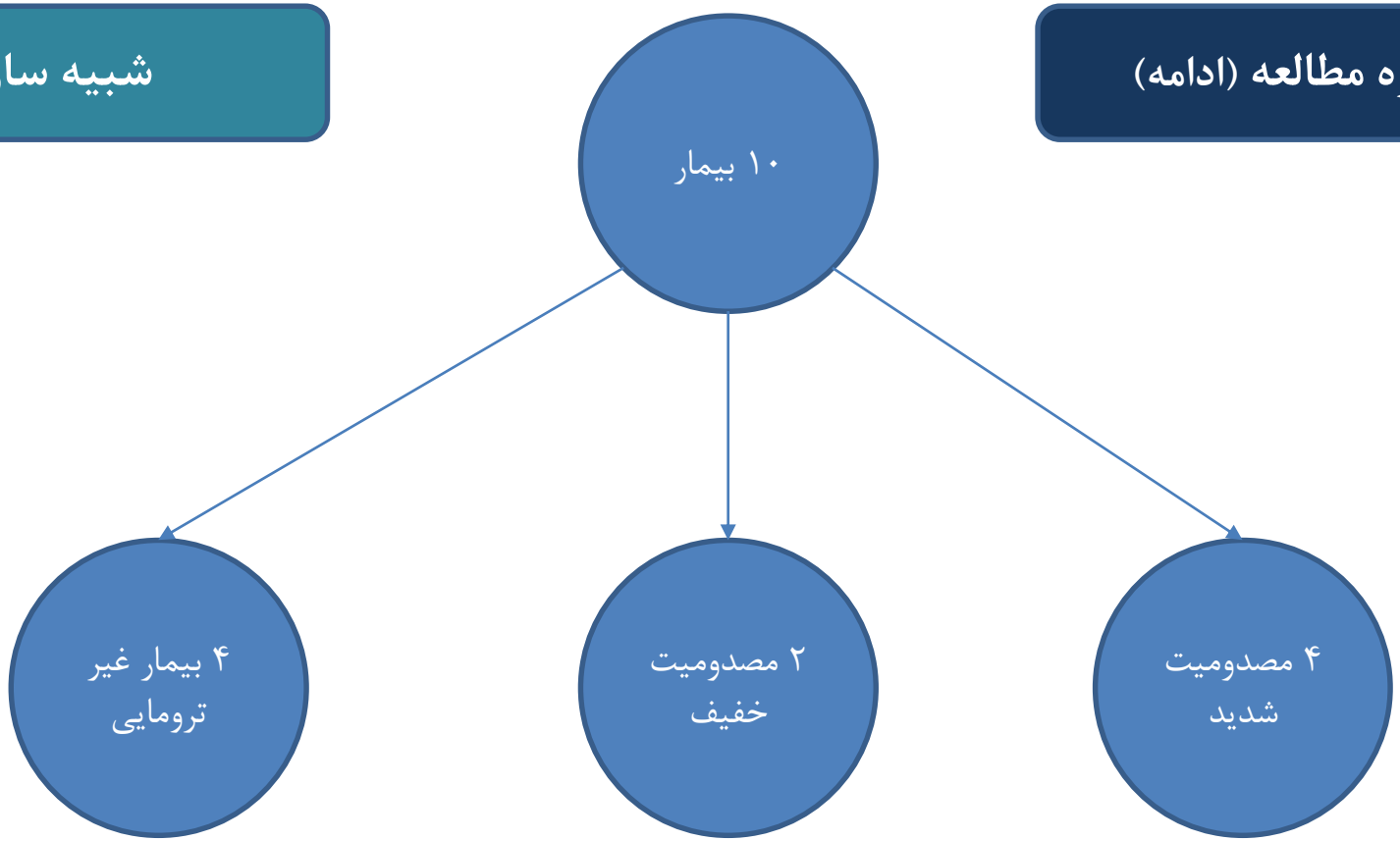
آموزش

- ✓ استفاده از دو برنامه آموزشی:
  - ✓ myATLS
  - ✓ Trauma Life Support MCQ Review
- ✓ انجام ۵۵۰ تست چند گزینه

روش اجرا (ادامه)

شیوه مطالعه (ادامه)

شبیه ساز



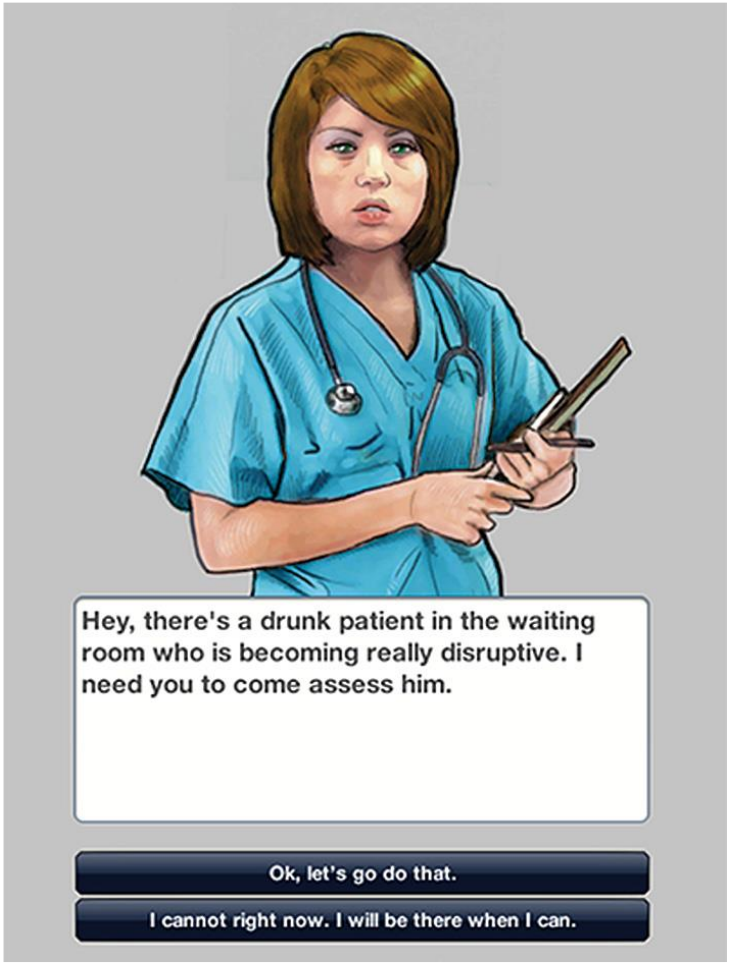
روش اجرا (ادامه)

شیوه مطالعه (ادامه)

بار شناختی بالا

بار شناختی پایین

روش اجرا (ادامه)



روش اجرا (ادامه)

شیوه مطالعه (ادامه)

بعد از ۶ ماه برروی ۱۰۰ نفر از اعضای هر گروه دوباره ارزیابی انجام شد البته در این دوره تمام افراد در شبیه ساز با بار شناختی بالا شرکت کردند.

نتایج

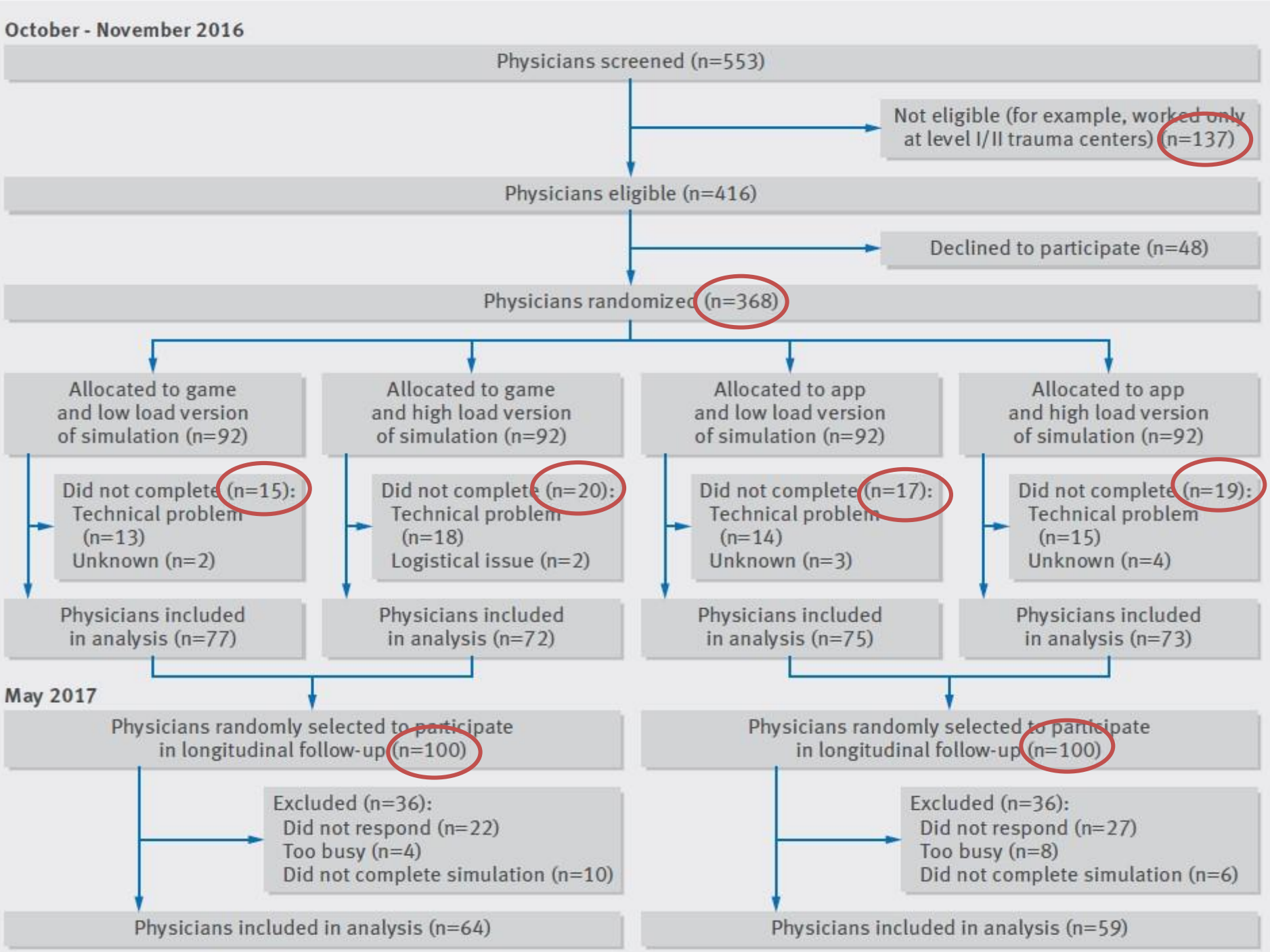

October - November 2016
Physicians screened (n=553)
Not eligible (for example, worked only at level I/II trauma centers) (n=137)
Physicians eligible (n=416)
Declined to participate (n=48)
Physicians randomized (n=368)
Allocated to game and low load version of simulation (n=92)
Allocated to game and high load version of simulation (n=92)
Allocated to app and low load version of simulation (n=92)
Allocated to app and high load version of simulation (n=92)
Did not complete (n=15):
Technical problem (n=13)
Unknown (n=2)
Did not complete (n=20):
Technical problem (n=18)
Logistical issue (n=2)
Did not complete (n=17):
Technical problem (n=14)
Unknown (n=3)
Did not complete (n=19):
Technical problem (n=15)
Unknown (n=4)
Physicians included in analysis (n=77)
Physicians included in analysis (n=72)
Physicians included in analysis (n=75)
Physicians included in analysis (n=73)
May 2017
Physicians randomly selected to participate in longitudinal follow-up (n=100)
Physicians randomly selected to participate in longitudinal follow-up (n=100)
Excluded (n=36):
Did not respond (n=22)
Too busy (n=4)
Did not complete simulation (n=10)
Excluded (n=36):
Did not respond (n=27)
Too busy (n=8)
Did not complete simulation (n=6)
Physicians included in analysis (n=64)
Physicians included in analysis (n=59)

Table 1 | Characteristics of participating physicians in study of effect of video game versus traditional educational apps on triage decisions in simulated trauma cases. Figures are numbers (percentage) unless stated otherwise

Characteristic	Game		Educational apps	
	Initial study (n=149)	Follow-up study (n=64)	Initial study (n=148)	Follow-up study (n=58)
Mean (SD) age (years)	40 (9.4)	38 (7.5)	40 (8.4)	38 (7.3)
Female	47 (32)	28 (44)	54 (37)	18 (31)
Mean (SD) years of experience	9.1 (9.0)	8.2 (7.4)	8.0 (8.1)	7.7 (7.4)
Race:				
White (non-Hispanic)	104 (70)	45 (70)	97 (66)	37 (63)
White (Hispanic)	11 (7)	4 (6)	12 (8)	4 (7)
Black	4 (3)	2 (3)	6 (4)	1 (2)
Asian	25 (17)	13 (20)	25 (17)	14 (24)
American Indian	2 (1)	0 (0)	3 (2)	1 (2)
Other	3 (2)	0 (0)	5 (3)	2 (4)
Primary board certification:				
Emergency medicine	141 (95)	61 (95)	142 (96)	58 (98)
Internal medicine/family practice	7 (5)	3 (5)	3 (2)	1 (2)
Other	1 (1)	0 (0)	2 (1)	0 (0)
ATLS certified	105 (71)	49 (77)	102 (69)	41 (71)
Practice at trauma center:				
Level I	15 (10)	6 (9)	5 (3)	2 (3)
Level II	9 (6)	3 (5)	7 (5)	3 (5)
Level III	19 (13)	7 (11)	23 (16)	10 (17)
Level IV	5 (3)	3 (5)	2 (1)	1 (2)
None	101 (68)	45 (70)	110 (75)	42 (72)
Means (SD) score for personality traits*:				
Extraversion	3.5 (1.0)	3.6 (0.97)	3.6 (1.0)	3.5 (1.01)
Agreeableness	3.6 (0.79)	3.5 (0.78)	3.6 (0.81)	3.6 (0.9)
Conscientiousness	4.3 (0.57)	4.3 (0.6)	4.3 (0.68)	4.3 (0.7)
Neuroticism	2.2 (0.83)	2.3 (0.89)	2.1 (0.82)	2.1 (0.9)
Openness	3.4 (0.89)	3.2 (0.83)	3.6 (0.91)	3.6 (0.96)

*Assessed with Big Five Inventory-10.[33]

نتایج(ادامه)

Table 2 | Assessment of triage decision making by physicians randomized to video game versus traditional educational apps based on educational programs on simulated trauma cases with analyses of variance

	Proportion under-triaged (No)				
	Video game	Educational apps	Estimated difference (95% CI)	F statistic	P value
Main model	0.53 (149)	0.64 (148)	0.11 (0.05 to 0.16)	4.91	<0.001
Sensitivity analyses					
Excluding physicians who work at trauma centers	0.56 (125)	0.65 (135)	0.09 (0.03 to 0.15)	0.29	0.002
Excluding physicians who experienced usability issues	0.53 (105)	0.64 (136)	0.11 (0.05 to 0.17)	12.53	<0.001
Excluding cases in which patient died	0.64 (149)	0.76 (148)	0.12 (0.06 to 0.18)	17.23	<0.001
Post hoc analyses					
Types of cases:					
Representative cases	0.44 (149)	0.47 (148)	0.03 (−0.05 to 0.11)	0.58	0.45
Non-representative cases	0.63 (149)	0.81 (148)	0.18 (0.11 to 0.25)	24.81	<0.001
Adherence:					
Exposure <75 min	0.59 (51)	0.67 (33)	0.08 (−0.03 to 0.19)	2.25	0.13
Exposure 75-105 min	0.53 (85)	0.63 (91)	0.09 (0.02 to 0.17)	6.61	0.01
Exposure›105 minutes	0.36 (13)	0.65 (24)	0.29 (0.13 to 0.45)	13.32	<0.001
Likeability:					
Did not report enjoying intervention	0.56 (149)	0.60 (148)	0.04 (−0.11 to 0.18)	0.28	0.60
Six month follow-up:					
Duration of treatment effect	0.57 (64)	0.74 (59)	0.17 (0.09 to 0.25)	16.14	<0.001

Table 3 | Assessment of triage decision making by physicians randomized to video game versus traditional educational apps based on educational programs on simulated trauma cases with Poisson regression models

	Relative risk (95% CI)	P value
Main model (n=297)		
Exposure to video game (reference: educational program)	0.86 (0.75 to 0.99)	0.04
Completion of outcome assessment under conditions of high cognitive load (reference: low load)	1.06 (0.94 to 1.20)	0.34
Sensitivity analyses		
Excluding physicians who work at level I/II trauma center (n=260):		
Exposure to video game (reference: educational program)	0.86 (0.78 to 0.95)	0.003
Completion of outcome assessment under conditions of high cognitive load (reference: low load)	1.02 (0.92 to 1.12)	0.73
Excluding physicians who experienced usability issues with interventions (n=241):		
Exposure to video game (reference: educational program)	0.82 (0.74 to 0.92)	0.001
Completion of outcome assessment under conditions of high cognitive load (reference: low load)	0.99 (0.90 to 1.10)	0.92
Excluding cases in which patients died (n=297):		
Exposure to video game (reference: educational program)	0.84 (0.78 to 0.91)	<0.001
Completion of outcome assessment under conditions of high cognitive load (reference: low load)	1.02 (0.94 to 1.10)	0.66
Post hoc analyses		
Cases with representative severe injuries (n=297):		
Exposure to video game (reference: educational program)	0.93 (0.78 to 1.11)	0.45
Cases with non-representative severe injuries (n=297)		
Exposure to video game (reference: educational program)	0.78 (0.70 to 0.86)	<0.001
Adherence (n=297):		
Exposure to video game (reference: educational program)	0.82 (0.75 to 0.90)	<0.001
Time spent on intervention: 75-105 min (reference <75 min)	0.92 (0.83 to 1.01)	0.11
Time spent on intervention: >105 minutes (reference <75 min)	0.84 (0.71 to 0.99)	0.04
Likeability (n=297)		
Exposure to video game (referent: educational program)	0.81 (0.72 to 0.91)	<0.001
Did not describe liking intervention (reference: liked intervention)	1.04 (0.92 to 1.19)	0.45
6 month follow-up study		
Duration of treatment effect (n=122)		
Exposure to video game (reference: educational program)	0.77 (0.67 to 0.88)	<0.001

نتایج(ادامه)

Table 4 | Sensitivity analysis to test effect of missing outcome data in study of effect of video game versus traditional educational apps based on educational programs with analyses of variance

	Proportion of under-triage			
	Video game	Educational apps	Mean difference (95% CI)	P value
Main analysis (n=297)	0.53	0.64	0.11 (0.05 to 0.16)	<0.001
Assumptions for scenario 1 (n=368)				
Missing physicians in game arm would have performed similarly to those observed in educational arm and missing physicians in educational arm would have performed similarly to those observed in their cohort	0.55	0.64	0.09 (0.03 to 0.14)	0.003
Assumptions for scenario 2 (n=368)				
Missing physicians in game arm would have performed similarly to those observed in their cohort and missing physicians in educational arm would have performed similarly to those observed in game arm	0.53	0.62	0.09 (0.03 to 0.14)	‹0.002
Assumptions for scenario 3 (n=368)				
Missing physicians in game arm would have performed similarly those observed in educational arm and missing physicians in educational arm would have performed similarly those observed in game arm	0.55	0.62	0.07 (0.01 to 0.12)	0.02

نتایج(ادامه)

Table 5 | Adherence, usability, and likeability of video game versus traditional educational apps. Figures are numbers (percentage) unless stated otherwise

	Game		Educational apps	
Measure	Data	Example of qualitative feedback	Data	Example of qualitative feedback
Median (IQR) time spent on intervention (min)*	90 (60-120)	NA	90 (65-120)	NA
Described problem with usability of apps	44 (30)	Not much of a gamer but enjoyed the app. Loved the mystery solving aspect of the game - found it annoying that if you accidentally clicked on "discharge" a "multi-trauma patient" for example, you could not go back and edit your mistake	12 (8)	The myATLS app is useful but the user interface could be improved...A better interface would make the otherwise useful info better. The review app has great questions, but is also in need of a better user interface. The questions are great and it's very responsive, but could be improved to the standard of other quiz apps
Commented positively about likeability of intervention†	60 (40)	The game, Night Shift, was a really fun experience. The story was interesting and had my attention to details as I wanted to solve the mystery and to connect the dots. It felt realistic and I could put myself in a position of the main character	135 (91)	The iPad apps were very user friendly. I completed questions while I was on a flight, and it was actually entertaining and made the time go by quickly. If I wanted to review a specific topic from a question, I could easily pull up the chapter
Commented negatively about likeability of intervention	89 (60)	The overall effect seemed more of a distraction than a help. I am not sure if I am to be more concerned with the "US NAVY" or the fact that elderly with trauma do better at a trauma hospital. The entire time I was playing the game I kept focusing on who wrote this the program and what their goal might be	13 (9)	myATLS was too superficial. More of an outline rather than substantive reading

NA=not applicable.
*Participants were asked to use their intervention(s) for minimum of one hour and to report their usage.
†Participants could provide both positive and negative feedback about their interventions.

بحث

- ✓ بار شناختی تاثیری در تصمیم گیری ندارد
- ✓ "non-representative"
- ✓ همه به بازی علاقه مند نبودند:
  - ✓ مشکلات گیم پلی
  - ✓ سن افراد
  - ✓ سلیقه

محدودیت های مطالعه

- ✓ تعداد محدود افراد
- ✓ تعداد محدود موارد شبیه ساز
- ✓ شبیه سازی مجازی

نتیجه گیری

EFFICACY OF VIDEO GAME VERSUS TRADITIONAL EDUCATIONAL APPS AT IMPROVING PHYSICIAN DECISION MAKING IN TRAUMA TRIAGE

دیدگاه من

- ✓ اضافه کردن شبیه ساز به خود بازی
- ✓ استفاده از موارد واقعی ثبت شده در پرونده ها
- ✓ بررسی نشدن تجربه کاری

با تشکر از توجه شما