Examining Mediator and Moderator effect using Rural Women HIV Study

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Background: This study examined the role of Spiritual Activities in the relationship between Available Social Support and Reason for Missing Medication, and tested if moderator or mediator effects influenced the relationship.

Method: The cross-sectional data reported here were collected in the first of three interviews of a longitudinal study designed to test the efficacy of a peer counseling intervention designed for rural women with HIV disease. The sample of 280 HIV infected women was recruited from ten community based HIV/AIDS organizations serving rural areas of three states in the southeastern United States. Baron and Kenny steps used to examine for mediation effect. The moderator effect was examined by including interaction effect in the regression model.

Result: The result indicated that the relationship between outcome (Reason Missing of Medication) and the predictor variable (Available Social Support) was significant (β =-.98 (p=.02)). The result showed that there was significant relationship between mediator and predictor variable (β =.143 (p=.003)). Also, the result indicated that the previously significant relationship between predictor (Available Social Support) and the outcome (Reason Missing of Medication) becomes non significant (β =-.79 (p=.055)). Therefore, there is partial mediator effect for Spiritual Activities in the relationship between Available Social Support and Reason for Missing Medication. However, the result did not reveal any moderator effect for Available Social Support and Spiritual Activities (P-value=0.51).

Keywords: Reason for Missing Medication, Available for Social Support, Spiritual Activities, mediation effect, and moderator effect.

Introduction

There is often confusion among students concerning the difference between a mediator variable and a moderator variable. In general, a given variable may be said to function as a mediator to the extent that it accounts for the relation between the predictor (independent variable) and the criterion (dependent variable). A moderator is a variable (M) whereby predictor variable (**X**) and criterion variable (**Y**) have a different relationship between each other at the various levels of M.

Purpose

The purpose of this poster is to examine the role of spiritual activities in the relationship between available social support and reason for missing medication, and tested if moderator or mediator effects influenced the relationship.

Background

The cross-sectional data used here were collected in the first of three interviews of a longitudinal study designed to test the efficacy of a peer counseling intervention designed for rural women with HIV disease. The longitudinal data set, referenced in the following sections, was generated in a study which tested a peer-based social support intervention designed for a population of rural women with HIV disease (Moneyham, 1999).The study is referred to as the Rural Women's Health Project (RWHP).The experimental study used a repeated measures design with data collection points at baseline, immediately following completion of the 6 months intervention, and at four months following intervention completion. The 280 study participants were recruited from 10 community-based HIV/AIDS service organization serving rural areas of the southeastern United States. Study participants were randomly assigned to intervention and control groups. Intervention group participants received a total of 12 face-to-face peer-counseling sessions over a period of six months, while the control group received the usual care provided by the agency by which they were recruited. Peer counselors were recruited at each local study site to implement the intervention.

Data Analyses

All data analyses were performed using SAS statistical software, version 9.1 (SAS, 2004). Descriptive statistics were used to describe the characteristics of the variables interest. Standard Pearson correlation and regression procedures were used to examine the interrelationships among the study variables. *P*-values less than or equal to .05 were considered significant.

Statistical Tests for the Mediator Effect and Moderator Effect
Mediation effect was determined by procedures described by Baron and Kenny (1986). According to the authors, three regression equations are tested to determine mediation and four criteria must be met. The first equation tests if the initial variable significantly predicts the

outcome variable. The second equation tests if the initial variable significantly predicts the mediator. In the third equation, both the initial variable and the mediator are entered simultaneously and are used to predict the criterion variable. Meditation is established if the first and the second equations are shown to be significant. In addition, two criteria must to be met in the third equation: (1) the mediator must significantly predict the criterion variable and (2) the direct relationship between the initial variable and the criterion variable must reduce to zero in the second equation in order to establish full mediation. If, however, the initial variable is reduced in absolute size but is different from zero when the mediator is controlled, partial mediation can then be concluded. Finally, we performed Sobel's (1982) test of significance to determine the extent to which a mediator contributed to the total effect on the criterion variable. The moderator effect was examined using regression analysis procedures as described by Baron and Kenny (1986). In our regression model, we included available social support, spiritual activities and their interaction effect. This interaction term was included in the regression analysis as an additional predictor of reason for missing medication. As stated by Baron and Kenny, we considered a moderator effect to exist if the interaction term explains a statistically significant amount of variance of criterion variable.

Results

To test for mediation, three regression equations were run. First, the outcome (Reason Missing of Medication) was regressed on the predictor variable (Available Social Support).This relationship were significant (β =-.98 (p=.02)). Therefore, we ran second and third equations were analyzed. In the second equation, the mediator (Spiritual Activities) was regressed on the predictor variable (Social Support). The result indicated that there was significant relationship between mediator and predictor variable (β =.143 (p=.003)). The third equation involved regressing the outcome (Reason Missing of Medication) variable simultaneously on the predictor (Available Social Support) and mediator variable (Spiritual Activities). The result indicated that the previously significant relationship between predictor (Available Social Support) and the outcome (Reason Missing of Medication) becomes non significant (β =-.79 (p=.055)). Also, the result revealed the relationship between mediator variable (Spiritual Activities) and outcome ((Reason Missing of Medication) was significant (β =-.44 (p=.02)).

To test for moderator effect, regression model was included the main effects Available Social Support and Spiritual Activities plus interaction term of these effect on Reason Missing of Medication. The result did not reveal any moderator effect for available social support and spiritual activities (P-value=0.51).

==Figure 1 Mediator Model:==   Spiritual Activities (TCOPESA) as Mediator of Available Social Support (TSSQAV) to Reason Missing of Medication (TREAS)
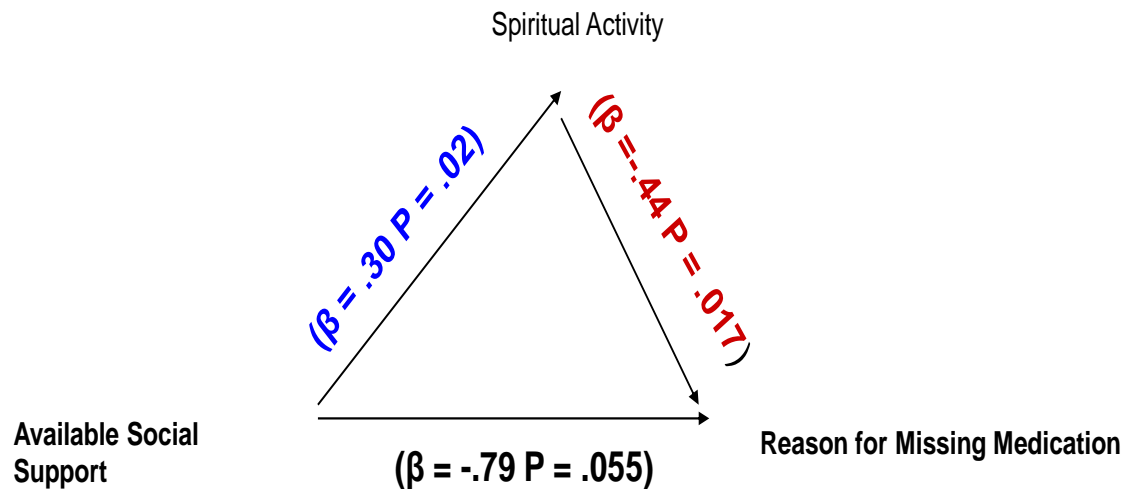
<u>Step. 1</u>
$$\beta =-.98 \ (p=.02)$$
Spiritual Activities -------------------- --------$\rightarrow$ Reason Missing of Medication

<u>Step 2 and 3.</u>

Figure1: Spiritual Activities (TCOPESA) as Mediator of Social Support (TSSQAV) to Reason Missing of Medication (TREAS).

Spiritual Activity

$(\beta = .30 \ P = .02)$

$(\beta =-.44 \ P = .017)$

Available Social Support

$(\beta = -.79 \ P = .055)$

Reason for Missing Medication

Indirect Effect= c – c' = -.98 – (-.79) = -.19

Conclusion

The present study examined the influence of Spiritual Activities in the relationship between Available Social Support and Reason for Missing Medication, whether the relationship was influenced by a mediator or moderator effect. The result revealed that there is partial mediator effect for Spiritual Activities in the relationship between Available Social Support and Reason for Missing Medication. However, the result did not indicate any moderator effect for Available Social Support and Spiritual Activities.

SAS Syntax for Mediator Effect:

```
ods rtf;
ods listing close;
proc reg data=two;
      model treas = tssqav / stb pcorr2 scorr2;
      title ' Regression model / step1 y=x' ;
      run;

   proc reg data=two;
    model tcopesa = tssqav / stb pcorr2 scorr2;
    title ' Regression model / step2 m=x' ;
    run;

        proc reg data=two;
    model treas = tssqav tcopesa / stb pcorr2 scorr2;
    title ' Regression model / step3 y=m x' ;
run;

ods rtf close;
ods listing;
quit;
run;
```

SAS Syntax for Moderator Effect:

```
ods rtf;
ods listing close
proc reg data=two;
      model treas = tssqav tcopesa sscopesa/ stb pcorr2 scorr2;
            title ' Regression model / testing moderator effect' ;
   run;
ods rtf close;
ods listing;
quit;
run;
```

SAS Outputs for Moderator Effect:

Regression model / testing moderator effect

Number of Observations Read	280
Number of Observations Used	222
Number of Observations with Missing Values	58

Dependent Variable: treas total/ reasons for missing medication

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1268.10507	422.70169	4.05	0.0079
Error	218	22731	104.27270		
Corrected Total	221	24000			

Root MSE	10.21140	R-Square	0.0528
Dependent Mean	9.31081	Adj R-Sq	0.0398
Coeff Var	109.67252		

								Parameter Estimates		
Variable	**Label**	**DF**	**Parameter Estimate**	**Standard Error**	**t Value**	**Pr > |t|**	**Standardized Estimate**	**Squared Semi-partial Corr Type II**	**Squared Partial Corr Type II**
Intercept	Intercept	1	**21.24949**	3.58759	5.92	<.0001	0	.	.
tssqav	total / ss/ available support	1	**-0.91744**	0.45428	-2.02	**0.0447**	-0.15049	0.01772	0.01837
tcopesa	cope score / spiritual activities	1	**-0.57910**	0.27795	-2.08	**0.0384**	-0.20976	0.01886	0.01952
sscopesa		1	**0.00175**	0.00270	0.65	**0.5172**	0.07090	0.00183	0.00193