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Research Article

Path Analysis of Physical Symptoms, Emotional Support, Self-Esteem, and Depressive Symptoms in HIV-Positive Perinatal Women in Thailand

Ratchneewan Ross [1*], **Carolyn Kleman** [1], **Pimpanitta Saenyakul** [1], **Andrea Warner Stidham** [2]

[1] College of Nursing; Kent State University; Kent, OH 44242.

[2] Department of Nursing; Hiram College, OH 44234, United States.

*** Correspondence:** Ratchneewan Ross, College of Nursing; Kent State University; Kent, OH 44242.

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Abstract

Evidence shows that depressive symptoms are associated with faster progression to AIDS in HIV-infected populations. Physical symptoms, self-esteem, and emotional support have been reported to play a major role in contributing to depressive symptoms. However, comparisons of different sources of support—specifically family vs. friends— have only been made in a few previous HIV studies. Therefore, the objectives of this study among HIV-positive perinatal Thai women were to examine: 1) both the direct and indirect effects of physical symptoms and emotional support on depressive symptoms; 2) which source of support is more significant, family or friends; and 3) the direct effect of self-esteem on depressive symptoms. Results revealed that half of the participants experienced major depressive symptoms. Physical symptoms and self-esteem both had direct effects on depressive symptoms. Emotional support, from friends and family, had an indirect effect on depressive symptoms. Treating physical symptoms and increasing self-esteem through emotional support, could help decrease depressive symptoms in the target population. Finally, it is crucial that routine screening for depressive symptoms is established at all HIV clinics for perinatal women in Thailand.

Keywords:
HIV; perinatal women; depressive symptoms; physical symptoms; emotional support; self-esteem; Thailand

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Introduction

At the end of 2009, the Joint United Nations Programme on HIV/AIDS [1] estimated that 33.3 million people were living with HIV, including at least 600,000 Thai adults (ages 15–49 years), 20,000 of whom were pregnant women [2]. In general, HIV infections cause greater problems in developing countries such as Thailand than in developed countries, partly because of a lack of antiretroviral medications. Studies have shown that depressive symptoms are associated with non-adherence to antiretroviral treatment [3], [4], [5], faster disease progression,[5], [6], [7] and poorer quality of life. [8]

Among HIV-positive perinatal women, being single, having a low income, having a low level of education, being younger, and being unemployed are often found to be correlated with depressive symptoms. [9], [10], [11], [12], [13] Other factors affecting depressive symptoms in those who are HIV positive include presence of physical symptoms, low emotional support, low self-esteem, and poor physical health. [11], [12], [14], [15], [16], [17], [18], [19]

Studies in various countries have found that HIV-positive perinatal women with low self-esteem tend to report more depressive symptoms than those with high self-esteem. [11], [12], [17], [20] Qualitative studies have found that HIV-positive pregnant women in Thailand with low self-esteem are more likely to be depressed than those with high self-esteem, and stigmatization related to the infection seemed to be an antecedent of low self-esteem. [21], [22], [23] Further, perinatal women with HIV tend to have low self-esteem and negative personal perceptions that lead to depression. They consider themselves as inferior or incapable women and fear being condemned both on a moral level and for having failed as mothers. [24] Studies have found that HIV-positive pregnant and postpartum Thai women worry constantly about their infant's health, fearing that the fetus/infant has been infected. [22], [25], [26] Negative perceptions about the infant's health can compound the mother's negative feelings of being incompetent and have been positively linked to depressive symptoms in Thai and U.S. postpartum women. [12], [27]

Emotional support also plays a major role in contributing to depressive symptoms. In Thailand, emotional support from family and friends has been negatively related to depressive symptoms in postpartum women [28], [29] and HIV-positive pregnant women. [11] However, to our knowledge, the two sources of support have not been compared in most previous HIV studies,[12], [14], [15], [16], [18] except in one study among HIV-positive women [19] and youth in the USA. [30] Family support was found to be related to less depression among young US individuals. [30] With only limited support, HIV-positive individuals are more likely to exhibit depressive symptoms. [11], [21], [22], [31] Other correlates of depressive symptoms include a history of psychiatric disorders,[32], [33] low income,[34] and low levels of education. [35]

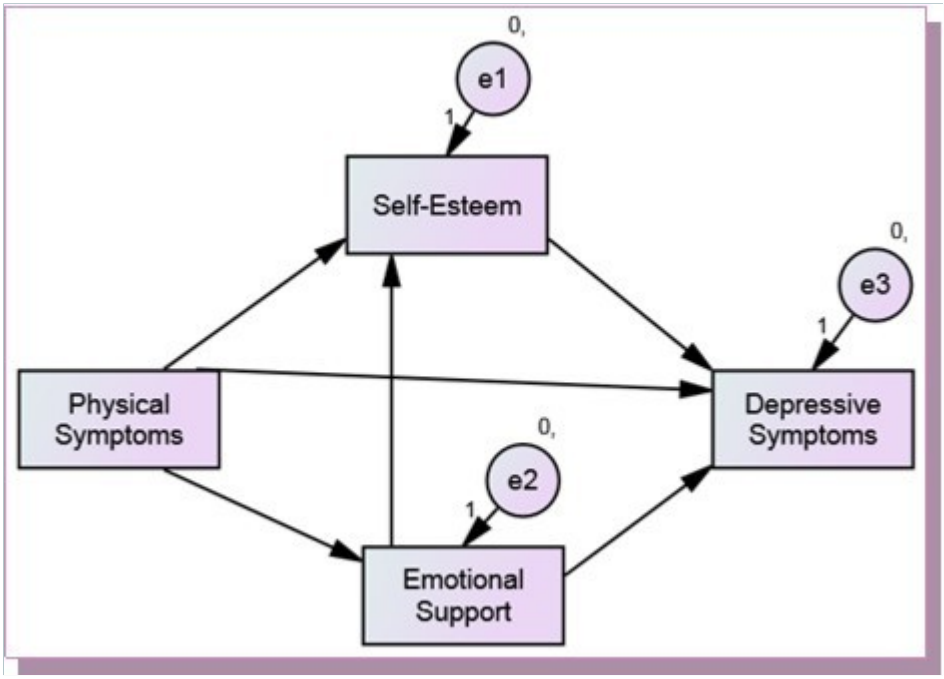

Figure 1. The initial/hypothesized path model with combined family & friend support

The objectives of this study were to examine among HIV-positive perinatal Thai women: 1) both the direct and indirect effects of physical symptoms and emotional support on depressive symptoms; 2) which source of support is more significant, family or friends; and 3) the direct effect of self-esteem on depressive symptoms. We hypothesized that physical symptoms and emotional support had both direct and indirect effects on depressive symptoms, while self-esteem had a direct effect on depressive symptoms (Figure 1). We also hypothesized that family is a stronger source of support than friends in the target population.

Materials and Methods

Data were combined from two separate previous studies that specifically examined only the direct effects of predictors of depressive symptoms among HIV-positive pregnant (n = 127) and postpartum women (n=85) in four hospitals in Thailand. [11], [12] Both studies included pregnant or postpartum adult women who were diagnosed with an HIV infection and who could read and write in Thai. The exclusion criteria for both studies included a history of depression/psychosis and substance abuse. The participants from both studies were comparable regarding their demographic-socioeconomic status (e.g., age, number of children, marital status, income), based on either the Chi-square or independent t-test. The study protocols were approved by five internal review boards before data collection which took place between 2004 and 2007. A questionnaire packet was administered at one of the hospital's private rooms. Well-established Likert-type scales with back translation were used to measure three key study variables. The 20-item Center for Epidemiologic Studies Depression Scale [CES-D],[36] was used to measure depressive symptoms (α=.91), the 12-item Multidimensional Scale of Perceived Social Support [MSPSS] [37], [38] to measure combined emotional support from family and friends (α=.87), the 8-item family subscale of the MSPSS to measure family support (α=.87), the 4-item friend subscale of the MSPSS to measure friend support (α=.85), and the 10-item Rosenberg Self-esteem scale [R-SE] [39] to measure self-esteem (α=.78). The higher the CES-D, MSPSS, and R-SE scores, the more depressive symptoms, the more emotional support, and the more self-esteem, respectively. Physical symptoms were measured with two questions. The first question asked if the woman had experienced any physical symptoms in the past seven days with possible answers of yes (1) or no (0). If the answer was yes, the woman was asked to rate the extent to which the symptom(s) interfered with her daily activities with possible responses ranging from "Not at all" (0) to "A lot" (3). The scores from these two items were summed up to create a total score which ranged from 0 to 4. The alpha for this measure was 0.74.

Table 1. Mean, standard deviation, and total score of key variables (n=212)

Variable	Mean	(SD)	Score	Possible Range
Self-esteem	29.4	3.56	19-40	10-40
Emotional Support	59.3	11.50	12-84	12-84
Physical symptoms	0.68	1.30	0-4	0-4
Depressive symptoms	23.0	10.54	2-51	0-60

Using SPSS version 20, key variables were screened for multivariate outliers (using Mahalanobis distance), multicollinearity (using Variance Inflation Factor), and normality, linearity, & homoscedasticity (using plots of regression standardized residuals and predicted values). No problems were detected. [40] An initial path analysis was constructed and run to examine the relationships among physical symptoms, combined emotional support, self-esteem, and depressive symptoms using maximum likelihood estimates through AMOS version 21 (Figure 1).

Results

The average age of the participants was 26.4 (SD=5.4) with each averaging one child per family. Approximately half of the participants were unemployed (45%), most lived with their spouse (90%), and more than half reported they did not make enough money (62%). About half of the participants had known their HIV status for over 6 months. Three out of four (75.5%) reported no physical symptoms. The top three frequent symptoms reported included fatigue (n=32), anemia (n=27), and weight loss (n=15). Table 1 shows each key variable's mean, standard deviation, total score, and possible score range.

As based on Radloff's (1977) cutoff recommendation, [36] one out of four (24.6%) did not experience depressive symptoms (CES-D score <16), while another one out of four (25.6%) reported minor depressive symptoms (CES-D score ≥16 but <23). Importantly, about half of all participants (49.8%) reported major depressive symptoms (CES-D score ≥ 23).

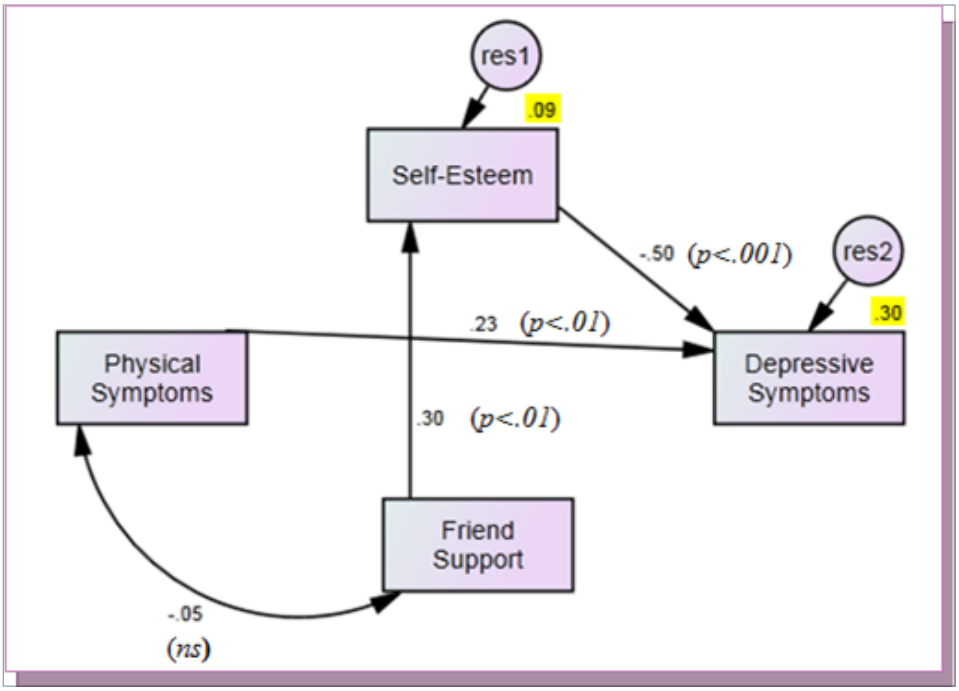

Figure 2. Results of the initial path model with combined family & friend support (R2 values are shaded) Note: ns = non-significant

Table 2. Maximum likelihood estimates for the recursive hypothesized path model (family & friends support) (Also see Figure 2)

Parameter			Unstandardized	SE	CR	p	Standardized
Emotional support	<---	Physical symptoms	-1.191	1.318	-.903	.366	-.079
Self-esteem	<---	Emotional support	.009	.002	4.500	***	.299
Self-esteem	<---	Physical symptoms	-.052	.039	-1.321	.187	-.110
Depressive symptoms	<---	Self-esteem	-13.569	1.831	-7.412	***	-.460
Depressive symptoms	<---	Physical symptoms	3.117	1.001	3.113	.002	.225
Depressive symptoms	<---	Emotional support	-.078	.057	-1.382	.167	-.085
Disturbance/Residual variances							
Emotional support			130.792	12.935			
Self-esteem			.114	.011			
Depressive symptoms			75.134	7.711			

*** $p<.001$

Table 2 shows results of the hypothesized/initial model (with combined emotional support from family and friends) which include unstandardized path coefficients with their respective standard errors, critical ratios, p-values, standardized path coefficients, and disturbance variances. Figure 2 shows that depressive symptoms were predicted by physical symptoms, combined emotional support from family and friends, and self-esteem which together accounted for 32% ($R^2 = .32$) of the explained variance in depressive symptoms. Significant standardized direct, indirect, and total effects are presented in Table 3 for this model and the other models which will follow. Table 4 shows values of model fit indices for this model and other models which also will follow. The path coefficients from physical symptoms to self-esteem, from physical symptoms to combined emotional support, and from combined emotional support to depression were not significant (Figure 2). Therefore, the model was trimmed by excluding non-significant paths and reanalyzed.

Table 5 shows maximum likelihood results of the trimmed model (with combined emotional support). Figure 3 shows a non-significant covariance between physical symptoms and family and friend support. The model fits the data well and better than the initial model, based on various model fit indices. From Table 4, the Chi-square value was not significant. The values of the Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Normed Fit Index (NFI) were larger than .95, which indicate a good fit between the model and the data. [41], [42] Moreover, the Root Mean Squared Error of Approximation (RMSEA) was less than .80. [41] The confidence interval of RMSEA is wide, indicating possible estimate instability. [41] The R^2 value of .31 for depressive symptoms in the trimmed model was slightly smaller than that of the initial model. Statistically, physical symptoms had a positive direct effect on depressive symptoms, while self-esteem had a negative direct effect on depressive symptoms (Figure 3). Combined emotional support had no direct effect but did have an indirect effect on depressive symptoms through self-esteem (Table 3). Table 5 shows the maximum likelihood estimates of the trimmed path model with combined emotional support from family and friends.

Table 3. Standardized direct, indirect, and total effects, and R2 values by model (Only significant results are shown)

Model	Direct effect: from → to			Indirect effect from emotional support → self-esteem → depressive symptoms	Total effect for depressive symptoms	R^2
	Physical symptoms→ Depressive symptoms	Emotional support→ Self-esteem	Self-esteem → Depressive symptoms			
1 Initial: Combined family & friend support (Figure 2)	.22	.30	-.46	-.14	-.38	.32
2 Trimmed: Combined family & friend support (Figure 3)	.23	.31	-.50	-.15	-.42	.31
3 Trimmed: Friend support (Figure 4)	.23	.20	-.50	-.15	-.42	.31
4 Trimmed: Family support (Figure 5)	.23	.30	-.50	-.15	-.42	.30

Table 4. Results of model fit indices by model

Model	Chi-square			CFI	IFI	NFI	RMSEA	LO90	HI90	Note
	Value	*df*	*p*							
1 Initial: Combined family & friend support (Figure 2)	0	0	-	1.0	1.0	1.0	.206	.172	.244	Just-identified model
2 Trimmed: Combined family & friend support (Figure 3)	1.86	2	.173	.990	.991	.981	.065	.000	.210	Second best model fit
3 Trimmed: Friend support (Figure 4)	6.32	2	.042	.946	.951	.930	.102	.017	.197	Least model fit
4 Trimmed: Family support (Figure 5)	2.71	2	.26	.992	.992	.971	.041	.000	.151	Best model fit

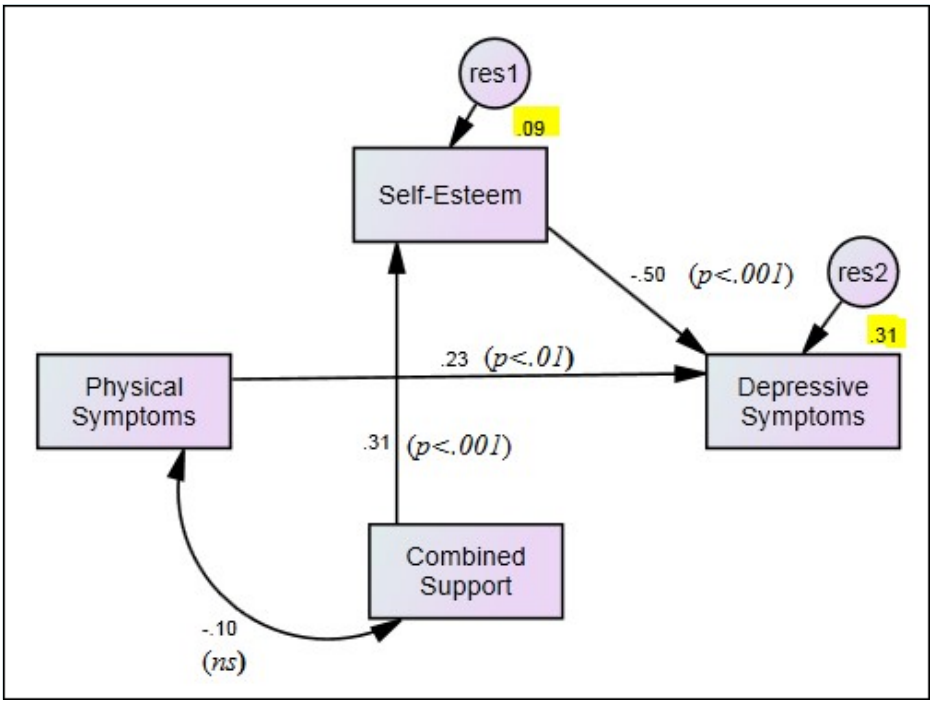

Figure 3. Results of the trimmed path model with combined family & friend support (R2 values are shaded)

Table 5. Maximum likelihood estimates for the recursive trimmed path model (family & friends support) (Also see Figure 3)

Parameter			Unstandardized	SE	CR	p	Standardized
Self-esteem	<---	Emotional support	.010	.002	4.640	***	.308
Depressive symptoms	<---	Self-esteem	-14.554	1.723	-8.445	***	-.498
Depressive symptoms	<---	Physical symptoms	3.104	.995	3.118	.002	.226
Depressive symptoms	<---	Emotional support	-.074	.057	-1.295	.195	-.081
Disturbance/Residual variances							
Self-esteem			.116	.011	10.149	***	
Depressive symptoms			76.025	7.798	9.749	***	

*** $p<.001$

To examine the effect of family support vs. friend support, we ran two models separately—one with friend support and the other one with family support. Table 6 shows the friend support model's unstandardized path coefficients with their respective standard errors, critical ratios, p-values, standardized path coefficients, and disturbance variances. Figure 4 shows a non-significant covariance between physical symptoms and family and friend support. Statistically, physical symptoms had a positive direct effect on depressive symptoms, while self-esteem had a negative direct effect on depressive symptoms. Friend support had no direct effect but did have an indirect effect on depressive symptoms through self-esteem (Figure 4) (Table 3). This friend support model was found to fit the data less well than the combined support model, based on different model fit indices (Table 4). The R^2 value of .31 for depressive symptoms in this model was slightly smaller than that of the initial model.

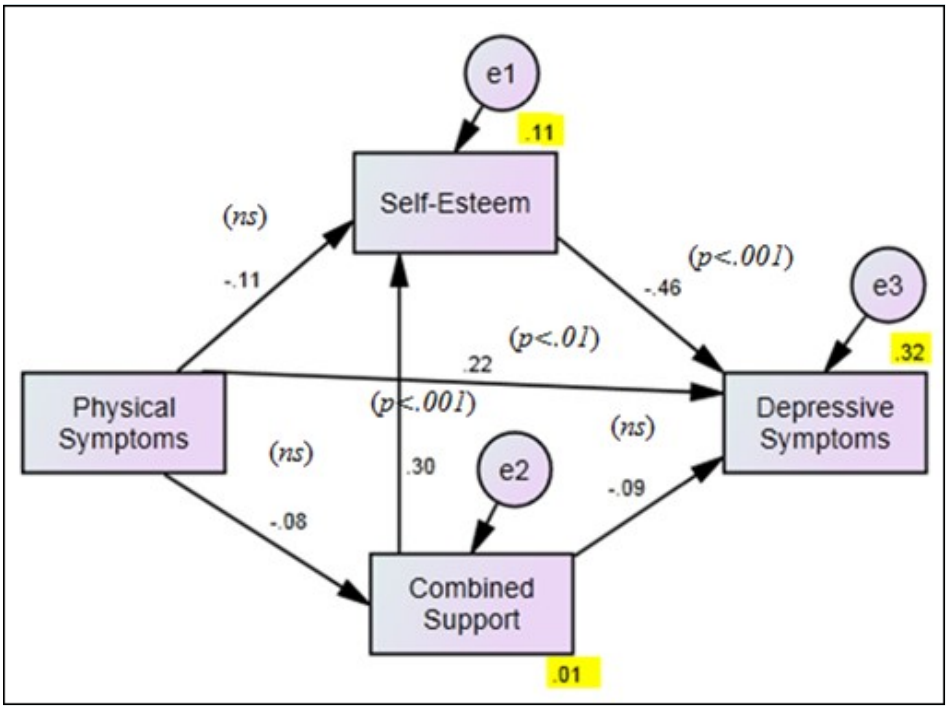

Figure 4. Results of friend support path model (R2 values are shaded)

Table 6. Maximum likelihood estimates for the recursive path model (friend support) (Also see Figure 4)

Parameter			Unstandardized	SE	CR	p	Standardized
Self-esteem	<---	Emotional support	.025	.006	4.464	***	.297
Depressive symptoms	<---	Self-esteem	-14.572	1.722	-8.461	***	-.499
Depressive symptoms	<---	Physical symptoms	3.106	.996	3.117	.002	.226
Disturbance/Residual variances							
Self-esteem			.117	.012	10.149	***	
Depressive symptoms			76.013	7.801	9.744	***	

*** $p<.001$

Table 7 shows the family support model's maximum likelihood results. Figure 5 shows a non-significant covariance between physical symptoms and family and friend support. The model fits the data best among all four models, based on various model fit indices (Table 4). The R^2 value of .30 for depressive symptoms in this model was slightly smaller than that of the initial, trimmed, and friend support models. Statistically, physical symptoms had a positive direct effect on depressive symptoms, while self-esteem had a negative direct effect on depressive symptoms. Family support had no direct effect but did have an indirect effect on depressive symptoms through self-esteem (Figure 5). Again, Table 3 summarizes the significant standardized direct, indirect, and total effects, and R^2 values in depressive symptoms for all of the four models.

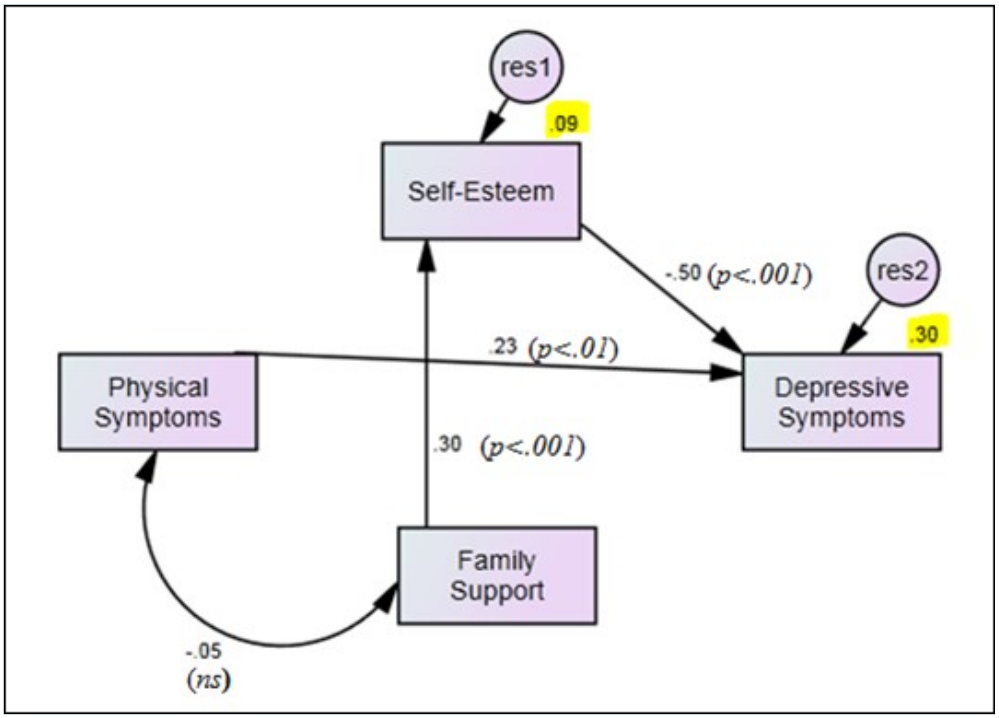

Figure 5. Results of family support path model (R2 values are shaded)

Discussion

This study is the first to examine both the direct and indirect effects of physical symptoms and emotional support on depressive symptoms among pregnant and postpartum women in Thailand. We found that about half of our 212 HIV-infected pregnant and postpartum participants reported major depressive symptoms, based on Radloff's (1977) CES-D cutoff score of ≥ 23. [36] This depression rate is comparable to those in previous studies among HIV-positive perinatal women around the world: 47% in pregnant women [17] and 42.2% in postpartum women in South Africa,[43] 53% in pregnant US women,[33] 30.8% in perinatal US women,[44] and 54% in postpartum women in Zimbabwe. [45] Based on this high prevalence of depression rates, we recommend that all HIV clinics in Thailand do a routine screening of HIV-positive pregnant and postpartum women. An early detection of clinical depression is crucial so that appropriate treatment and care can help to delay progress to full blown AIDS in depressed HIV-positive perinatal women.

Results from our trimmed path model with the combined family and friend support showed that the data fit the model well, based on various model fit indices. Among our perinatal HIV-positive Thai

Table 7. Maximum likelihood estimates for the recursive path model (family support) (Also see Figure 5)

Parameter			Unstandardized	SE	CR	p	Standardized
Self-esteem	<---	Emotional support	.013	.003	4.464	***	.297
Depressive symptoms	<---	Self-esteem	-14.572	1.722	-8.461	***	-.499
Depressive symptoms	<---	Physical symptoms	3.106	.996	3.117	.002	.226
Disturbance/Residual variances							
Self-esteem			.117	.012	10.149	***	
Depressive symptoms			76.013	7.801	9.744	***	

*** $p<.001$

women, physical symptoms had a positive direct effect on depressive symptoms, meaning that the more physical symptoms our participants experienced, the more depressed they were. Frequently, reported symptoms among our participants included fatigue, anemia, and weight loss. Detecting such physical symptoms and providing appropriate care and treatment to reduce the symptoms may help lessen depressive symptoms. Generally, in previous research, fatigue was found to be moderately associated with depressive symptoms among HIV-positive individuals, and more so among females than males. [46], [47] We noted that even though fatigue is correlated to depressive symptoms, it has its unique contribution to negative physical functions. Thus, fatigue is a separate concept and needs to be assessed separately from depressive symptoms and should be treated when detected. [48], [49]

No indirect effect from physical symptoms was found either through emotional support (combined family and friends) or through self-esteem leading to depressive symptoms. However, combined emotional support positively affected self-esteem, and self-esteem had a negative direct effect on depressive symptoms—indicating that combined emotional support had an indirect effect on depressive symptoms through self-esteem. In other words, the more combined emotional support from family and friends our participants received, the higher their self-esteem, and the fewer depressive symptoms they experienced. Our results are consistent with those from previous studies among HIV-positive individuals in different countries (e.g., Brazil, India, South Africa, Thailand, and the USA) in that self-esteem is directly correlated with depression. [11], [12], [15], [17], [50]

A question arises: "How can self-esteem be strengthened in HIV-positive perinatal women in Thailand?" The result in our trimmed model suggests that combined emotional support is a significant and helpful way to increase self-esteem among our target population. Combined emotional support in our study involved support from two sources: family and friends. Which source of support is more helpful? To answer this question, we analyzed family support and friend support separately. Our results revealed that family support is just as important as that of friends. These results are different from those of a previous study conducted among HIV-positive US women which revealed that support from friends was more positive than from family. [19] This inconsistency could be explained in light of cultural differences. While family in the USA values individuality, in Thailand a family is considered as "oneness"—meaning that both immediate and extended family members belong to one family. [51] Thus, in Thailand, when any family member is affected by a disease or any unfortunate event, every member is in the overall family structure expected to help out emotionally, tangibly, and/or informationally. [51] In this regard, it is not surprising that family support was found to be just as helpful as friend support in our Thai study.

If the HIV-positive perinatal woman does not have a family, having a friend who understands her and helps her feel good about herself is indeed valuable. If support from both family and friends is available, both sources of support should be encouraged by health care professionals to help HIV-positive perinatal women in Thailand feel loved and included—thereby increasing their self-esteem and decreasing their depressive symptoms. Such support coincides with Leary's notion that "self-esteem system is an internal, psychological gauge that monitors the degree to which the individual is being included versus excluded by other people. Self-esteem, then, is an internal representation of social acceptance and rejection." [52] Thus, including family and/or friend support in counseling services for Thai HIV-positive perinatal women will be beneficial.

Our research, nevertheless, is limited in that only quantitative data were available, and the study is correlational in nature. Future research should include both quantitative and qualitative data collection (mixed methods) so that the cultural context and the processes of emotional support, self-esteem, and depressive symptoms can be examined in more depth. A longitudinal study with mixed methods methodology will maximize the results' validity and deepen our understanding of the phenomenon of depressive symptoms among HIV-positive perinatal women in Thailand. A larger sample size for future studies will also be helpful because the confidence intervals around RMSEA in our study indicate possible result instability. Finally, comparing the effects of family vs. friend support on self-esteem and depressive symptoms among HIV-positive perinatal women in other cultures beyond the Thai and US cultures will be helpful.

Conclusion

Strong evidence in the literature shows that depressive symptoms are associated with faster progression to AIDS in HIV-infected populations. Results in this study revealed that half of the participants experienced major depressive symptoms. It is crucial that routine screening for depressive symptoms is established at all HIV clinics for perinatal women in Thailand. Physical symptoms and self-esteem had direct effects on depressive symptoms. Therefore, treating physical symptoms and increasing self-esteem through emotional support - especially family and friends support - could decrease depressive symptoms in the target population. Educating family and health care professionals about a potential positive effect of emotional support from family and friends may encourage more emotional support endeavors and may be particularly beneficial for HIV-positive pregnant and postpartum Thai women.

Competing Interests

The authors have declared that no competing interests exist.

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