Increased Low Birth Weight Risk Among Public Prenatal Care Users – Correlation or Causality?

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Concept

In Hungary, public health care coverage is in practice universal, only a mere 5% of the population has unclear health insurance status (OECD 2017). According to the national legislation, every pregnant woman has the right to use the public primary care (GP's and health visitor's consultations) as well as gynaecologists' examination financed by the social security system in every trimester of the gravidity. However, visits to private gynaecologists are widespread in Hungary. According to recent data, among pregnant women the share of using private care is 64 percent (based on Cohort '18 survey). This magnitude in itself results in significant inequalities among pregnant women in terms of prenatal care and other related factors (Chiavarini et al. 2014) which together may determine the outcome of childbirth. In these circumstances, the use of paid private care can be considered as an individual investment whose return, or disadvantage resulting from its absence, is worth analyzing.

The birth weight as the major indicator of the pregnancy outcomes determines the physical growth and mental development of an infant significantly. It is considered to be low under 2500 g regardless of gestational age by the WHO classification (WHO 2004).

There is a vast literature documenting the effects of disadvantaged background in terms of social stratification or adverse health behaviour on poorer maternal and infant health outcomes during the perinatal period (Sutherland et al. 2012; Kramer et al. 2000; Kramer 1987, Han et al. 2011, Hawsawi et al 2015, Talati et al. 2017).

However, precisely because of the above mentioned relevant background determinants on the pregnancy outcomes, the direct effects of using the public or private prenatal care services are often unclear or not proven (Anum et al. 2010). In the study we will seek to isolate the direct impact of the differently financed pregnancy care systems on low birth weight risk.

Research question

The key question here is whether the financial difference in prenatal care affects the health of the unborn child. Therefore the aim of the study is to identify the independent role of prenatal care offered by public health insurance system in Hungary. To this end we examine the relationship between the use of public vs. private prenatal care during the pregnancy period and the low birth weight risk as the negative outcome of the childbirth, by controlling those maternal demographic, socio-economic and health-related factors that are proven to influence the former.

Data and methods

The empirical basis of the analysis is provided by the Cohort '18 – Growing Up in Hungary research project, which is a Hungarian birth cohort study started in 2018. The full methodological details of the Cohort '18 have been published previously (Veroszta 2018). In

the first wave of the Cohort ’18 pregnant women (28-31st weeks of gestation) were recruited and surveyed by face to face interviews between March 2018 and March 2019 by their health visitors on a nationwide representative sample. Women were followed up 6 months after the childbirth. Within the birth cohort study several further waves are still ongoing (18 months survey) or in the process of being planned (3 years old survey). The number of participants reached 8,500 which represents 10 per cent of Hungarian births during one-year period. The analysis is performed on the linked database of the first and second waves, during which we combined maternal background variables and the type of prenatal care from the database of pregnant women and the outcome of childbirth (i.e. low birth weight) from the dataset on 6 months infants.

Testing our initial hypothesis regarding the direct effect of public prenatal care system on low birth weight risk, besides the exclusive use of public services as dependent variable, several maternal characteristics were included in a multivariate model as controls:

- demographic characteristics of the pregnant women: age, parity, marital status
- socio-economic background variables: educational level, employment, cultural background, financial difficulties
- health status and behaviour of the mothers during pregnancy: low BMI, passive/active smoking, alcohol consumption, chronic illness, dental care, vitamin (folic acid) intake

Preliminary results

A very strong social selectivity in the use of prenatal services in Hungary can be clearly identified on the basis of contingency table analyses (Table 1).

Table 1

Selectivity in the use of prenatal services in Hungary

Among woman during the 7th months of their pregnancy. Results of the Bivariate Analysis

Factors	**Public care client (n=3,095)**	**Private care client (n=5,179)**	**Chi-square (□²)**	**P-value**
Demographic characteristics				
Age				
<20 years	11.8%	0,9%	477.781	< .001
≥20 years	88.2%	99.1%		
Marital status				
Marriage	37.6%	64.3%	556.448	< .001
Cohabitation/LAT/single	62.4%	35.7%		
Parity				
0 child	41.4%	52.1%	90.124	< .001
1 child or more	58.6%	47.9%		
Socio-economic background				
Wealth (subj.)				
Financial difficulties	47.0%	23.7%	475.034	< .001
No financial difficulties	53.0%	76.3%		
Cultural background (nr. of books in the household)				
Up to 50 books (low)	52.0%	23.2%	704.881	< .001
More than 50 books	48.0%	76.8%		
Educational level (ISCED)				

ISCED 0-2 (low)	57.9%	12.6%	1912.376	< .001
ISCED 3-	42.1%	87.4%		
Employment status				
Unemployed	48.3%	11.3%	1409.787	< .001
Employed	51.7%	88.7%		
Type of work (among employed)				
Blue collar	74.8%	35.7%	1185.305	< .001
White collar	25.2%	64.3%		
Health status and behaviour				
Smoking during pregnancy				
Yes	37.0%	11.5%	761.859	< .001
No	63.0%	88.5%		
Passive smoking during pregnancy				
Yes	37.8%	13.3%	668.675	< .001
No	62.2%	86.7%		
Alcohol consumption during pregnancy				
Yes	10.7%	15.3%	34.398	< .001
No	89.3%	84.7%		
Taking folic acid during/before pregnancy				
Yes	76.7%	94.7%	592.015	< .001
No	23.3%	5.3%		
Chronic illness				
Yes	18.1%	24.5%	45.855	< .001
No	81.9%	75.5%		
Dental check during pregnancy				
Yes	54.5%	73.6%	315.753	< .001
No	45.5%	26.4%		
Underweight (BMI<18.5 before becoming pregnant)				
Yes	11.3%	6.5%	57.795	< .001
No	88.7%	93.5%		

Source: Cohort ’18 – Growing Up In Hungary, Wave 1., Hungarian Demographic Research Institute, 2018

Although a further descriptive statistical examination shows a strong correlation between public prenatal care clients and mothers of low birth weight infants (Table 2), the independent effects of it can not be proved (Table 3).

Table 2

The incidence of low birth weight by the type of prenatal services

Preliminary results of the Bivariate Analysis

Factors	**Low birth weight (<2,500g) (n=349)**	**Normal birth weight (≥2,500g) (n=4,737)**	**Chi-square (χ^2)**	**P-value**
Prenatal care services				
Public care	8.6%	91.4%	22.157	< .001
Private care	5.1%	94.9%		

Source: Cohort ’18 – Growing Up In Hungary, Wave 1 & Wave 2, Hungarian Demographic Research Institute, 2018

Based on the preliminary result of an explanatory model, when corrected for the above mentioned risk variables, birth outcomes are not significally different between private and public prenatal care users (Table 3).

Table 3

Binary logistic regression model for risk factors of low birth weight (LBW)
Preliminary results

Variables		**LBW** (ref: normal BW)	
(Potential risk factors for LBW)	**OR**	**95% CI for OR**	**P-value**
Constant	.033		<.001
Public prenatal care	1.253	.926 – 1.696	.144
Demographic characteristics			
<20 years	.881	.504 – 1.540	.656
Married	.999	.750 – 1.331	.997
1 child or more	.857	.652 – 1.128	.270
Socio-economic background			
Financial difficulties	1.328	1.012 – 1.743	.041
Up to 50 books (low cult. bg.)	1.123	.839 – 1.503	.436
ISCED 0-2 (low ed.level)	1.383	.952 – 2.010	.089
Unemployed	1.002	.712 – 1.409	.991
White collar	.927	.660 – 1.300	.659
Health status and behaviour			
Smoking during preg.	1.492	1.084 – 2.052	.014
Passive smoking during preg.	.926	.671 – 1.279	.641
Alcohol consumption during preg.	1.121	.787 – 1.599	.527
No folic acid intake during preg.	1.147	.796 – 1.654	.461
Chronic illness	1.442	1.082 – 1.922	.012
No dental check during preg.	1.356	1.031 – 1.783	.029
Underweight before preg.	1.724	1.178 – 2.525	.005
Model statistics	**χ^2**	**df**	**p**
Likelihood ratio test	78.365	16	<.001
Hosmer and Lemeshow	13.022	8	.111
R^2		.048	
N		5.003	

Source: Cohort ’18 – Growing Up In Hungary, Wave 1 & Wave 2, Hungarian Demographic Research Institute, 2018, 2019

Note: CI= confidence interval; OR=odds ratio

Conclusions

According to the logistic regression analysis, LBW is strongly associated with maternal smoking during pregnancy, chronic illness, being underweight before pregnancy, financial difficulties and low education level of the mother. However, the role of public health care use during pregnancy was not statistically significant in the model. According to this, as a preliminary result, we can conclude that the use of public prenatal services appears to be more an appropriate indicator (by identifying a separable population of women at higher risk for LBW), than an independent explanatory factor for the low birth weight risk.

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