Effect of two 12-minute culturally targeted films on intent to call 911 for stroke

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ABSTRACT

Objective: We assessed the behavioral effect of two 12-minute culturally targeted stroke films on immediately calling 911 for suspected stroke among black and Hispanic participants using a quasi-experimental pretest-posttest design.

Methods: We enrolled 102 adult churchgoers (60 black and 42 Hispanic) into a single viewing of one of the 2 stroke films—a Gospel musical (English) or Telenovela (Spanish). We measured intent to immediately call 911 using the validated 28-item Stroke Action Test in English and Spanish, along with related variables, before and immediately after the intervention. Data were analyzed using repeated-measures analysis of variance.

Results: An increase in intent to call 911 was seen immediately following the single viewing. Higher self-efficacy for calling 911 was associated with intent to call 911 among Hispanic but not black participants. A composite measure of barriers to calling 911 was not associated with intent to call 911 in either group. A significant association was found between higher stroke symptom knowledge and intent to call 911 at baseline, but not immediately following the intervention. No sex associations were found; however, being older was associated with greater intent to call 911. The majority of participants would strongly recommend the films to others. One participant appropriately called 911 for a real-life stroke event.

Conclusions: Narrative communication in the form of tailored short films may improve intent to call 911 for stroke among the black and Hispanic population. *Neurology*® 2016;86:1992-1995

GLOSSARY

BRFSS = Behavioral Risk Factor Surveillance System; **STAT** = Stroke Action Test.

Ambulance use is associated with earlier hospital arrival and increased likelihood of receiving acute stroke treatments.¹ However, data from a nationally representative sample of emergency department visits show that the proportion of stroke patients arriving by ambulance has not appreciably changed over the past decade, remaining at 51%.²

Stroke knowledge is poorer among the black and Hispanic population.³ Despite a higher risk of stroke, black patients experience greater delays to hospital arrival and are less likely to receive acute stroke thrombolysis compared to white patients.⁴ Due to low stroke event rates, surrogate outcome measures, such as stroke symptom knowledge and intent to call 911, are often used to evaluate the efficacy of stroke education interventions.

We present the results of the first phase of a 2-phase study designed to (1) develop and pilot test 2 narrative communication stroke education films and (2) evaluate the effectiveness of the films on improving stroke knowledge and intent to call 911 in a 2-arm cluster randomized controlled trial using a separate, adequately powered sample.⁵

METHODS Pilot design. We enrolled a convenience sample of 102 (60 black and 42 Hispanic) adult congregants from 2 churches. They participated in an unanticipated viewing of either an English or Spanish stroke film in the church sanctuary during regular Sunday service. Using a quasi-experimental, pretest-posttest design, we compared participants' scores between pretest and immediate posttest following a single viewing of the film.

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Standard protocol approvals, registrations, and patient consents. We obtained ethics approval from our institutional review board and informed consent from all participants.

Intervention. Using a community-engaged approach and theoretical underpinnings (Health Belief Model; figure),⁶ we developed two 12-minute, narrative health communication tools—a Gospel musical in English and a Telenovela in Spanish—to educate black and Hispanic participants about stroke symptoms and response. We placed special emphasis on ambiguous symptoms, such as transient and slight symptoms, and the therapeutic benefit of early hospital arrival. Details regarding the intervention development have been reported elsewhere.⁵

Assessments. We measured the effect of these films on intent to call 911 before and after the film screening using the self-administered Stroke Action Test (STAT).⁷ The validated STAT instrument (Cronbach $\alpha = 0.83$) contains 28 items: 21 stroke items—expressed through hypothetical acute stroke scenarios—and 7 distractors. We also assessed participants' engagement with the film, barriers to calling 911 (6-item composite), self-efficacy for calling 911 (8-item composite), and stroke symptom knowledge (5-item composite) based on the Behavioral Risk Factor Surveillance System (BRFSS).⁸ Demographic data were also collected.

Data analysis. Analyses were performed using SAS PROC Mixed, with adjustments for the correlation within participants induced by repeated measures. The outcome variable was the STAT. Covariates included barriers to calling 911, self-efficacy, and perceived likelihood of having a stroke in the next 5 years. A test variable was created to indicate pre, post, or delayed posttest (black participants only). This variable was treated categorically, allowing for comparisons of the STAT score between pre and posttest. The black and Hispanic samples were analyzed separately.

RESULTS Demographics. The mean age of participants was 44.6 for black participants and 54.9 for Hispanic participants. Approximately 72% ($n = 43$) of black participants were women, vs 79% ($n = 33$) of Hispanic participants. One-third of participants reported employment status, 99% of whom were gainfully employed.

Attitude toward the film. Most participants (>70%) identified with the films' characters and >80% found the films interesting and realistic. Using a 4-point Likert scale, more than 95% in both groups "totally" or "very much" agreed with the

Figure Role of stroke films in the Health Belief Model for the acute stroke situation

Adapted from the National Institute of Neurological Disorders and Stroke Stroke Proceedings of a National Symposium on Rapid Identification and Treatment of Acute Stroke.⁶ STAT = Stroke Action Test.

statement “It is likely that I will recommend this film to others.”

Increase in knowledge about treatment. Knowledge of time-dependent stroke treatment increased significantly in both groups following the intervention (~20%). However, there was no significant association between passing the STAT and thinking there is medication available at the hospital for treatment of a stroke ($p > 0.05$).

Increase in intent to call 911. Consistent with the original STAT article,⁷ we used 75% as a passing score (16/21 correct). Thirty-eight percent of black participants passed at baseline and 82% passed immediately following the intervention. Comparatively, 24% of Hispanic participants passed at baseline and 59% passed immediately following the intervention (table 1).

Bivariate association of covariates with intent to call 911. Table 1 shows the scores for the STAT at pretest and immediate posttest. Although internal consistency estimates for the BRFSS stroke symptom knowledge composite were low, 0.22 for Hispanic participants and 0.14 for black participants, higher stroke symptom knowledge composites were associated with greater intent to call 911 on the STAT at baseline (Hispanic participants $r = 0.475$, $p = 0.002$; black participants $r = 0.473$, $p < 0.001$; Spearman $r = 0.470$ for both, $p = 0.002$, $p < 0.001$, respectively). No significant associations were observed between symptom knowledge and 911 intent at immediate

posttest, suggesting that improved 911 response may occur independently of knowledge. No sex associations were found at baseline; however, being older was associated with greater intent to call 911 (Hispanic participants $r = 0.32$, $p = 0.04$; black participants $r = 0.40$, $p < 0.01$).

Multivariate predictors of intent to call 911. Increased intent to call 911 was seen immediately following the intervention (table 1). This remained significant at 3 months among black participants ($p < 0.001$). Due to logistical barriers related to access, we were unable to collect 3-month data from Hispanic participants. Higher self-efficacy for calling 911 was associated with higher STAT scores among Hispanic participants ($p < 0.01$), but not black participants. Barriers to calling 911 were not associated with intent in either group (table 2).

Real-world 911 activation. One week postintervention, a 51-year-old black study participant, with no prior stroke experience, recognized stroke (speech difficulty and right facial droop) in her 80-year-old uncle and immediately called 911. He initially refused to go to the hospital when the ambulance arrived, but was convinced by the study participant—actions she attributed to the film.

DISCUSSION A brief, culturally tailored film focused on improving perceived severity of stroke symptoms and the need to immediately call 911 may improve intent to call 911.

Studies have shown no significant correlation between stroke symptom knowledge and calling 911 for stroke.⁹ This discrepancy has been attributed to findings suggesting that the decision to call 911 is determined more by the perception of symptom severity (from the Health Belief Model) than on symptom knowledge.¹⁰ Compared to most studies, which show high baseline intent to call 911 for stroke by the public,⁴ we found low baseline intent to call 911. This is more consistent with real-world ambulance use,³ with only 38% of black participants and 24% of Hispanic participants demonstrating baseline intent to call 911 based on a passing STAT score. We attribute this to the use of an instrument (STAT) with established reliability and validity,⁷ rather than an adaptation of the BRFSS instrument that is commonly used in stroke education studies.⁸ The BRFSS may not adequately reflect the acute stroke situation because of a potential response bias related to the provision of the stroke diagnosis in its 911 questions. The low internal consistency of the BRFSS measure observed in our study may also play a role. Finally, while our anecdotal report of behavior change (calling 911 for an actual stroke event) does not constitute evidence for effectiveness, it highlights the importance of a witness.

Table 1 Stroke Action Test (STAT) outcomes

	Pretest		Immediate posttest			p Value
	No.	Mean (SD) or %	No.	Mean (SD) or %		
Black respondents						
STAT: No. of questions answered correctly (21 items)	60	12.42 (5.88)	62	18.71 (4.02)	<0.001	
STAT: % of questions answered correctly (out of 21)	60	59.13 (28.00)	62	89.09 (19.15)	<0.001	
STAT: Pass or fail test (16/21 considered passed)					<0.001	
Failed	37	61.7	11	17.7		
Passed	23	38.3	51	82.3		
Hispanic respondents						
STAT: No. of question answered correctly (21 items)	42	9.17 (6.39)	41	15.22 (6.12)	<0.001	
STAT: % of questions answered correctly (out of 21)	42	43.65 (30.41)	41	72.47 (29.15)	<0.001	
STAT: Pass or fail test (16/21 considered passed)					0.001	
Failed	32	76.2	17	41.5		
Passed	10	23.8	24	58.5		

t Tests were used to compare pretest and immediate posttest scores for the continuous STAT. The likelihood χ^2 test was used to compare pretest and immediate posttest pass status.

Table 2 Multivariate results for Stroke Action Test (STAT) for black and Hispanic participants, including covariates

	Black sample			Hispanic sample		
	Estimate	SE	p Value	Estimate	SE	p Value
Intercept	19.0063	2.8196	<0.001	8.3259	0.9673	<0.001
Immediate posttest (compared with pretest)	5.6118	0.8050	<0.001	0.1375	0.3521	0.698
Delayed posttest (compared with pretest)	3.3449	0.9096	<0.001	—	—	—
Barrier to call 911 (higher score indicates greater degree of barriers)	−0.9789	0.6532	0.136	0.1546	0.1753	0.381
Self-efficacy (higher score indicates lower self-efficacy)	−1.0038	0.6973	0.152	−0.6947	0.2875	0.018
How likely do you think it is that you will have a stroke in the next 5 years? (1 = very likely; 5 = not at all likely)	−0.7110	0.5842	0.226	−0.1636	0.2407	0.499

The STAT was scored in the positive direction, with a higher score indicating more questions answered correctly. SAS Proc Mixed was used in all analyses, with adjustments for the correlation within participants induced by repeated measures. The test variable was treated categorically, creating an analysis of covariance type mixed model. Delayed posttest (compared with pretest) represents the difference of the STAT scores from pretest to delayed posttest. Immediate posttest (compared with pretest) represents the difference of the STAT scores at pretest to immediate posttest.

Our study has several limitations: (1) it uses a small sample, which may threaten generalizability; (2) it lacks a control group; (3) no data on long-term retention among Hispanic patients is provided due to access barriers; and (4) behavioral intent, while approximating actual behavior, does not always correlate with the latter. These limitations are being addressed in the second phase of the overarching study, an adequately powered, 2-arm, cluster randomized controlled study.⁵

Our study provides preliminary data on a novel, easy to implement method for improving 911 activation for stroke.

AUTHOR CONTRIBUTIONS

Olajide Williams' individual contributions included drafting/revising the manuscript for content, study concept or design, study supervision, and interpretation of data. Ellyn Leighton-Herrmann's individual contributions included drafting/revising the manuscript for content and study coordination. Alexandra DeSorbo's individual contributions included drafting/revising the manuscript for content, study coordination, and acquisition of data. Joseph P. Eimicke's individual contributions included drafting/revising the manuscript for content, statistical analyses, and interpretation of data. Amparo Abel-Bey's individual contributions included drafting/revising the manuscript for content and acquisition of data. Lenfis Valdez's individual contributions included drafting/revising the manuscript for content and acquisition of data. James Noble's individual contributions included drafting/revising the manuscript for content, study concept or design, and interpretation of data. Madeline Gordillo's individual contributions included drafting/revising the manuscript for content and acquisition of data. Joseph Ravenell's individual contributions included drafting/revising the manuscript for content and study concept or design. Mildred Ramirez's individual contributions included drafting/revising the manuscript for content, statistical analyses, and interpretation of data. Jeanne A. Teresi's individual contributions included drafting/revising the manuscript for content, study concept or design, statistical analyses, and interpretation of data. Girardin Jean-Louis's individual contributions included drafting/revising the manuscript for content and study concept or design. Gbenga Ogedegbe's individual contributions included drafting/revising the manuscript for content and study concept or design.

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