

*The relationship between health- related quality of life, mother's birth
circumstances and fear of childbirth: a transgenerational approach*

Ph.D. Dissertation

By

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Introduction

1. Sub-study 1: Fear of childbirth and Health-related quality of life

Intensive fear of pregnancy and childbirth can be one source of maternal stress, which might lead to anxiety and depression in the perinatal period (Belsky, 1986). By the last decades of the 20th century, this issue has attracted remarkable scientific and clinical attention worldwide, particularly in the Nordic states and Australia (Haines, Pallant, Karlström, & Hildingsson, 2011; Saisto & Halmesmäki, 2003; Toohill, Fenwick, Gamble, & Creedy, 2014). The association between fear of childbirth and prolonged labor (Adams, Eberhard-Gran, & Eskild, 2012), elective and emergency cesarean section (Alehagen, Wijma, & Wijma, 2006; Waldenström, Hildingsson, & Ryding, 2006), negative birth experience (Waldenström et al., 2006), and posttraumatic stress disorder (Ayers, 2014) has been documented in recent studies. Also, fear of childbirth has been shown to be a cause of postponement or avoidance of pregnancy among nulliparous women (Hofberg, 2003). These potentially serious complications highlight the clinical importance of investigating and evaluating fear of childbirth by means of a precise and valid instrument. Of the several instruments aimed to assess fear of childbirth during pregnancy, the Wijma Delivery Expectancy/Experience Questionnaire A (W-DEQ A) has been most frequently utilized in studies (Adams et al., 2012; Alehagen et al., 2006; Soet, Brack, & DiIorio, 2003; Toohill et al., 2014). It was developed in the late 1980s to assess fear of childbirth by mapping pregnant women's anticipations and worries regarding their birth. In Hungary, according to our knowledge, there has not been a valid and reliable instrument available for the assessment of fear of childbirth.

health-related quality of life (HRQOL) is a broad concept encompassing those aspects of overall quality of life that can be clearly shown to affect health—either physical or mental. It is a multidimensional concept comprising physical, mental and emotional, and social functioning domains (Ferrans, 2005). As has been mentioned above, FOC is paired with some

negative physical and psychological consequences (e.g. fatigue, sleep disturbance, anxiety, and depression) that may be influential in different domains of HRQOL. However, respect to their multidimensional structure, it has not been evidenced that how FOC subscales can affect different domains of HRQOL and which of its domains are mostly influenced by FOC. It is, therefore, essential to provide a hypothesized model to specify all the causal linkages between these variables after adjusting for confounding variables.

2.Sub-study2: fear of childbirth and mother's birth circumstances from the aspect of intergenerational transmission of reproductive behavior

The evidence of intergenerational transmission of the maternal behavior to the rearing environment that probably relies on epigenetic processes (such as DNA methylation) has been displayed by several studies in rats and humans (F. A. Champagne, 2008; F. Champagne, Diorio, Sharma, & Meaney, 2001; Francis, Young, Meaney, & Insel, 2002). Consistent results from primate and rodent studies confirm strongly effectiveness of the maternal environment on offspring phenotype and it's mediating by means of changes in gene expression (F. A. Champagne, 2008; Lovic, Gonzalez, & Fleming, 2001). Little is known about how circumstances of birth influence the offspring's mental health in humans, particularly with respect to the epigenetic regulation. We aimed to assess the link between certain dimensions of FOC in pregnant women and the circumstances of their own birth, such as the mode of their birth, whether they were born on time, was it an induced or augmented labor, were they breastfed, was there an early rooming in, etc. Our aim was to contribute to the already existing knowledge about the long-lasting or even transgenerational effects of maternity care.

Significance of this project

In Hungary, according to our knowledge, there is not any study to elaborate fear of childbirth using a validated instrument. Also, no any study hasn't been yet explored the relationship

between different dimensions of FOC and HRQOL as a noticeable factor in mother and baby's well-being. Moreover, as was stated in sub-study 2, it has been little known that how early circumstances of birth can influence on offspring's reproduction and mental health in humans particular respect to the epigenetic regulation over time. Since, we considered the mother's birth circumstances as early life environment to assess its association with FOC as a cognitive and emotional behavior in their daughters. By this way, we can enhance the existing knowledge regarding the importance of quality of prenatal and postnatal maternal care in relation to the long-lasting effects on maternal behaviors in the next generations.

Main aims:

- To assess psychometric characteristics of WDEQ-A among nulliparous and multiparous Hungarian women.
- To assess the relationship between fear of childbirth and health-related quality of life among nulliparous and multiparous Hungarian women after controlling confounders.
- To assess the relationship between mother's birth circumstances and fear of childbirth among nulliparous and multiparous Hungarian women.

Methodology

Recruitment procedure

This population-based cross-sectional study was carried out from a consecutive sample of healthy pregnant women with a singleton pregnancy at their third trimester, not having a history of alcohol and/or drug abuse and/or major psychological disorder over the past year, attending the Nonstress Test (NST) in the Laboratory of the Department of Obstetrics and Gynecology, at the University of Pécs. Recruitment took place from September 2016 till February 2017 by a registered midwife as a research assistant. Of the 392 invited women, 370 agreed to

participate after reading and signing an informed consent form. They returned the filled booklet at a subsequent visit.

Measures

- **Socio-demographic and obstetrics checklist** included twelve questions concerning age, education, occupation, residency, economic hardship, marital status, number of pregnancies, gestational age, history of miscarriage, pregnancy status, mode and experience of previous birth (for multiparous women).
- *Hungarian version of WDEQ-A* is a valid and reliable instrument comprising 30 items with 4 factors including “Social isolation” (10 items),” Lack of positive emotions” (11 items), “Moment of birth” (5 items), and “Fear” (4 items). Total score 0-50 for Isolation, 0-55 for Lack of positive emotion, 0-25 for Moment of birth, and 0- 20 for Fear (MoghaddamHosseini, Makai, Dweik, & Várnagy, 2018). In this study, we obtained a good Cronbach’s alpha coefficient for all subscales (0.90 for Isolation, 0.80 for Lack of positive emotions, 0.87 for Moment of birth and 0.75 for Fear).
- *PROMIS–43 Profile v2.0* is a 43- item scale comprising of seven subscales namely Physical function, Anxiety, Depression, Fatigue, Sleep Disturbance, Ability to participate in social roles and activities, and Pain interference. Each subscale has 6 items on a Likert point from 1(always) to 5(never). Also, there is a single item namely Pain intensity that measures the degree of pain with a range from 0 (no pain) to 10 (worst imaginable pain) (“PROMIS Profile Scoring Manual.pdf,” n.d.)
- *Circumstances of the pregnant woman’s own birth* were mapped by questions about the date of birth (due date, preterm or post term), mode of birth (vaginal or cesarean delivery), interventions during birth (administration of oxytocin, amniotomy, epidural analgesia, instrumental delivery, and episiotomy) and the early events of their infant life (the presence of their father during their birth, immediate skin-to-skin contact with their mother, having been

breastfed during the first few hours, and early rooming-in). The internal consistency of each domain of validated Hungarian version was approved by Cronbach alpha of .68, .87, .86, .90, .62, .93, .96 for physical function, anxiety, depression, fatigue, sleep disturbance, ability to participate in social roles and activities, pain interference, respectively.

- *Beck Anxiety Inventory (BAI)* with 21 item (Gerevich, Bacskai, Matuszka, & Czobor, 2009; Szakáts, Sebestyén, Németh, Birkás, & Purebl, 2015) ($\alpha=0.90$), *Beck Depression Inventory - Short Form (BDI-SF)* with 9 item (Kopp, Skrabski, & Szedmák, 1995; Rózsa, Szádóczy, & Furedi, 2001) ($\alpha=0.73$), and *Multidimensional Scale of Perceived Social Support(MSPSS)* with 21 items ($\alpha=0.67$) were additionally applied.

Statistical Analysis

Descriptive statistics, Mann-Whitney u and chi-squared tests (non-normality distribution was assessed by Kolmogorov-Smirnov test) and stepwise multivariate linear regression analysis were performed. Exploratory (EFA) and confirmatory factor analysis (CFA) were performed using SPSS and AMOS software, respectively to assess the construct validity of W-DEQ A (based on common factor model) among nulliparous, multiparous women.

To assess the link between FOC and HRQOL, a multiple linear regression was performed, allowing for some other potential variables (confounders) expected to affect the change in different domains of HRQOL. At first, a stepwise procedure without including confounders was used to obtain unadjusted values. In the next step, the model re-assessed to determine the significance of each of the remaining variables after including confounders. To determine the relationship between mother's birth circumstances and FOC, bivariate tests such as Mann-Whitney u and Kruskal-Wallis were applied

All estimates were reported with 95% confidence intervals (95% CI), data were expressed as mean \pm standard deviation (SD). Statistical significance was assumed with P-values less than 0.05. SPSS v. 22 (IBM Corp.) was used for the analyses.

Main Results

Factor analysis of WDEQ- A

The sampling adequacy for the analysis was confirmed by Kaiser–Meyer–Olkin test (KMO = 0.90) and Bartlett’s test of Sphericity ($\chi^2 = 8076.14$; $p < 0.00$). EFA yielded in a four-factor solution with 30 items was identified to explain 60.25% of the total variation. The factors were labelled as “Isolation”, “Lack of positive emotions”, “Moment of birth” and “Fear”, including 10, 11, and items, respectively (Table 1). Factor loadings of all these items were above 0.52. CFA confirmed multidimensionality of the instrument with satisfactory indices (Table 2). Each factor showed high reliability. The Cronbach’s α coefficient for the instrument was 0.92. W-DEQ A scores correlated fairly with anxiety and depression scores, indicating a distinction between fear of childbirth and general anxiety and depression.

Descriptive analysis of WDEQ-A subscales

Among four WDEQ-A subscales, Fear (19%) and Lack of positive emotion (13%) obtained the largest and smallest percentages of cases needing more investigation, respectively. The nulliparous obtained significantly higher mean score in subscales Isolation and Lack of positive emotion compared to the multiparous.

Descriptive analysis of PROMIS-43 subscales

Comparing mean T-scores of PROMIS subscales between nulliparous and multiparous women revealed the significantly higher mean score of subscale “Anxiety” in nulliparous in compare to the multiparous women ($p= 0.02$). Assessing T-score ranges, the greatest proportion of participants felled into the normal range in all subscales except for Physical function and Fatigue for which, mild and moderate range obtained the highest percentages, respectively in both groups.

The relationship between fear of childbirth and health-related quality of life

Using adjusted multiple regression model in the nulliparous group, Isolation significantly predicted poorer HRQOL in domains sleep disturbance (adjusted OR=0.28; 95%CI, 0.11, 0.48), pain interference (adjusted OR=0.22; 95%CI, 0.10, 0.41), and physical function (adjusted OR=-0.22; 95%CI, -0.28, -0.02). In opposite, Moment of birth (adjusted OR=0.27; 95%CI, 0.07, 0.43) emerged as a predicting factor for the higher levels of physical function (Table3). In multiparous women, Isolation showed to be a significant contributor only for sleep disturbance (adjusted OR=0.35; 95%CI, 0.17, 0.41). In addition, subscale fear could predict the higher level of depression (adjusted OR=0.17; 95%CI, 0.03, 0.61) and anxiety (adjusted OR=0.24; 95%CI, 0.26, 0.75) in HRQOL (Table4).

The association between women's fear of childbirth and their own birth circumstances

In this part, respondents whose mother did not have recollections about the particular items of the early postpartum period were excluded from the analysis. Participants whose mothers experienced certain medical interventions such as amniotomy and administration of OT, scored markedly higher on certain subscales of W-DEQ A in comparison with those whose mothers did not receive these interventions. Of these items, higher scores on subscales 'Moment of birth' ($p = 0.03$) and 'Fear' ($p = 0.01$) were associated with the administration of OT during their own birth. Higher scores on subscale 'Lack of positive emotions' ($p = 0.02$) were associated with amniotomy during labor of the respondents' mothers.

Neither all the other medical interventions during birth and early experiences of infancy, nor the duration of having been breastfed correlated with the scores reached on W-DEQ A subscales (Table 5).

Clinical implication

Given to the obtained results from assessing fear of childbirth that was the most important concern in this project, the following strategies for reducing it should be taken into account.

First of all, educating midwives and obstetricians about symptoms, risk factors, and other different aspects of fear of childbirth and making them sensitive to this common psychological problem is a fundamental measure that should be carried out. Secondly, implementing preventive strategies to detect women with a severe level of fear in early pregnancy would be helpful. In this way, maternity caregivers could provide a required platform for pregnant women to discuss their feelings and expectations of childbirth. Assuring mothers that they will be sufficiently cared for and supported during labor is also very important in alleviating the fear of being left alone and of losing control. Thirdly, regarding the subject of coping with labor pain, providing a continuous supporting care particularly by a midwife during labor has been pointed out to be significantly more helpful than using different types of medical pain relief like epidural analgesia. Therefore, the continuous presence of a supportive professional obviously also leads to a more positive experience of childbirth. Finally, continuing discussion after birth and talking with women about their childbirth process during postnatal visits may be beneficial to identify underlying causes of negative birth experience and amend its effects on the subsequent pregnancy and even on reproductive behavior in the next generation.

Since anxiety was recognized as the most consistent predictive factor for most HRQOL and FOC domains, designing screening programs at the early pregnancy, particularly for nulliparous women, seems to be required.

Paying attention to the mother's birth circumstances, especially in terms of received medical interventions during labor in their mothers, and also the history of breastfeeding in the previous childbirth for identifying mothers who are prone to perceive severe FOC should be considered.

Conclusion

The first section of this project using EFA and CFA revealed a valid and reliable Hungarian version of W-DEQ A with 30 items and 4 factors, confirming the multidimensionality of this instrument and being suitable for both nulliparous and multiparous women.

Examining the relationship between FOC and HRQOL showed that subscale isolation can significantly be associated with sleep disturbance in both groups, physical function and pain interference only in the nulliparous group, indicating the effectiveness of insufficient level of confidence in care providers and also self-efficacy on diminishing some domains of HRQOL during pregnancy.

In assessing the relationship between mother's birth circumstances and fear of childbirth, the most significant result was an association between recollections of the most common medical intervention during labor such as amniotomy and administration of exogenous OT, and increased scores on FOC subscales in the offsprings. This outstanding result firstly suggests the role of the mother's negative birth experiences in increasing FOC level in their daughters via internalizing mother's negative stories. Secondly, it highlights the tentative long-term effect of insufficient amount of endogenous OT level and/or OT receptors in the offspring and its capability of transmission to the next generation and affecting them negatively. There is a need for more precise investigations with longitudinal respective design in order to fill the wide gap in existing knowledge in this regard and achieve a comprehensive consensus.

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Publication list

Directly from the thesis

- 1- *MoghaddamHosseini V*, Makai A, Varga K, Ács P, Prémusz V, Várnagy Á. Assessing fear of childbirth and its predictors among Hungarian pregnant women using Wijma Delivery Expectancy/Experience Questionnaire subscales. *Psychology, health & medicine*. 2019 Jan 30:1-1.
- 2- *Vahideh MoghaddamHosseini*, Alexandra Makai, Diana Dweik, Ákos Várnagy. Factor analysis study of the Hungarian translation of Wijma Delivery Expectancy/Experience Questionnaire (version A), *Current Psychology*, 2018;1-8,

Other publications

- 3- *Vahideh MoghaddamHosseini*, Milad Nazarzadeh, Shayesteh Jahanfar. Interventions for reducing fear of childbirth: A systematic review and meta-analysis of clinical trials. *Women and Birth* 31 (4), 2018; 254-262
- 4- *Vahideh MoghaddamHosseini*, Jocelyn Toohill, Arash Akaberi, BibiMarzie HashemiAsl. Influence of intimate partner violence during pregnancy on fear of childbirth. *Sexual & Reproductive Healthcare* 14 (2017) 17–23.

Publication to be reviewed

- *Vahideh MoghaddamHosseini*, Alexandra Makai, Diana Dweik, Kiss István, Katalin Varga, Ákos Várnagy. Fear of childbirth in pregnant women might be rooted in their own birth circumstances – a retrospective study of intergenerational transmission.
- *Vahideh MoghaddamHosseini*, Alexandra Makai, Katalin Varga, Ákos Várnagy. The Assessment of Health-related Quality of Life and its Predictors Among Hungarian Pregnant Women Using the Patient-Reported Outcomes Measurement Information System.

Table 1: Summary of the results of the exploratory factor analysis of the Hungarian version of W-DEQ A. (N=343)

Items	Factors			
	1 Isolation	2 Lack of positive emotions	3 Moment of birth	4 Fear
11 Desolate	.923			
15 Abandoned	.910			
3 Lonely	.897			
20 Hopelessness	.881			
31 Dangerous	.842			
27 Totally Lose Control	.791			
25 Behave Badly	.696			
8 Weak	.694			
19 Panic	.613			
2 Frightful	.584			
17 Relaxed		.792		
5 Confident		.790		
13 Glad		.787		
22 Self-Confidence		.768		
16 Composed		.740		
4 Strong		.729		
10 Independent		.699		
9 Safe		.645		
1 Fantastic		.634		
23 Trust		.599		
14 Proud		.525		
28 Enjoyable			.850	
24 Natural			.820	
30 As Should Be			.793	
21 Longing for The Child			.759	
18 Happy			.619	
6 Afraid				.812
12 Tense				.736
7 Deserted				.691
24 Pain				.599
Eigenvalues	9.34	6.78	2.08	1.77
% of variance	28.31	48.88	55.19	60.56
Cronbach's α	.94	.91	.84	.81

Table 2: Goodness-of-fit indicators for W-DEQ A and its four-factor models from CF. (N=343)

Model	Chi square	df	Chi square/df	RMSEA	CI RMSEA lower	CI RMSEA Upper	CFI	TLI
Wijma et al (1998) One factor	5156.513	495	10.417	.166	.162	.170	.405	.366
Johnson & Slade (2002)	2516.346	434	5.798	.141	.141	.153	.513	.546
Takegata et al (2013)	2679.262	495	5.413	.141	.136	.146	.520	.550
Pallant et al (2016)	1299.898	324	4.012	.116	.110	.123	.728	.749
Hungarian version (n=343)	1118.406	378	2.959	.076	.071	.081	.90	.885

RMSEA: root means square error of approximation, CFI: comparative fit index, TLI: tucker-lewis index

Table 3: Crud and adjusted significant results of the effect of childbirth fear on health-related quality of life in the nulliparous group. (N=140)

Variables	Crude results β (95%CI)			Adjusted results β (95%CI)		
	Sleep disturbance	Physical function	Pain interference	Sleep disturbance	Physical function	Pain interference
Isolation	0.24** (0.08, 0.44)	- 0.24* (- 0.32, -0.00)	0.27** (0.13, 0.55)	0.28** (0.11, 0.48)	-0.22* (-0.28, -0.02)	0.22* (0.10, 0.41)
Moment of birth		0.22* (0.12, 1.90)			0.27** (0.07, 0.43)	
Anxiety ¹						0.29** (0.10, 0.41)
R ²	0.05	0.05	0.07	0.10	0.07	0.17

1. As a confounder measured by Beck Anxiety Inventory that remained in the model. * P<0.05, **P<0.01

Table 4: Crude and adjusted significant results of the effect of childbirth fear on health-related quality of life in the multiparous group.(N=215)

Variables	Crude results β (95%CI)			Adjusted results β (95%CI)		
	Sleep disturbance	Depression	Anxiety	Sleep disturbance	Depression	Anxiety
Isolation	0.30** (0.14, 0.37)	0.29** (0.16, 0.45)		0.35 (0.17, 0.41)		
Moment of birth			0.14* (0.01, 0.58)			
Fear			0.38** (0.52, 1.08)		0.17 (0.03, 0.61)	0.24 (0.26, 0.75)
MSPSS-SO ¹					-0.21** (-3.28, - 0.76)	
Depression ²						0.50** (0.88, 1.44)
Anxiety ³					0.35** (0.15, 0.40)	
R ²	0.09	0.08	0.21	0.12	0.26	0.42

* P<0.05, **P<0.01

1. Multidimensional Scale of Perceived Social Support-Significant others
2. As a confounder measured by Beck Depression Inventory-Short Form that remained in the model.
3. As a confounder measured by Beck Anxiety Inventory that remained in the model.

Table 5: Relationship between mother's birth circumstances and fear of childbirth subscales. (N= 316)

Variable	Lack of positive emotion		Moment of birth		Fear		Isolation		Maternal-fetal attachment	
	Mean rank	Median	Mean rank	Median	Mean rank	Median	Mean rank	Median	Mean rank	Median
Date of birth										
In-term	166.56	27.00	160.85	3.00	162.34	9.00	160.85	13.00	156.91	102.00
Pre-term	155.71	27.00	160.28	3.50	152.00	8.00	150.99	14.00	151.31	100.00
Post-term	156.87	26.00	173.52	4.00	153.45	9.00	148.78	13.00	140.72	99.00
<i>Bivariate test (χ^2)</i>	.080		0.87		1.01		0.72		1.42	
Mode of birth										
Normal vaginal	176.89	27.00	176.67	3.00	171.83	9.00	169.63	13.00	165.31	101.00
Elective CS ¹	175.90	27.50	171.57	4.00	185.21	9.50	171.36	14.00	166.69	101.00
Emergency CS ¹	183.04	27.00	186.58	5.00	138.71	7.50	189.25	16.00	179.15	102.00
<i>Bivariate test (χ^2)</i>	0.04		0.20		1.97		0.46		0.26	
Medical intervention										
Episiotomy										
Yes	116.87	26.00	114.85	3.00	113.27	8.00	111.37	12.00	17547.50	102.00
No	102.70	25.50	110.66	2.00	109.44	8.00	112.00	13.00	5030.50	102.50
<i>Bivariate test (z)</i>	-1.308		-.388		-.059		-.355		-0.95	
Amniotomy										
Yes	102.73	27.00	95.91	3.50	90.85	9.00	92.06	13.00	5547.50	102.00
No	85.20	24.00	88.74	3.00	89.47	8.00	87.14	13.00	9158.50	103.00
<i>Bivariate test</i>	-2.182*		-.900		-.621		-.174		-0.40	
Instrumental delivery										
Yes	134.84	27.00	124.00	4.00	111.75	8.00	111.17	13.00	1842.00	100.00
No	109.32	26.00	110.33	3.00	109.30	8.00	108.80	13.00	19686.00	102.00
<i>Bivariate test (z)</i>	-1.658		-.893		-.153		-.159		-0.31	
EDA2										
Yes	112.36	26.00	109.03	3.00	113.63	9.00	109.40	14.00	7305.00	102.00
No	108.06	26.00	108.99	3.00	103.76	8.00	103.55	12.00	14016.00	102.00
<i>Bivariate test (z)</i>	-.475		-.005		-.658		-1.103		-0.36	
OT³ - induction										
Yes	129.72	28.00	134.87	6.50	129.61	10.00	118.53	10.00	4103.50	100.00
No	108.36	24.00	107.30	3.00	105.88	8.00	106.98	8.00	18262.50	102.00
<i>Bivariate test (z)</i>	-1.860		-2.414*		-2.108*		-1.031		-0.39	

Early Experiences										
Father present										
Yes	160.90	28.00	175.19	4.00	142.62	9.00	140.08	12.50	3471.00	103.00
No	148.64	26.00	147.55	3.00	145.72	9.00	144.83	13.00	35589.00	101.00
<i>Bivariate test (z)</i>	-.630		-1.425		-.247		-.164		-1.07	
Immediately skin-to-skin contact with mother										
Yes	93.55	27.00	94.26	3.50	90.04	8.00	88.32	13.00	4654.00	102.00
No	89.26	26.00	88.97	3.00	88.57	8.00	88.57	13.00	10397.00	101.00
<i>Bivariate test (z)</i>	-.501		-.621		-.030		-.175		-0.43	
Early breastfeeding										
Yes	82.69	27.00	83.73	3.00	79.05	8.00	81.14	12.00	6093.50	102.00
No	84.31	26.00	83.27	3.00	86.04	8.00	81.88	13.00	6467.50	101.00
<i>Bivariate test (z)</i>	-0.218		-0.062		-0.101		-0.948		-0.37	
Rooming-in with mother										
Yes	113.39	24.00	114.26	4.00	112.99	9.00	118.37	14.50	3823.50	100.00
No	104.00	26.00	103.76	3.00	102.16	8.00	98.39	12.00	15877.50	102.00
<i>Bivariate test (z)</i>	-0.916		-1.029		-1.074		-1.957		-1.07	