

Effect of Resilience on Infertile Couples' Quality of Life: An Actor–Partner Interdependence Model Approach

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Research

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Abstract

Background This study aims to analyze the influence of resilience, a positive factor that infertile couples may have, on their quality of life (QoL).

Methods Using the method of couples' data analysis, we analyzed the effect of resilience on the QoL of infertile couples as actors and partners. The subjects of this descriptive causal study were 150 infertile couples. Fertility Quality of Life and Resilience Scale were used to measure couples' QoL and resilience. The Actor–Partner Interdependence Model was applied to analyze QoL.

Results In terms of actor effects, the resilience of both wives ($\beta = .201$, $p < .001$) and husbands ($\beta = .713$, $p < .001$) had a significant effect on individual QoL. With regard to partner effects, husbands' resilience ($\beta = .351$, $p < .001$) had a significant impact on wives' QoL, and the wives' resilience ($\beta = .219$, $p = .009$) had a significant impact on husbands' QoL.

Conclusions The resilience of an infertile actor was found to affect both his or her own QoL as well as that of his or her partner. In the future, if a program is to be developed to improve couples' QoL, both spouses should work together to improve their resilience, thereby improving their QoL.

Background

The total fertility rate of South Korea was .98 in 2018, which makes the country the first and only OECD country to have an ultra-low birth rate with a total fertility rate of less than 1.0 [1]. One of the causes for such a low birthrate is infertility. The number of infertility diagnoses in Korea rose by approximately 24% from 178,000 in 2007 to 221,000 in 2016 [2]. Healthcare costs for infertility also increased from KRW 9.575 billion in 2005 to KRW 43.42 billion in 2017 [3]. Thus, infertility is emerging as a socioeconomic issue that affects not only individual lives but also the nation as a whole.

Because infertility and its subsequent treatment can be a negative psychological burden for infertile couples, it is likely to have a significant influence on their quality of life (QoL) [4]. Fertility and problems associated with it affect couples' QoL, which leads to social and psychological stress, reduced life satisfaction, increased marital problems, and reduced sexual self-confidence as well as lowered sexual and marital satisfaction [5].

Resilience is one of the several factors that positively affect infertile couples' QoL [6]. It is defined as the extent to which an individual resists and adapts to difficult life events [7]. It plays the role of protecting the affected couple from the stress caused by infertility so that they are able to maintain and enhance their QoL despite the negative impact of infertility [8]. In addition, it plays the role of a mediator between infertility stress and QoL [9]. Therefore, in order to provide help for infertile couples whose QoL is threatened by social and psychological stress due to infertility, studies are needed to examine the relationship between the resilience of infertile couples and their QoL.

Infertility, in particular, is not an issue that affects just one person but is rather a couple's issue, and both individuals influence one another [10]. Therefore, infertility problems and couples' QoL are highly correlated [11]. Nevertheless, most previous studies have shown that its emotional impact is stronger on women than on men [12, 13]. For this reason, subjects in those studies were mainly infertile women and not couples. Thus, there was a limit to investigating the interaction of infertile couples. Herrmann et al. and Royani et al. have studied resilience and QoL in infertile couples, but they have not analyzed the effects of interdependent and intimate couples [5, 8].

Therefore, it would be useful to analyze these effects using the Actor–Partner Interdependence Model (APIM) model in which the bidirectional influence of the couple is evaluated and how partners influence each other is clarified [14]. There are studies that identify actor and partner influences using APIM. Maroufizadeh et al. examined the effects of depression on QoL, while Kim et al. confirmed the effects of infertility stress, marital adjustments, and depression on QoL [4, 15]. Thus, a limited number of studies have examined the influence that resilience exerts on the QoL of spouses as actors and the partners. In this study, we used the APIM to understand the actor and partner effects of resilience, a positive psychological factor, on the QoL of infertile couples; resilience is expected to help improve their QoL.

Thus, the present study aimed to (a) evaluate whether there were differences in the level of resilience and QoL between male and female dyads experiencing infertility and (b) use the APIM approach to elucidate and differentiate actor effects and partner effects of resilience on QoL.

Methods

Participants and Study Design

This is a descriptive study in which the data collected on infertile couples were analyzed to understand the actor and partner effects of couples' resilience on their QoL.

The subjects of this study were 150 couples selected among those who visited H health center in P city or those members of an online infertility cafe who volunteered to participate in the study. They have experienced primary or secondary infertility without history of parity and volunteered to participate in this study after giving their informed consent. There is a controversy regarding the size of the sample of subjects suitable for path analysis, but the sample size in this study was determined using Song and Kim, in which the appropriate sample size was assumed to be 150–400 [16].

Instruments

Approvals for the use of the tools mentioned in this study were obtained from the authors.

Resilience

We used a translated version of the Resilience Scale developed by Wagnild and Young [7, 17]. The scale consists of 25 questions, including 17 questions on individual abilities, 8 questions on self and acceptance of life. Each item is scored on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) with higher scores representing higher resilience. The reliability coefficient Cronbach's α was .85 when the scale was originally developed, .88 in Song Yang-sook's study, and .80 in the present study [17].

Fertility Quality of Life

We used a translated version of the Fertility Quality of Life questionnaire (FertQol) by Boivin et al., which had 36 questions at the time of its development [18,19]. Kim Joo-hee used 24 questions, barring 10 questions about infertility treatment that were not related to QoL and two items that were deleted via factor analysis [19]. There were four parts in the scale: Emotional, Mind–Body, Relational, and Social. Each item was measured on a 5-point Likert scale, with higher scores representing greater QoL. The reliability coefficient Cronbach's α was .92 (.75 ~ .90) when the scale was developed, .92 (.72 ~ .89) in Kim Joo-hee's study, and .88 (.68 ~ .71) in the present study [19].

Data Collection

Data were collected from August 1, 2018 to October 31, 2018 at H Public Health Center and Infertility Internet Cafe in P City. First, we obtained permission for data collection from the director of the public health center. The researcher approached infertile couples who were visiting the public health center to receive infertility funding and explained the purpose of the study. The questionnaire was administered to those who agreed to participate in the study. If both spouses were present, they were asked to fill out the form separately, and the questionnaires were collected on the spot. If only one spouse was present, he or she was given an envelope containing the study description and questionnaire for the couple to complete at home and bring on a scheduled date.

In the case of the infertility internet cafe, a study recruitment notice was posted along with the researcher's telephone number on the site's bulletin board. We explained the purpose of the study over the phone to those who contacted us and wished to participate in the study. An envelope including the purpose of the study and a consent form was mailed to those who agreed to participate, and signed consent forms were mailed back to us. Once the consent forms were received, we sent the online questionnaires to each of the infertile couple via phone. The questionnaire took about 10–15 minutes to be completed. After the questionnaire was completed, the subjects were remunerated for their participation in the study.

Data Analysis

Collected data were analyzed using SPSS Version 22.0 and AMOS Version 22.0. Descriptive statistics on the general characteristics and measurement variables of the couples were presented using SPSS descriptive statistics, and the skewness and kurtosis of the measurement variables were examined to test the normality of the data.

Additionally, Pearson correlation coefficients were used to check the correlation and multicollinearity of each factor and the measurement variables. To identify actor and partner effects of infertile couples' resilience on their QoL, we used the AMOS structural equation model. We chose the structural equation model because it has the advantage of statistically comparing and evaluating the magnitudes of the estimates obtained through model verification.

Confirmatory factor analysis was conducted to investigate the validity of the latent variables for the model. The fit of the model was evaluated using absolute goodness-of-fit indices and incremental fit indices. Absolute goodness-of-fit indices include Chi-square (χ^2), χ^2/df , root mean square error of approximation (RMSEA), standard root mean square residual (SRMR), goodness-of-fit index (GFI), and adjusted goodness-of-fit (AGFI). Incremental fit indices include an incremental fit index, comparative fit index (CFI), normed fit index (NFI), incremental fit index (IFI), and Tucker-Lewis index (TLI). Finally, bootstrapping in AMOS was used to verify the statistical significance of the paths in the structural equation model.

Results

Characteristics of the Male and Female Dyads

The average age was 35.81 years for the husbands and 34.03 years for the wives. The most common length of marriage was 4–6 years (64.2%), followed by 1–3 years (20.5%) and 7–9 years (15.2%). The most common duration of attempted pregnancy was 5 years (29.8%), followed by 4 years (25.2%), 2 years (19.2%), 3 years (17.2%), and 6 years (8.6%). Most couples (90.1%) received governmental support for infertility treatment, while 9.9% did not. The cause of

infertility was unknown (90.7%) in most cases, followed by the wife (5.3%) and the husband (4%). None of the couples have received psychiatric treatment (100%)<Table 1>.

(Insert Table 1 here)

Resilience and Quality of Life in Male and Female Dyads

Resilience was 4.45 for wives and lower than 4.92 for husbands ($p < .001$). Individual resilience, a sub-area within resilience, was 4.74 for wives and lower than 4.82 for husbands ($p = .040$). The acceptance of self and life was 3.83 for wives and lower than 4.69 for husbands ($p < .001$). QoL was 3.28 for wives and lower than 3.61 for husbands ($p < .001$). The quality of emotional life, a sub-area of QoL, was 2.59 for wives and lower than 3.30 for husbands ($p < .001$). The QoL in physical and mental areas was 2.94 for the wives and lower than 3.12 for the husbands ($p = .070$). The quality of relational life was 3.38 for the wives and lower than 3.60 for the husbands ($p = .002$). The quality of social life was 3.55 for the wives and lower than 3.85 for the husbands ($p < .001$).

Test of the Measurement Model

In order to understand how the measurement variables used in this study account for the latent variables, we tested the measurement model in terms of the resilience and the QoL of the husband and wife. The results were as follows: $\chi^2 = 68.763$ ($p < .001$); $df = 47$; $\chi^2/df = 1.463$; NFI = .930; GFI = .936; AGFI = .893; CFI = .976; IFI = .977; TLI = .933; RMSEA = .056; and SRMR = .052. The value of the χ^2/df index is 3 or less. SRMR, a standardized RMR value, is acceptable if the value is less than or equal to .08 [20]. RMSEA, which considers both model error and simplicity at the same time, is considered appropriate if it is less than or equal to .08. NFI, the standard GFI, is considered appropriate if it is .80 or more. GFI and AGFI numbers are appropriate if better than .90 [21]. Incremental fit indices, CFI, IFI, and TLI estimates are good if they are .9 or more, being close to 1 [20].

Test of the Structural Model

In order to find the actor and partner effects of couples' resilience on QoL, the normality of the measured variables was checked before a structural equation was modeled. To test the univariate normality of the measured variables, the skewness and kurtosis were calculated. The assumption of normal distribution was satisfied because skewness was 3 or less and kurtosis was 10 or less for both husband and wife. Furthermore, as shown in Table 2, correlations were found to be -.012–.803, which indicates that there is no issue of multicollinearity. The hypothetical model has the following characteristics: $\chi^2 = 68.763$ ($p < .001$); $df = 47$; $\chi^2/df = 1.463$, NFI = .930, GFI = .936, AGFI = .893, CFI = .976, IFI = .977, TLI = .966, RMSEA = .056, and SRMR = .052, which shows a good fit, as shown in Table 3.

(Insert Table 2 here)

(Insert Table 3 here)

Impact of Resilience on Quality of Life at the Dyadic Level

The results of the actor and partner effects of couples' resilience on QoL are shown in Table 4 and Figure 1. The resilience of both wives ($\beta = .201$, $p < .001$) and husbands ($\beta = .713$, $p < .001$) had a significant effect on individual QoL. Husbands' resilience ($\beta = .351$, $p < .001$) had a significant effect on wives' QoL, and wives' resilience ($\beta = .219$, $p = .009$) had a significant effect on husbands' QoL.

(Insert Table 4)

With regard to actor's resilience effect on emotional life, the resilience of both wives ($\beta = .330$, $p = .003$) and husbands ($\beta = .959$, $p < .001$) had a significant effect on their emotional life. As for partner's resilience effect, husbands' resilience ($\beta = .167$, $p = .285$) had no significant effect on wives' QoL and wives' resilience ($\beta = .096$, $p = .442$) had no significant effect on their husbands' QoL.

With regard to actor's resilience affecting the mind–body area, wives' resilience ($\beta = .266$, $p = .023$) had a significant effect on their mind–body area of QoL, whereas husbands' resilience ($\beta = .374$, $p = .091$) had no significant effect on their mind–body area. In terms of partner's resilience, husbands' resilience ($\beta = .443$, $p = .041$) had a significant effect on the wives' mind–body area and wives' resilience ($\beta = .279$, $p = .029$) had a significant effect on the husbands' mind–body area.

With regard to actor effect on relational life, both wives' ($\beta = .248$, $p = .004$) and husbands' ($\beta = .448$, $p = .003$) resilience had a significant influence on their relational life. With regard to partner effect on relational life, husbands' resilience ($\beta = .483$, $p = .002$) had a significant effect on wives' relational life, and wives' resilience ($\beta = .198$, $p = .012$) had a significant effect on husbands' relational life.

With regard to the effect of actor's resilience on social life, both wives' ($\beta = .182$, $p = .003$) and husbands' ($\beta = .610$, $p < .001$) resilience had a significant effect on their social life. Regarding partner's resilience, husbands' resilience ($\beta = .303$, $p = .004$) had a significant effect on wives' social life, and wives' resilience ($\beta = .174$, $p = .024$) had a significant effect on husbands' social life.

Discussion

While most previous studies on infertile couples have focused on the effect of negative emotions on QoL, this study focused on the effect of resilience, a positive emotion, on the QoL of infertile couples. In addition, actor and partner effects were identified. The QoL of infertile couples measured in this study was standardized for comparison with previous studies. Husbands' QoL (72.22 out of 100) in this study was higher than that of wives (65.62), which is similar to the results of 67.36 and 72.89, respectively, for Iranian infertile couples reported in Maroufizadeh et al.'s study and 71.8 and 76.5, respectively, for Turkish infertile couples reported in Goker et al.'s study [4, 22]. This is because wives respond differently; they tend to be more sensitive to and more affected by infertility than husbands [5, 23]. As previous studies suggest, long-term infertility treatment negatively affects women's emotional life, subsequently lowering their QoL.

In particular, while wives' QoL in this study was lower than that in previous studies, it is similar to the figure of 64.54 reported by Li et al. [9]. Infertile women are regarded as defective in Middle Eastern countries, such as in Iran and Turkey; therefore, they are subjected to feelings of disappointment and insufficiency when they are unable to conceive a child [24]. In Korea and China, where there are strong traditions that emphasize the succession of immediate family, the burden of being unable to carry on the family line is considered a serious problem.

Because resilience refers to the ability to overcome adversity, the resilience that may exist in a couple experiencing infertility is closely associated to their relationship [25]. Thus, it is crucial to investigate how resilience affects couples as actors and as partners. Because resilience is an important predictor and a key factor for couples' marital satisfaction levels, it is necessary to focus on couples rather than just individuals [26]. Husbands' resilience scores were higher than those of wives, similar to the results of Herrmann's study [8]. Resilience is closely related to positive emotions and a wife facing infertility is more sensitive to negative emotions than her husband [5, 27]. Therefore, husbands, who were less exposed to negative emotions, had higher scores in resilience than wives.

With regard to effects of resilience on QoL, both wives and husbands showed significant actor and partner effects. These results are similar to those that have been reported in previous studies in which resilience was an important factor affecting the QoL of infertile couples [8, 19]. In other words, people with higher levels of resilience also have higher QoL levels. Therefore, strengthening resilience is essential for improving the QoL of infertile couples. In addition, resilience affected not only the quality of actors' own lives but also that of their partners. Therefore, infertility should be regarded not as an issue for individual spouses alone but as one that the couple deals with together. Therefore, in order to provide interventions for improving the QoL of infertile couples, it is necessary to strengthen resilience and for spouses to share positive emotions so that they are able to deal with the various problems involving infertility.

We could not find the actor and partner effects on emotional aspects of QoL. The items in emotional aspects include anger, grief, loss, sadness, depression, fluctuating hope, despair, jealousy, resentment, and inability to cope, which can be defined as elements that belong to the personal realm representing the private feelings of an individual [18]. In addition, in Kim Ju-hee's study, in which resilience was classified as an individual area, husbands' depression did not significantly affect wives' QoL [28]. Further, the partner effect was not found in Maroufizadeh's study [4]. These results are consistent with those reported for emotional aspects in the present study. Further research is needed to clarify the interactions between individual areas and partner effect.

In summary, this study clearly identified actor and partner effects of infertile couples beyond the correlation between resilience and QoL. Because the actor and the partner influence each other in terms of resilience and QoL, respectively, it is necessary to recognize husbands and wives as interdependent beings rather than as independent beings. Furthermore, in intervention studies aimed at improving QoL, a couple should participate as an integrated unit so that they can seek ways to increase their QoL through their resilience. That this study included only Korean subjects may be a limitation because its results may not be suitably generalized for infertile couples from other cultures. However, this is the first study in which the interaction between resilience and QoL in infertile couples is explored through APIM analysis. Therefore, it is necessary to include more variables using APIM analysis in order to better understand the actor and partner influence of infertile couples.

Conclusion

This study employed the APIM to identify infertile couples' resilience on QoL from actor and partner perspectives. The results showed that the resilience of infertile couples affected their QoL both as actors and partners. Until now, several intervention programs have involved only infertile women, largely because women tend to accept the issue and are more sensitive to infertility than men. However, this study found that spouses mutually influence one another in terms of resilience and QoL; therefore, it is necessary to develop intervention programs in which couples, and not just individuals, participate so that they learn to have a positive impact on each other. In particular, it may be necessary to include resilience improvement in both spouses as an important component in QoL improvement intervention programs.

The results found in this study suggest the following for future research. First, it is necessary to develop intervention programs in which infertile couples participate to improve their resilience and QoL. Second, it is necessary to expand the pool of experimental subjects to include those from other cultures to further investigate the interaction between resilience and QoL using the APIM. Third, the current study can be replicated by selecting subjects from wider areas and increasing their numbers to explore the interaction between the individual area variables and emotional life, a sub-area of QoL.

Declarations

Ethics Approval and Consent to Participate

This study was approved by the Institutional Review Board of P University (PNU IRB/2017_85_HR). The couples were informed of the aim of the study and of their right to refrain from participation and were assured of confidentiality and anonymity. Agreement to participate and a signed consent form were obtained from all infertile couples before data collection.

Consent for Publication Not applicable

Availability of Data and Materials All data supporting our findings are contained within the manuscript and the authors can be contacted at elli2378@hanmail.net for further clarification if required.

Competing Interests The authors declare that they have no competing interests

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Authors' Contributions JYH: Study design and conception, data analysis and interpretation and SHB: Study design and conception, data acquisition, data interpretation. All authors read and approved the final manuscript.

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Abbreviations

QoL
Quality of Life

APIM
Actor–Partner Interdependence Model

(χ^2), χ^2/df
Chi-square

RMSEA
root mean square error of approximation
SRMR
standard root mean square residual

GFI
goodness-of-fit index
AGFI
adjusted goodness-of-fit

CFI
comparative fit index
NFI
normed fit index

IFI
incremental fit index
TLI
Tucker-Lewis index

AMOS
Analysis of Moment Structures
SPSS
Statistical Package for the Social Sciences

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Tables

Table 1. Demographic and Clinical Characteristics of the Husbands and Wives Dyads (n = 150 Couples)

	Couples	Wives	Husbands	t/ χ^2	p
Age (mean)		34.03	35.81	13.95	< .001
Duration of marriage	1-3 years	30 (20.5)			
	4-6 years	97 (64.2)			
	7-9 years	23 (15.2)			
Duration of infertility	2 years	29 (19.2)			
	3 years	25 (17.2)			
	4 years	38 (25.2)			
	5 years	45 (29.8)			
	6 years	13 (8.6)			
National support	Yes	135 (90.1)			
	No	15 (9.9)			
Cause of infertility	Unknown	136 (90.7)			
	Woman	8 (5.3)			
	Man	6 (4.0)			
Psychiatric treatment	Yes	0 (0)	0 (0)		
	No	150 (100)	150 (100)		

SD: Standard Deviation

Table 2. Correlation between Resilience and Quality of Life in in infertile Couples (N = 150 Couples)

	1	2	3	4	5	6	7	8	9	10	11	12
Wives' Resilience												
Individual ability	1											
Self and acceptable of life	.79**	1										
Wives' quality of life												
Emotional life	.26**	.27**	1									
Mind-body life	.20*	.23**	.61**	1								
Relational life	.30**	.23**	.44**	.55**	1							
Social life	.35**	.29**	.42**	.41**	.68**	1						
Husbands' Resilience												
Individual ability	.12	.17*	.10	.24**	.31**	.34**	1					
Self and acceptable of life	.17*	.25**	.14	.19*	.27**	.25**	.65**	1				
Husbands' quality of life												
Emotional life	.21**	.17*	.14	.24**	.25**	.35**	.37**	.38**	1			
Mind-body life	.23**	.27**	-.01	.06	.03	.17*	.20*	.17*	.56**	1		
Relational life	.26**	.22**	.15	.24**	.26**	.31**	.34**	.30**	.77**	.57**	1	
Social life	.25**	.24**	.24**	.31**	.36**	.43**	.42**	.35**	.74**	.57**	.80**	1

p-value: <.05*, <.01**

Figures

Table 3. Level of Resilience and Quality of life in infertile Couples (N = 150 Couples)

Variables	Wives	Husbands	t	p
Resilience	4.45 ± .66	4.92 ± .49	5.94	< .001
Individual ability	4.74 ± .66	4.87 ± .53	-2.07	.040
Self and acceptable of life	3.83 ± .78	4.69 ± .55	-12.55	< .001
Quality of Life	3.28 ± .49	3.61 ± .58	6.650	< .001
Emotional	2.59 ± .74	3.30 ± .78	-8.75	< .001
Mind-body	2.94 ± .80	3.12 ± .93	-1.88	.062
Relational	3.38 ± .58	3.60 ± .63	-3.57	< .001
Social	3.55 ± .53	3.85 ± .57	-6.24	< .001

M ± SD = Mean standard deviation; / p-value: < .05*, < .001***

Table 4. Effect Coefficients for Hypothetical Model (N = 150 Couples)

		Wives			Husbands		
		β (SE)	t	p	β (SE)	t	p
Total Quality Life	Actor's resilience	.201 (.060)	3.370	< .001	.713 (.152)	4.685	< .001
	Partner's resilience	.219 (.084)	2.607	.009	.351 (.102)	3.428	< .001
Emotional part	Actor's resilience	.330 (.110)	3.015	.003	.959 (.245)	3.913	< .001
	Partner's resilience	.096 (.125)	.769	.442	.167 (.156)	1.070	.285
Mind-body part	Actor's resilience	.266 (.117)	2.266	.023	.374 (.221)	1.692	.091
	Partner's resilience	.279 (.128)	2.178	.029	.443 (.217)	2.040	.041
Relational part	Actor's resilience	.248 (.087)	2.853	.004	.448 (.149)	3.012	.003
	Partner's resilience	.198 (.079)	2.501	.012	.483 (.153)	3.151	.002
Social part	Actor's resilience	.182 (.062)	2.940	.003	.610	3.707	< .001
					(.165)		
	Partner's resilience	.174 (.077)	2.251	.024	.303 (.106)	2.861	.004

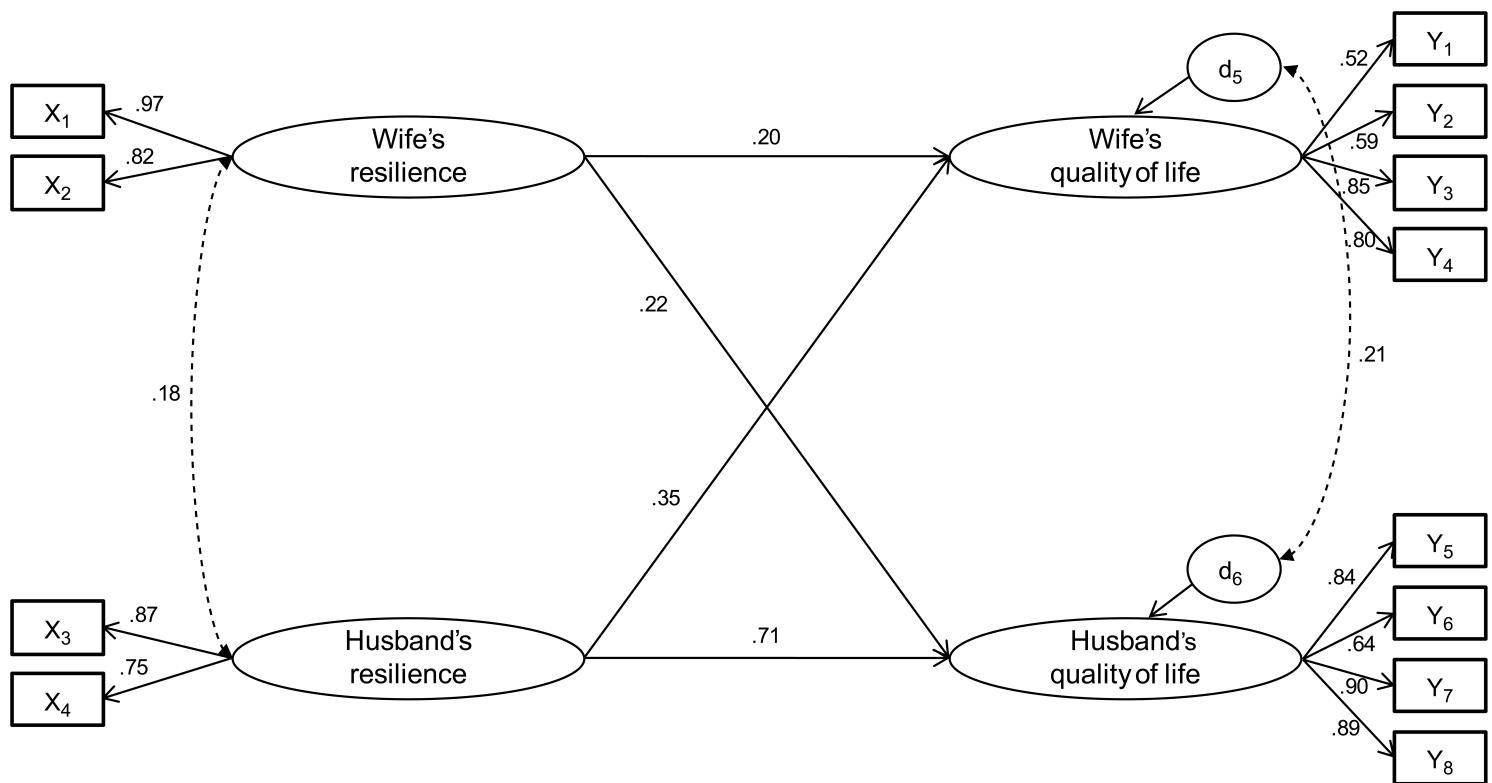


Figure 1

Test for hypothetical model