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Advancing Team Cohesion: Using an Escape Room as a Novel Approach

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Advancing team cohesion: Using an escape room as a novel approach

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Abstract

Objective: An escape room was used to study teamwork and its determinants, which have been found to relate to the quality and safety of patient care delivery. This pilot study aimed to explore the value of an escape room as a mechanism for improving cohesion among interdisciplinary healthcare teams.

Methods: This research was conducted at a nonprofit medical center in Southern California. All participants who work on a team were invited to participate. Authors employed an interrupted within-subjects design, with two pre- and post-escape room questionnaires related to two facets of group cohesion: (belonging – (PGC-B) and morale (PGC-M)). Participants rated their perceptions of group cohesion before, after, and one-month after the escape room. The main outcome measures included PGC-B/M.

Results: Sixty-two teams participated (n = 280 participants) of which 31 teams (50%) successfully "escaped" in the allotted 45 minutes. There was a statistically significant difference in PGC between the three time periods, $F(4, 254) = 24.10$, $p < .001$; Wilks' $\Lambda = .725$; partial $\eta^2 = .275$. Results indicated significantly higher scores for PGC immediately after the escape room and at the one-month follow-up compared to baseline.

Conclusions: This work offers insights into the utility of using an escape room as a team building intervention in interprofessional healthcare teams. Considering the modifiability of escape rooms, they may function as valuable team building mechanisms in healthcare. More work is needed to determine how escape rooms compare to more traditional team building curriculums.

Keywords

Communication and teamwork in health care, games, team communication, team collaboration, patient safety

Introduction

A major challenge facing healthcare organizations today is creating effective teams. Healthcare teams exist in all areas of a hospital system, including surgery, nursing, radiology, human resources, information technology, and finance. Due to the complex nature of healthcare systems, healthcare teams are commonly forced to function with multidisciplinary and multi-professional members, under extreme time pressures, and with ambiguous information – frequently in high-risk situations.[1,2] Effective teams are contingent upon effective teamwork, and teamwork is connected to the quality and safety of healthcare delivery systems.[3–5]

Recent research has demonstrated the importance of strengthening group cohesion or "an individual's sense of belonging to a particular group and his or her feelings of morale associated with membership in the group" to improve teamwork.[6(p.482),7,8] With respect to healthcare teams, Mickan and Rodger (2005) found that cohesion is among six conceptual categories that are consistently present when distinguishing effective

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teams.[9] In one study, group cohesion was found to increase job satisfaction and reduce emotional exhaustion among providers.[10] In another study it has been found to be a significant predictor of patient falls in a nursing home setting, with better work group cohesion positively impacting patient safety.[11]

While effective teams are widely recognized as the building blocks of patient-centered, quality care,[12] and the importance of group cohesion cannot be understated, team development opportunities are not typically part of the healthcare educational process.[13] Team-building interventions to improve team outcomes are also uncommon,[14] despite evidence indicating that such team-building activities improve team outcomes.[15]

One novel practice-based application for team-building experiences involves escape rooms. Simulated environments, such as escape rooms, present a unique opportunity to study and enhance team cohesion. Escape rooms are interactive experiences in which teams are "locked in a room" with a series of puzzles and tasks which they must work together to solve in order to "escape" within a certain amount of time.[16] Commercial escape rooms (those designed and used for profit by individual companies) have been found to provide participants with the opportunity to practice collaboration skills, leadership skills and conflict management.[17]

Given the inherent reliance of healthcare on effective teams, escape room team interventions naturally have multiple applications within healthcare and are receiving increased attention towards this end. One recent literature review exploring escape rooms used in healthcare research identified 25 articles published within the last three years.[18] The papers identified in this review discussed the use of escape rooms in a number of healthcare domains including anesthesia, dentistry, nursing, occupational therapy, pharmacy, emergency medicine, public health, and radiology. Most articles (84%) utilized escape rooms for education, while the remaining focused on teambuilding and recruiting. In this review, educational escape room studies focused primarily on the development of technical skills, while a smaller percentage explored non-technical skills. Another review of 23 recently published articles found that escape room activities may enhance teamwork and collaboration among healthcare populations as well as facilitate the delivery of content aimed to teach skills required in healthcare environments.[19] For instance, escape rooms have been found to create opportunities to practice non-technical skills,[20,21] improve confidence among medical students,[22] as well as enhance communication and patient safety awareness among interprofessional healthcare teams.[23] Escape rooms have also been effectively utilized to advance learning among pharmacy students[24,25] and

radiology residents,[26] and to educate healthcare learners about sepsis assessment[27] and event reporting.[28]

Although there is evidence to suggest the utility of escape rooms for enhancing teamwork, team outcomes, and learning outcomes, there is limited literature investigating the use of escape rooms for improving cohesion among healthcare teams. To our knowledge, only three studies have investigated cohesion using an escape room among adult groups of friends,[29] university students/recent grads[30] and elementary students.[31] Only two studies have explored this among healthcare team members; one among dentistry students[32] and another among medical trainees.[33] In all of these studies, cohesion was assessed either only immediately after[32] or both immediately before and after participation in the escape room. Because the influence of escape rooms on cohesion is nascent with only two studies focusing on healthcare teams and none of the prior work examining cohesion over time, it is important to expand this work to better understand the utility of escape rooms to improve cohesion among healthcare teams specifically. Moreover, cohesion emerges over time as team members interact; therefore, it should be explored longitudinally,[8] something that has yet to be studied (likely due to logistic challenges limiting longitudinal measurement)[8] among healthcare team members using escape rooms.

Given the limited evidence of using escape rooms in this way, coupled with the criticality of teamwork and team outcomes concerning healthcare teams, the aims of this pilot study are twofold: 1) to investigate the value of an escape room for team building and 2) to evaluate the role of an escape room as a mechanism to improve perceived group cohesion longitudinally.

Method

This pilot study was conducted at a large, nonprofit academic medical center in Los Angeles, California. This research complied with the American Psychological Association Code of Ethics and was approved by the medical center's Institutional Review Board (IRB). Informed consent was obtained from each participant.

Upon IRB approval, researchers developed the escape room as a mechanism to study team behavior and enhance team cohesion for employees at the medical center. The study ran from October 1, 2018 to January 17, 2019 in a simulation laboratory located about one mile north of the main medical center.

Escape room

Teams of three to six individuals had to work together to complete challenging tasks to "escape the room"

(i.e., solve over nine puzzles) as quickly as possible within a 45-minute time limit. Participants could ask for up to three hints which they had to request directly from the room administrator who was observing them from a separate control room. The control room was configured with A/V equipment that allowed researchers to receive auditory and visual feedback from the escape room and microphones that allowed for real-time communication with participants over speakers (see Figure 1).

The escape room was themed as a scientist's laboratory (see Figure 2). This setting (as opposed to a medical or clinical setting) was used to eliminate the concern that certain individuals may feel more comfortable or experienced with the tasks and theme. Upon entering the room, teams were informed that a dangerous poison had been released into the air and that they had only 45 minutes to find the appropriate components to create a cure. The escape room included nine locked areas and employed a variety of puzzle types, including finding hidden objects, jigsaw puzzle assembly, and coordinated symbol retrieval (i.e., decoding a hidden message). If teams did not successfully solve each puzzle and create the cure as instructed within the 45 allotted minutes, they would fail the task.

Prior to the activity, moderators, commonly known as "game masters",[34] provided participants with a costume (a numbered lab coat to identify them for subsequent analysis, disposable bouffant cap, and protective eyewear), and explained the rules of the activity. Costs incurred in building the escape room were minimal, as most supplies were obtained freely from storage units or other parts of the hospital involved in simulation or staff education.

Figure 1. Control room setup.

Figure 2. Escape room configuration.

Participants

All teams from the medical center (which houses 2,000 medical staff members and 10,000 employees) were invited to participate in the research study and were recruited using an internal, campus-wide newsletter. Interested teams were sent an email that included a description of the study, an information sheet, and a link to an online demographic questionnaire and the pre-escape room surveys. No clinical training or experience were required to participate in the escape room and teams included individuals from clinical and non-clinical departments of the medical center. Teams consisted of between three and six team members who currently work together (i.e., intact teams).

Research design

This pilot study employed an interrupted within-subjects design, with pre- and post-escape room questionnaires; we collected measures of perceived group cohesion immediately before, immediately after, and one-month after the escape room activity for the purpose of within-groups comparisons. Consistent with the purpose of this research, escape room activities focused on teambuilding and cohesion.

Measures

Before and at two time periods following participation in the escape room (i.e. immediately after the escape room and at one-month follow-up), participants rated their perceptions of cohesion using the Perceived Group Cohesion (PGC) scale[35] (a six-item questionnaire with a seven-point, Likert-type scale). The cohesion scale includes two dimensions: "Belonging" (PGC-B), which measures a sense of belongingness

(association with cohorts), and "Morale" (PGC-M), which measures feelings of morale (motivation to achieve organizational goals).[35]

Finally, overall team performance was measured using participants' time required to escape and number of hints used. During data analysis, authors focused on changes in PGC scores after participation in the escape room.

Procedure

After expressing interest in the escape room activity, participants were scheduled and the following questionnaires were administered prior to participation in the escape room activity: 1) a demographic questionnaire, 2) the Perceived Group Cohesion scale

On the day of participation, teams arrived at the escape room location, completed the escape room experience, and answered post-participation questionnaires (PGC). One month later, follow-up data collection was conducted wherein prior participants were asked to complete the PGC scale again. Data were analyzed using SPSS Statistics (Version 24).

Results

Descriptive analysis

A total of 62 teams participated in the escape room ($n = 280$ participants, 67% female, 33% male) of which 31 teams (50%) successfully "escaped" in the allotted 45 minutes (see Table 1). A variety of health-care teams participated. Included in the sample were clinicians (18% – RNs, MDs, pharmacists, health technicians), administrators (67% – financial teams, project/program coordinators, directors, managers, recruiters, patient services representatives,
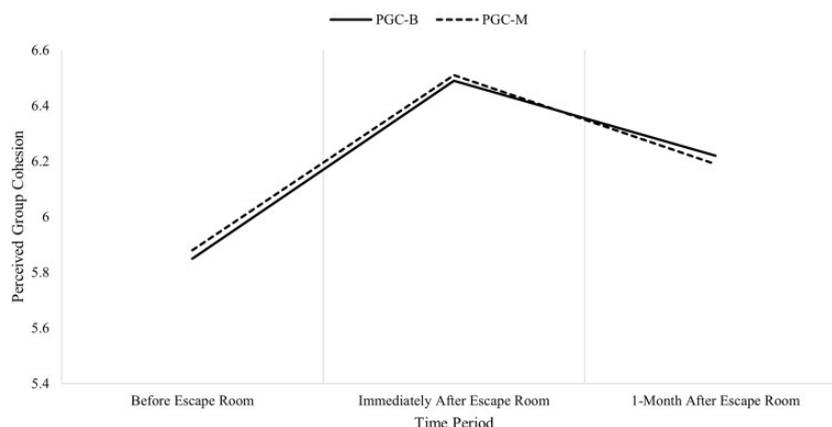

Figure 3. Perceived group cohesion – belong (PGC-B) and perceived group cohesion – moral (PGC-M), at pre-, immediate post-, and 1-month follow-up escape room time periods.

Table 1. Hints and time to complete.

Variable	Minimum	Maximum	Mean	Std. deviation
Number of hints used	2	3	2.82	.385
Amount of time taken to complete the room in minutes (if completed)	27.23	45.00	41.86	4.6

Table 2. Summary of reliability coefficients.

Measure	Time period	Cronbach's alpha
Perceived group cohesion	Pre-escape room	.944
	Post-escape room	.975
	One-month follow-up	.968

Table 3. Descriptive statistics for PGC-B and PGC-M.

Variable	N	Mean	Std. deviation
PGC-B (before escape room)	258	5.89	1.13
PGC-B (immediately after escape room)	258	6.53	0.92
PGC-B (one-month after escape room)	258	6.22	1.07
PGC-M (before escape room)	258	5.90	1.07
PGC-M (immediately after escape room)	258	6.54	0.89
PGC-M (one-month after escape room)	258	6.19	1.04

administrative assistants), and researchers/engineers (15% – researchers, engineers, analysts, graduate students). While all participants were invited to give their responses on the Perceived Group Cohesion scale, it was not compulsory. As a result, the sample sizes listed in the tables below vary as a function of the number of survey responses that were collected at each time period.

Reliability of dependent measures

Before beginning any analyses utilizing PGC, we first assessed the reliability of the PGC scale at each time period. A summary of reliability coefficients can be found in Table 2. The PGC scale exhibited acceptable reliability at each time period.

Multivariate differences in cohesion over time

A one-way repeated measures multivariate analysis of variance (MANOVA) was used to assess differences in perceptions of group cohesion (PGC-B and PGC-M) at three time periods: before participation in the escape room, immediately following participation in the escape room, and a follow-up period one-month after their participation in the escape room. PGC-B and PGC-M were the dependent variables and time was the independent variable with three levels. Means and standard deviations are reported in Table 3. There was a statistically significant difference between the three

time periods on the combined dependent variables, $F_{(4, 254)} = 24.10$, $p < .001$; Wilks' $\Lambda = .725$; partial $\eta^2 = .275$. This model accounted for approximately 28% of the variance in participants' aggregated perceptions of group cohesion (see Figure 3).

Univariate differences in cohesion over time

There was a statistically significant difference in PGC-B between the three time periods, $F_{(2, 514)} = 47.892$, $p < .001$; partial $\eta^2 = .157$. This model accounted for approximately 16% of the variance in PGC-B. There was also a statistically significant difference in PGC-M between the three time periods, $F_{(2, 514)} = 47.554$, $p < .001$; partial $\eta^2 = .156$. This model accounted for approximately 16% of the variance in PGC-M.

We performed multiple post-hoc paired samples t-tests to identify where these significant differences in PGC-B and PGC-M occurred among the three time periods. These results are reported in Table 4. Both variables significantly increased from baseline immediately following the escape room. Both variables significantly decreased from immediately after the escape room to the one-month follow-up. Both variables were significantly higher than baseline at the one-month follow-up.

Table 4. Significant differences in PGC-B and PGC-M across time periods.

Variable pair	Mean difference	Std. deviation	t	df	Sig. (2-tailed)
PGC-B (before escape room) & PGC-B (immediately after escape room)	−.633	1.202	−8.782	277	$p < 0.01$
PGC-B (before escape room) & PGC-B (one-month after escape room)	−.337	1.060	−5.107	257	$p < 0.01$
PGC-B (immediately after escape room) & PGC-B (one-month after escape room)	.312	1.000	5.025	259	$p < 0.01$
PGC-M (before escape room) & PGC-M (immediately after escape room)	−.621	1.149	−9.013	277	$p < 0.01$
PGC-M (before escape room) & PGC-M (one-month after escape room)	−.287	1.078	−4.279	257	$p < 0.01$
PGC-M (before escape room) & PGC-M (one-month after escape room)	.358	1.024	5.629	259	$p < 0.01$

Correlations between performance variables and perceived cohesion

We used Pearson product-moment correlations to assess relationships between measures of performance in the escape room and PGC (PGC-B and PGC-M) at each time period. There were weak, significant, positive correlations between escape outcome and immediate post-room perceptions of belongingness ($r = .140$, $n = 280$, $p = .019$) and morale ($r = .137$, $n = 280$, $p = .022$). Escaping the room was associated with higher perceptions of belongingness and cohesion immediately after the activity. There were also weak, significant, negative correlations between the amount of time taken to escape the room in seconds with immediate post-room perceptions of belongingness ($r = −.139$, $n = 280$, $p = .02$) and morale ($r = −.140$, $n = 280$, $p = .019$). Taking more time to escape the room was associated with lower perceptions of belongingness and cohesion immediately after the activity (see Table 5).

Discussion

In this pilot study, individuals reported a stronger sense of group cohesion over time, but these measures decreased at the one-month follow-up period. We did not investigate the reason for decreased scores specifically; however, this may be attributable to decay, team attrition, and institutional turnover that naturally occurs in the span of a given month. Regardless, the decrease in the PGC measure of cohesion does imply that team-building efforts need a concerted sustainment plan in order to secure results over time. Recent work has echoed the importance of sustainment efforts to ameliorate decay.[36,37] Sustainment efforts are particularly valuable with healthcare teams, as healthcare teams are prone to staff turnover and the resulting

reconfigurations of teams may result in detriments of the team-building intervention.

Because all team-building efforts would require sustainment plans to ensure that desired knowledge, behaviors, and attitudes are exhibited without decay, an escape room becomes a valuable interventional strategy. Escape rooms encourage novel[38] methods that are easily adaptable for continuing education or refresher courses. With more traditional teamwork curriculum, it is often challenging to incorporate novel materials; therefore, participants are simply exposed to the same materials at later periods. Being exposed to identical material has two drawbacks. One, learners may begin to familiarize themselves with the material and are able to maintain their scores simply due to repeated exposure as opposed to actual learning.[39] Two, learners may become less engaged and motivated which can detract from learning.[40,41] Future research, however, should explore the use of an escape room compared to more traditional continuing education curriculums.

Limitations

Measures used in this study were self-report; therefore, results are limited in that the data is based upon individuals' self-perceptions. Similarly, the inability to measure non-self-reported group cohesion precluded any kind of comparison with the administered self-report measures of team cohesion. However, perceptions have been found to be reliable predictors of actual changes in teamwork dynamics; individual perceptions of teamwork have been found to have the potential to influence actual individual performance, and thus, actual team performance.[38] Further, evidence suggests that perceptions of group cohesion are associated with job satisfaction and intent to stay in a current role,[42] and have been found to have a positive impact

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Table 5. Correlations between PGC and escape room performance.

Variable		Escape outcome	# of hints used	Time to complete (s)	PGC-B (T1)	PGC-M (T1)	PGC-B (T2)	PGC-M (T2)	PGC-B (T3)	PGC-M (T3)
Escape outcome	Pearson correlation	1								
	Sig. (2-tailed)									
	N	280								
# of hints used	Pearson correlation	−.476**	1							
	Sig. (2-tailed)	.000								
	N	280	280							
Time to complete (s)	Pearson correlation	−.691**	.603**	1						
	Sig. (2-tailed)	.000	.000							
	N	280	280	280						
PGC-B (T1)	Pearson correlation	.072	−.095	−.075	1					
	Sig. (2-tailed)	.233	.114	.212						
	N	278	278	278	278					
PGC-M (T1)	Pearson correlation	.040	−.059	−.036	.833**	1				
	Sig. (2-tailed)	.510	.328	.555	.000					
	N	278	278	278	278	278				
PGC-B (T2)	Pearson correlation	.140*	−.041	−.139*	.370**	.376**	1			
	Sig. (2-tailed)	.019	.493	.020	.000	.000				
	N	280	278	280	278	278	280			
PGC-M (T2)	Pearson correlation	.137*	−.011	−.140*	.288**	.365**	.943**	1		
	Sig. (2-tailed)	.022	.856	.019	.000	.000	.000			
	N	280	280	280	278	278	280	280		
PGC-B (T3)	Pearson correlation	.026	.079	−.042	.538**	.449**	.502**	.429**	1	
	Sig. (2-tailed)	.671	.203	.502	.000	.000	.000	.000		
	N	260	260	260	258	258	260	260	260	
PGC-M (T3)	Pearson correlation	.040	.046	−.067	.471**	.479**	.435**	.443**	.904**	1
	Sig. (2-tailed)	.524	.458	.281	.000	.000	.000	.000	.000	
	N	260	260	260	258	258	260	260	260	260

T1: before escape room; T2: immediately after escape room; T3: one month after escape room.
*Indicates that a correlation is significant at the 0.05 level (2-tailed).
**Indicates that a correlation is significant at the 0.01 level (2-tailed)

on moderating negative effects of stress exposure among nurses.[43]

Results reported in our study may also be limited by demand characteristics or cues that make participants aware of how they are expected to behave or what the researcher expects to find (e.g., improved cohesion after participation).[44] In this study, the research team made every effort to reduce demand (e.g., remaining as neutral as possible when describing the research project and collecting data); however, the nature of the activity being a team-building exercise with surveys conducted before and after participation may have been apparent to a participant, raising the concern that they respond "appropriately" in an effort to be a "good participant". Notably, determining the presence of demand characteristics is difficult given that group cohesion was measured using a self-report survey, and was not explored objectively.

Teams in this pilot study self-selected to participate in the escape room, and likely consisted of members who enjoyed working together. As a result, it is possible that teams were already highly cohesive prior to participating in the study, potentially limiting the study findings. Moreover, we focused on investigating teams with stable membership (i.e., those with fixed or consistent team members),[45] despite many healthcare teams involving dynamic membership. While it is possible that teams with dynamic team membership have different perceptions of cohesion, it is still valuable to assess teams with more stable membership as these teams do exist in healthcare. Most teams in healthcare are interprofessional; however, not all teams are dynamic. Consider, for example, pediatric cardiac teams,[46] ophthalmology teams,[47] and primary care teams[48] which often consist of the same group of individuals. Additional research efforts should compare escape rooms as a team building intervention using teams with dynamic membership.

Conclusion

This pilot study aimed to better understand the utility of using an escape room as an interprofessional team building intervention tool. Specifically, we sought to understand how an escape room might influence perceptions of cohesion in the healthcare setting. Our results indicate that an escape room may be a worthwhile mechanism; however, we urge researchers to conduct more investigations as the evidence surrounding escape rooms is still in its infancy.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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