Does Postpartum Depression Affect Employment?

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Outline

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Postpartum Depression

- Postpartum depression (PPD)is considered a major public health problem (Chew-Graham et al., 2009).
- It is a relatively common psychological disorder following childbirth which if left untreated may have long term adverse effects on women's mental health, children's wellbeing, family structure.
- It is estimated that PPD affects around 10% to 15% of women in developed countries
- In the United Kingdom PPD affects 8-15% of women. Depression in the postpartum period varies between 8% and 15% according to different diagnostic criteria used (Forman et al., 2000).

Research question/ what this study adds

Research questions:

- Whether postpartum depression affects/is associated with maternal employment
- The direct and indirect effects (through marital status, future maternal mental health outcomes, physical health outcomes and children's cognitive outcomes) of postpartum depression on maternal employment.
- Previous research in the literature on the effects of maternal depression has focused extensively on child outcomes (Chatterji et al., 2013). To my knowledge no studies have focused on the impact of postpartum depression on women's employment outcomes.

Data

- The Millennium Cohort Study (MCS) is a longitudinal study of babies born in the four constituent countries of the United Kingdom. The first sweep (MCS1) contained information on 18,819 babies in 18,533 families, collected from the parents when the babies were 9-11 months old.
- This paper uses all available sweeps MCS1 age 9 months-MCS5 age 11.
- Due to the study design all data are weighted (MCS5 pop weight)
- Sample consisted of the main respondents who were the natural mothers and responded to all five sweeps. Observations with missing values were excluded. N=9669

Data II PPD Indicator

- Malaise Inventory (Rutter et al., 1970 cited in Johnson (2012)) is a psychometrically valid measure of psychological distress (Rodgers, et al., 1999 cited in Flouri, E. et al. (2010)).
- The Malaise Inventory is widely used to measure psychological distress as an indicator of maternal depression (Malmberg, L. and Flouri, E., 2011; Flouri et al., 2010; Kiernan and Mensah, 2010).
- The Malaise Inventory is still used to assess psychological distress and is particularly useful for comparison purposes as it has been included in several birth cohort studies both in the United Kingdom and abroad (Flouri, E. et al., 2010).

Data II Control variables

maternal age at birth	baby's age in months in MCS1
whether father completed questionnaire/interview	OECD median poverty rate
baby's sex- male-	maternal longstanding illness
baby's weight at birth	whether baby was very early pre-term
whether the baby was very late post-term	whether the mother was born in the UK
whether the mother lived with both parents at age 15	whether the mother smoked before pregnancy
whether the mother consumed alcohol before pregnancy	maternal ethnic identity category she felt she belonged
whether mother attends religious services	whether father was present at birth
whether baby has other siblings	maternal highest educational qualification achieved

Descriptives

Postpartum Depression	Percentage %	Observations
No	84.5	8168
Yes	15.5	1501
Total	100	9669

Employment	Age 3 (MCS2)			Age 5 (MCS3)			Age 7 (MCS4)			Age 11 (MCS5)		
	Postpartum depression			Postpartum depression			Postpartum depression			Postpartum depression		
	No	Yes	Total	No	Yes	Total	No	Yes	Total	No	Yes	Total
No %	37.2	9.02	*46.2*	32.5	8.51	*41.1*	11	3.8	*14.8*	23.4	6.67	*30*
Yes %	47.3	6.47	*53.8*	52	6.99	*58.9*	73.5	11.7	*85.2*	61.2	8.74	*70*
Total %	84.5	15.5	*100*	84.5	15.5	*100*	84.5	15.5	*100*	84.6	15.4	*100*

KHB method

- **Developed by** Karlson et al. (2011; 2013)
- $Y^* = \alpha_F + \beta_F X + \gamma_F Z + \delta_F C + \epsilon$
- $Y^* = \alpha_R + \beta_R X + \delta_R C + \varepsilon$
- Y^* is the latent outcome variable, Z is the mediating variable, C are the control variables, X is the variable that we want to decompose,β_R is the total effect, β_F is the direct effect and ϵ is the error term.
- The only difference in these models is the effect of Z, the indirect effect which can also be expressed as $\beta_R - \beta_F$.

KHB method II

- Assuming the model is non-linear (ie logit/probit) this estimator requires an assumption about the distribution and the variance of the error terms in the previous 2 equations (Long 1997)
- the estimated coefficients for the total and direct effect to be $b_F = \frac{\beta_F}{\sigma_F}$ and $b_R = \frac{\beta_R}{\sigma_R}$ respectively.
- where σ_F and σ_R are scale parameters, which are a function of the residual standard deviation of the underlying linear models. We only identify the underlying coefficients of interest relative to a scale unknown to us.

KHB method III

- How to achieve an estimate of the indirect effect not distorted by differences in scales?
- the residuals (R) of a linear regression of Z on X are calculated

$$R = Z - (a + bX)$$

and then is used instead of Z

$$Y^* = \tilde{\alpha}_R + \tilde{\beta}_R X + \tilde{\gamma}_R R + \tilde{\delta}_R C + \epsilon$$

resulting in the indirect effect

$$\tilde{b}_R - b_F = \frac{\tilde{\beta}_R}{\tilde{\sigma}_R} - \frac{\beta_F}{\sigma_F} = \frac{\beta_R - \beta_F}{\sigma_F}$$

Results I-Probit

	Employed Age 3 (MCS2)	Employed Age 5 (MCS3)	Employed Age 7 (MCS4)	Employed Age 11 (MCS5)
PPD	-0.041*	-0.066**	-0.031**	-0.051**
Std Errors	(0.019)	(0.018)	(0.010)	(0.016)

Notes: Marginal effects at means. Standard errors in parentheses.* p<0.05 ** p<0.01.

Results II –Potential mediators

	Probit equations (1)	KHB method (2)
Age 3 (MCS2)		
Married	Yes	No
Mental Health	Yes	Yes
Child BAS Scores	No	Not considered
Physical problems	Yes	No
Fertility	No	Not considered
Age 5 (MCS3)		
Married	Yes	Yes
Mental Health	Yes	Yes
Child BAS Scores	Yes	No
Physical problems	Yes	Yes
Fertility	No	Not considered
Age 7 (MCS4)		
Married	Yes	No
Mental Health	Yes	Yes
Child BAS Scores	No	Not considered
Physical problems	Yes	Yes
Fertility	No	Not considered

Results III- KHB Method

Mediator: Maternal Mental Health Problems Age3			
	Average Partial Effects	Coefficient	Robust Standard Errors
Postpartum depression			
Total	-0.054	-0.175**	0.046
Direct	-0.043	-0.141**	0.047
Indirect	-0.010	-0.033**	0.008
N	9659		
Pseudo R2	0.20		

Results III- KHB Method

Mediators: Maternal Mental Health Problems Age 3 Age 5, Physical Health Problems and Marital Status Age 5			
	Average Partial Effects	Coefficient	Robust Standard Errors
Postpartum depression			
Total	-0.029	-0.172**	0.063
Direct	-0.014	-0.085	0.063
Indirect	-0.014	-0.087**	0.015
N	9660		
Pseudo R^2	0.28		

Results III- KHB Method

Mediators: Maternal Mental Health Problems Age 3 Age 5 Age 7 and Physical Health Problems Age 5 Age 7			
	Average Partial Effects	Coefficient	Robust Standard Errors
Postpartum depression			
Total	-0.042	-0.152**	0.050
Direct	-0.016	-0.058	0.051
Indirect	-0.026	-0.094**	0.013
N	9584		
Pseudo R2	0.19		

Conclusions

- The effect of PPD on employment although mediated by mental health problems is not fully explained by the mediators at age 5. → PPD direct effect on employment at age 5.
- The effect of PPD on employment at ages 7 and 11 is fully mediated; primarily by maternal mental and physical problems at earlier stages. → PPD indirect effect on employment at ages 7 and 11.
- At age 11 the mediators combined explain 62% of the total effect of PPD on employment.

Further steps

- The model should be viewed as one plausible simplification of reality in which the feasibility of a number of hypothesized pathways has been tested. Not all pathways in which PPD might affect maternal employment can be tested in this study.

- Replication using medical data: measures of previous history of maternal psychological characteristics (prior to pregnancy), family psychological history, hormonal/medical influences.