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Therapeutic Relationship and Study Adherence in a Community Health Worker-Led Intervention

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Abstract

Community health workers (CHWs) are increasingly utilized to reach low-resource communities. A critical domain influencing success is the CHWs' ability to create and maintain a therapeutic relationship with the participants they serve. A limited evidence base exists detailing this construct, and evaluating CHW-participant relationships in the context of CHW-led programs. In a longitudinal study design, data on this therapeutic relationship were collected [as captured using The Scale to Assess the Therapeutic Relationship in Community Mental Health Care (STAR)] on 141 participants who had been assigned to a CHW during their perinatal period. Results indicate that therapeutic relationship was associated with the participant's psychosocial health, and independently predicted study adherence in the longitudinal intervention. Changes in therapeutic relationship over the months following birth were strongly associated with changes in anxiety and depression symptoms. A trustful relationship is critical in ensuring CHWs can effectively reach the population they serve. The findings offer additional psychometric evidence of the uses and benefits of STAR outside of the traditional clinical setting in the context of public health research.

Keywords

STAR; Community health worker; Pregnancy; Structural equation modeling; Therapeutic relationship; Study adherence

Introduction

To foster engagement of medically underserved communities and address health disparities, health programs regularly utilize community health workers (CHWs) [1]. CHWs are leaders often from the same community they serve, and as a result, are uniquely capable of establishing vital links with both health providers and community members to reduce barriers and change behavior among community members [2]. The ability to develop these links—sometimes referred to as a therapeutic alliance or therapeutic relationship—is

fundamental in determining the success of CHWs, as well as the projects that engage them to reduce health risks through improved access [3].

While many projects have enacted CHW-led programs to develop these relationships [1, 4], process and outcome evaluation metrics to monitor and evaluate this construct are limited [3]. Evaluation is tracked most commonly through output statistics (number of visited, participants educated, or program completed), or through changes in the participant's behavior (knowledge, compliance, health outcome) [5, 6]. However, no measurement exists to evaluate CHWs based on the therapeutic alliance they create with the participant beyond simple client satisfaction surveys [7].

A similar problem existed for years in the Community Psychiatry field, where relationship development was necessary for therapy and program success. Therapeutic alliance was understood in this field as the affective and collaborative bond existing between a therapist and their patient [8]. Also termed therapeutic relationship (TR), this concept was argued to be influential in treatment adherence and health outcome [9]. To address this issue, the Scale to Assess the Therapeutic Relationship (STAR) was developed to assess the clinician–patient relationship more substantively [9]. Most studies that have used STAR in the field found the rating to be related to shared decision–making preferences [10], greater visit satisfaction [11], and treatment adherence [12]. The scale has also been associated with predictors of health behavior, such as health locus of control [13], personal trust [12], and attachment avoidance [14]. Finally, studies have even found STAR to be associated with improved health outcomes like recovery orientation [14], and recovery process inventory [13].

Our team recently validated a modified version of the STAR for use in a CHW-led 15-month intervention study involving low-income, first-time pregnant women [15]. In this manuscript, we will further explore the modified STAR scale to evaluate its relationship examining g adherence and psychosocial health of the mother. Particularly, our scientific inquiry presented in this manuscript is three-pronged:

- Was the STAR scale rated consistently across a study population of pregnant women?
- Were STAR measures reliably associated with study adherence in this non-clinical CHW setting?
- How did the STAR results change during the intervention, and what best predicted the change?

Methodology

Study Design and Recruitment

The study was conducted in a cohort of women participating in an ongoing intervention that focused on partnering CHWs with underserved, low-income women during their pregnancy. The inclusion criteria for the cohort required the women to be first-time pregnant women, and residents of a Southeast Louisiana parish affected by the 2010 Gulf oil spill (Orleans, Jefferson, St. Bernard, Terrebonne, Lafourche, and Plaquemines). Women were recruited

from Women, Infants, and Children (WIC) clinics and were required to meet the WIC eligibility criteria.

Participants were paired with a CHW at study baseline in their first trimester. CHWs were then tasked with establishing a relationship with their participants by communicating with them via phone calls and text messaging designed to communicate key perinatal information through mobile health technology. They also scheduled regular in-person meetings at all study time points (2nd trimester, 3rd trimester, 6-weeks postpartum, and 6-months postpartum). The CHWs were trained as health navigators in core public health disciplines and specialty public health research disciplines such as reproductive health. They were also taught to communicate key pre- and postnatal health messages through mobile health technology [16] (Fig. 1).

Measures—The original STAR survey is comprised of two sets of 12-item scales that measure perceptions of the clinician-patient relationship. The 12 items address a wide-ranging set of attitudes about the clinician, and the participant is asked to rate on a scale from 0 (never) to 4 (always). One set is completed by the clinicians (STAR-C) and one by the patients (STAR-P). In the study, the relevant set was completed by participants and CHWs respectively at each in-person data collection meeting. Only the set completed by the participant (STAR-P) was used for this study. The psychometric properties of the original STAR instrument were not strong; therefore after eliminating items, a revised 10-item scale was used. This revised scale demonstrated strong psychometric properties at the two postpartum time points (6-weeks and 6-months postpartum). The original STAR-P score had three subscale scores, but our revised STAR only had two: a positive interaction, and a negative interaction (which was reverse-coded) [9].

To measure study adherence, we assessed whether the participant missed any data collection time points. Depending on the trimester being evaluated, 10–20 % of the study population had missed at least one time point. We created a dichotomous variable that classified the participant as having a perfect study adherence record (1 = yes; 0 = no).

Psychosocial Factors: Mental and physical health status were collected at each prenatal and postpartum time point for women in Project 3:

- *General health:* The SF-12 health survey serves as a generic measure of physical and mental functioning, where respondents are asked to rate their health at that moment (0 = poor- 4 = excellent) [17].
- *Depressive Symptoms:* The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item self-report scale devised as a screening questionnaire for postpartum depression [18]. The instrument includes statements of common depressive symptoms collected on a four-point scale (0–3) to assess intensity of depressive symptoms over the previous 7-day period. The scale was collected at 6-weeks and 6-months postpartum.

- *Anxiety*: State-Trait Anxiety Inventory (STAI) consists of two separate 20-item self-report scales that measure transient state anxiety and dispositional trait anxiety [19].
- *Resilience*: To measure resilience in the participants, the Connor-Davidson Resilience Scale (CD-RISC) was used. CD-RISC is a 25-item scale that measures the ability to cope with adversity. Items are rated on a scale from 0 (not true at all) to 4 (true nearly all the time) [20].
- *Optimism*: Life Orientation Test (LOT-R) is a 10-item survey used to assess individual expectancies for positive versus negative outcomes, and was used to assess optimism [21].
- *Affect*: Positive and negative affect were measured through the 20-item Positive and Negative Affect Schedule, which assesses the frequency of positive and negative emotional experiences [22].
- *Positive mood*: Profile of Mood States (POMS) is a 65-item survey that assesses how the respondent is currently feeling. Lower scores indicate a lesser degree of particular mood experience whereas higher scores indicate the opposite [23].
- *Pregnancy and delivery complications*: Questions were taken from the Louisiana Pregnancy Risk Assessment Monitoring System (LaPRAMS) survey. This is a population-based survey of women delivering live-born infants in Louisiana in the calendar year [24]. This instrument was administered to the sample population at 6 weeks postpartum. Two issues were collected for analysis: (a) whether the pregnancy was planned (1 = yes; 0 = no), and (b) whether the mother reported experiencing any delivery-related complications (1 = yes; 0 = no).

Sociodemographic Factors: Demographics were collected from participant at baseline. This included information on marital status, family income, race, age, ethnicity, and region.

Ethics Statement—This study was approved by the Tulane University Human Research Protection Office. Written consent was obtained at the start of all study data collection.

Statistical Analysis

The evolution of the CHW/participant relationship over time is presented using the total STAR score and individual item scores. We present mean $\pm$ SD scores at 6-weeks and 6-months postpartum, differences and effect size of the change in score. Mean difference was calculated by taking 6-months postpartum scores minus 6-week postpartum scores, and also expressed as an effect size (6-month minus 6-week difference divided by pooled SD). The change in the STAR effect size was compared across all collected socio-demographic variables (e.g., race, age, income, etc.), and with changes in psychosocial measures (measured by taking 6-month postpartum scores minus 6-week postpartum scores). This was also measured categorically, as women were classified as either having an (1) increased score (increased symptoms), or (2) had a score that stayed the same or decreased (decreasing symptoms).

Finally, maximum-likelihood (ML) was used to estimate the parameters in the structural equation models (SEM) which were used to identify a path diagram to relationship between a pregnant women and their CHW. The model was fit to a correlation matrix. Three endogenous latent variables (optimism, mood and negative affect) and four exogenous latent variables (state anxiety, resiliency and STAR) were used to create the path diagram. Covariances were specified between the three exogenous variables. State anxiety was hypothesized to be associated directly with mood, optimism and negative affect. Resiliency was hypothesized to have both direct association with mood, optimism, and negative affect and indirect associations with mood state anxiety. STAR was assumed to be indirectly associated with mood, optimism, and negative affect through state anxiety and resiliency but also directly associated with optimism. Model fit of the CFA model as well as the SEM path analysis was assessed using several tests including the Chi square, Root Mean Square Error of Approximation (RMSEA), non-normed Fit Index (NNFI), and Bentler's Comparative Fit Index (CFI).

Results

The study enrolled 141 women at baseline. Of the 141 women, 99 participated in the data collection point at 6-weeks postpartum, and 103 participated in the data collection point at 6-months postpartum. Table 1 shows the average STAR score at these time points by different socio-demographic groups. Most of the women were relatively young, African-American, and living in a metro region. There was a significant relationship (Chi square, $p < 0.05$) at both time points between STAR scores and both pregnancy intention and study adherence. There was a significant relationship at 6-months postpartum between STAR scores and both age and region.

To examine the influences of STAR, we developed a structural equation fit path model at 6-months postpartum that compared STAR with the data derived from several psychosocial surveys. Results of the structural equation path model (see Table 2) showed good model fit for the hypothesized model ($\chi^2 = 0.83$; $p = 0.66$). STAR (see Fig. 2) showed significant direct association with optimism ($\beta = -.27$) and indirectly with mood ($\beta = 0.33$), optimism ($\beta = -0.24$) and negative affect ($\beta = 0.36$) through state anxiety ($\beta = -0.32$). STAR was also significantly associated indirectly with mood ($\beta = 0.51$), optimism ($\beta = -0.34$) and negative affect ($\beta = -0.34$) through resiliency ($\beta = -0.24$).

To investigate the relationship between STAR and study adherence, we created a hierarchical logistic regression analysis (Table 3). The analysis revealed that the first block (containing demographic variables), the second block (containing baseline mental/physical health), the third block (containing pregnancy stressors), and the fourth block (containing 6-month postpartum mental/physical health) all explained a significant amount of the variance in adherence, yet none of the individual items were significant predictors. However, in the fifth block, 6-month postpartum STAR scores explained a significant amount of variance (Nagelkerke $R = 0.32$), and was the only significant variable in the model. Additionally, when inserting STAR into the model, statistically significant differences were found related to pregnancy/delivery complications. Overall, STAR scores at 6-months postpartum [Exp(B)

1.22 (1.03–1.44)] and pregnancy/delivery complications [Exp(B) 0.18 (0.03–1.00)] explained about 32 % of the variance associated with perfect (100 %) study adherence.

Finally, individual STAR items, and mean change scores are shown in Table 4. Only two items had a relatively large change in effect size from 6-weeks postpartum to 6-months postpartum. Differences were further examined by stratifying the effect size across geographic region (rural vs. metro), education (high school diploma vs. no high school diploma), and study adherence (Table 5). We also compared the STAR scale with changes in psychosocial scores. The effect of time was almost exclusively seen in women who had exhibited worse anxiety symptoms (in relation to the first question: “my health worker and I are open with one another”), and depression symptoms (in relation to the second question: “I believe my health worker withholds the trust from me”).

Discussion

This study is the first to use ratings of therapeutic relationships between CHWs and low-income mothers to explore the potential interaction with psychosocial health and study adherence in a longitudinal study. We found a strong association between STAR and various psychosocial measurements. Controlling for demographic variables, baseline and postpartum health, and pregnancy stressors, STAR remained a strong and significant predictor of study adherence.

Therapeutic relationship has long been used to assess treatment adherence and health outcome improvement [9]. STAR was not originally found to be associated with sociodemographic characteristics in the past [9], however, an association with age was established [25], supporting the findings from this study. The therapeutic relationship has also been long hypothesized to be influenced by psychopathology [26]. Unlike other studies, our analysis did not find STAR to predict symptom reduction [12]; however, the level of therapy involved in the field of community psychology compared to a CHW-led intervention would likely explain that difference.

We were also able to show the association between CHW therapeutic relationships and study adherence. Several studies have previously found STAR to be associated with study adherence, either through an improved attachment to the team/program [27], or through greater program satisfaction [11]. Our findings support this dynamic, as participants who felt they had a better relationship with the CHW were more likely to keep all of their appointments.

CHWs have long been believed to be central to ensuring adherence to actions promoting health [28, 29]. It has been argued that adherence is closely linked to the quality of interactions with the health worker [28], and when the participant has faith and trust in the messenger [30]. As a result, a central goal of employing CHWs in health programs is the development of a therapeutic relationship (or alliance) [3]. The indicator of this alliance has been argued to be the “liaison between provider and patient”, however the closest that this has been evaluated is through quantifying proxy measurements such as “education offerings”, “providers educated”, “persons served”, or “service hours logged” [3]. The

STAR survey offers a potentially more detailed examination of the therapeutic relationship that develops and changes over time.

In previous studies STAR scores decreased over time, however, unlike our study, no between-group differences were found [31]. For this study, the source of the decline in STAR scores from 6-weeks to 6-months postpartum was predominantly isolated to changes in two areas: participants' apprehension that their health worker was not being open with them, and suspecting the health worker of withholding the truth. Moreover, these attitudes were almost exclusively seen in women who were experiencing worsening symptoms regarding their anxiety and depression. This, along with the findings in Fig. 2, potentially demonstrate how interconnected psychosocial health is with the development of a therapeutic relationship. This has been asserted and demonstrated in previous uses of STAR [8, 12]; however, research has been limited in detailing this dynamic among CHWs and the people they serve.

This study was unable to explore the potential relationship between therapeutic relationship and the general affability of the participant. As described previously, this theory asserts that participants who rate their CHW relationship higher are in part doing so because they are more agreeable to social interactions. This was not the case using STAR in the field of community psychiatry [27]. The association between effect size and changes in psychosocial health would seem to support the idea that as participants are experiencing increasing anxiety and depression symptoms they are becoming less agreeable with their CHW. Additional research should explore this dynamic further.

The main practical limitation of this survey is the longitudinal study design. The STAR required several months of time to become validated, due to the establishing CHW-participant relationship. Hence, while this STAR scale tailored towards a public health setting may have limited use for short-term cross sectional studies, its value in examining long-term relationships e.g. in the context of federally-qualified health centers and the communities they serve is highly promising.

Our study suggests that therapeutic relationship, as measured by the revised STAR survey is a strong predictor of study adherence in a longitudinal study. This therapeutic relationship is in part driven by the psychosocial health of the participant, along with key demographic variables (region, education, age). Future research can build on these findings to critically examine the relationship between affability, psychosocial health, the development of therapeutic relationships, and study adherence.

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Fig. 1.
GROWH project study design

Fig. 2.
SEM modeling predictor of STAR

Table 1

Descriptive statistics of STAR at 6-weeks and 6-months postpartum

	STAR-6-weeks postpartum	STAR 6-months postpartum
Race		
White	(29) 29.79 (6.05)	(30) 29.93 (5.16)
Black	(62) 30.55 (4.87)	(63) 30.08 (5.36)
Other	(8) 32.00 (4.99)	(10) 31.50 (5.21)
Adherence *		
No missed timepoint	(80) 31.20 (5.11)	(83) 30.77 (4.62)
Missed at least one timepoint	(19) 27.26 (4.59)	(20) 26.20 (6.35)
Region **		
Metro	(74) 30.88 (4.94)	(76) 30.54 (5.13)
Rural	(25) 29.16 (5.94)	(26) 27.92 (5.45)
Relationship at baseline		
Yes	(43) 30.86 (4.60)	(45) 30.20 (4.98)
No	(53) 30.04 (5.83)	(55) 29.49 (5.66)
Education		
High school diploma	(82) 30.32 (5.12)	(85) 29.85 (5.19)
No diploma	(17) 31.06 (5.86)	(18) 30.06 (5.90)
Income		
Under \$10 k	(51) 30.51 (4.89)	(53) 30.06 (5.49)
\$11–30 k	(26) 29.92 (5.71)	(28) 29.14 (5.30)
Over \$30 k	(15) 30.53 (4.31)	(15) 31.47 (4.79)
Intended to get pregnant *		
Yes	(34) 32.26 (3.80)	(34) 31.97 (3.43)
No	(61) 29.39 (5.76)	(59) 28.91 (5.90)
Any delivery/pregnancy complications		
Yes	(61) 30.04 (4.99)	(60) 29.82 (5.69)
No	(34) 31.09 (5.84)	(33) 30.42 (4.66)
Age **		
18–22	(22) 30.45 (5.39)	(23) 28.61 (5.88)
23–24	(25) 28.88 (5.25)	(26) 27.92 (5.32)
25–28	(25) 29.84 (6.02)	(26) 30.54 (5.35)
29–42	(27) 32.44 (3.73)	(28) 32.14 (3.74)

* Chi square test of independence $p < 0.05$ at both timepoints** $p < 0.05$ at 6-months postpartum only

Table 2

Model fit statistics of SEM model STAR

Fit indices	
Chi square	0.83
Pr > Chi square	0.66
RMSEA estimate	0
Bentler Comparative Fit Index	1
Bentler–Bonett NFI	0.99
Bentler–Bonett Non-normed Index	1

Table 3
Hierarchical logistic regression of predictors perfect study adherence (no missed timepoints)

	Step 1	Step 2	Step 3	Step 4	Step 5
Exp (B) (95 %)					
Education	4.21 (0.48–36.67)	4.11 (0.46–36.37)	5.38 (0.58–49.92)	8.24 (0.68–99.56)	9.20 (0.66–127.73)
Age	1.13 (0.97–1.32)	1.14 (0.98–1.34)	1.17 (0.98–1.39)	1.17 (0.92–1.39)	1.09 (0.91–1.31)
Region	1.64 (0.41–6.55)	1.74 (0.43–7.09)	1.49 (0.35–6.35)	1.50 (0.34–6.66)	2.55 (0.49–13.26)
Baseline physical health		1.03 (0.97–1.10)	1.03 (0.96–1.10)	1.02 (0.95–1.09)	1.01 (0.93–1.08)
Baseline mental health		0.96 (0.89–1.05)	0.96 (0.87–1.04)	0.94 (0.86–1.03)	0.99 (0.90–1.10)
Pregnancy wantedness			0.72 (0.19–2.71)	0.61 (0.15–2.47)	0.34 (0.07–1.63)
Pregnancy/delivery complications			0.20 (0.04–1.01)	0.22 (0.04–1.14)	0.18 (0.03–1.00)*
Postpartum physical health				1.04 (0.94–1.14)	1.03 (0.92–1.15)
Postpartum mental health				1.05 (0.95–1.16)	0.99 (0.88–1.11)
STAR rating					1.22 (1.03–1.44)*
Nagelkerke R	0.08	0.12	0.20	0.22	0.32

Education: (0 = High School Dropout; 1 = High School Diploma)

Region (rural 1/0)

Age: Scale variable

Table 4

Mean differences and effect sizes for each STAR item from 6-weeks to 6-months postpartum

		Mean difference (6-weeks to 6-months)	Effect size
P1	My health worker speaks with me about my personal goals and goals of my pregnancy	−0.02	−0.02
P2	My health worker and I are open with one another	−0.18	−0.23
P3	My health worker and I share a trusting relationship	−0.03	−0.04
N1	I believe my health worker withholds the truth from me	0.29	0.23
P4	My health worker and I share an honest relationship	0.02	0.03
P5	My health worker and I work towards mutually agreed upon goals	−0.02	−0.02
N2	My health worker is stern with me when I speak about things that are important to me and my situation	−0.03	−0.02
P6	My health worker and I established an understanding of the kind of changes that would be good for me	−0.05	−0.05
N3	My health worker is impatient with me	0.03	0.03

Table 5

Stratified differences in mean difference and effect size for two openness questions on STAR survey

	“My health worker and I are open with one another”		“I believe my health worker withholds the truth from me”	
	Mean difference	Effect size	Mean difference	Effect size
Total (99)	−0.18	−0.23	0.29	0.23
Region				
Metro	−0.22	−0.28	0.14	0.12
Rural	−0.06	−0.10	0.74	0.48
Education				
HS degree	−0.10	−0.13	0.35	0.25
No degree	−0.54	−0.61	0.04	0.04
Adherence				
Missed	−0.32	−0.40	−0.22	−0.16
No	−0.14	−0.19	0.42	0.33
Change in anxiety (S-STAI)				
Worse	−0.40	−0.49	0.25	0.19
Same or better	0.02	0.02	0.38	0.30
Change in depression (EPDS)				
Worse	−0.11	0.13	0.71	0.57
Same or better	−0.18	0.26	0.10	0.08