

**Maternal age and child health:
An analysis based on 2 sets of recent Belgian
regional birth weight and child health micro-data**

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outcomes in early infant in Europe'**

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Structure

1. Research background
2. Research questions & hypotheses
3. Data and method
4. Results
5. Conclusion

1 Research background

- o Literature on maternal age and child health divided:
 - o Maternal age and birth weight
 - OR
 - o Maternal age and child health after birth
- o This paper takes comprehensive view and treats two issues together

1.1 Maternal age and birth weight – Literature

- o Risk factors of low birth weight:
 - Maternal health related:
 - Hypertension; abortion; fertility treatment; etc
 - Behavioural:
 - Smoking; alcohol; stress; etc
 - Socio-demographic:
 - **HIGH AGE**; marital status; living arrangement; education; income; class; etc
- o High age:
 - Independent effect
 - Interaction effects
 - Age*hypertension; Age*abortion; Age*fertility treatment; Age*smoking; Age*class/education; etc.

1.2 Maternal age and child health after birth – Literature

- o Little direct attention paid to this
- o Indirectly approached via role social/family environment (early home environment plays central role in child cognitive development)
- o Problems (especially when studying LBW):
 - o High attrition
 - o Strong selection effect
 - o Inconsistent findings on relative importance perinatal/socio-economic factors

2 Research questions & hypotheses

- Research question 1 (maternal age and birth weight):
 - Is high age a risk factor for low birth weight?
- Research question 2 (maternal age and child health after birth):
 - DIRECTION: Taking weight gain as a proxy for child health, what factors determine whether a child will **worsen** its weight gain performance VS **maintaining/improving** it?
- Research question 3 (maternal age and child health after birth):
 - STRENGTH: Taking weight gain as a proxy for child health, what factors determine whether a child will experience **great change** (positive or negative) in its weight gain performance VS **moderate or no change**?

3 Data and method (1)

Data origin	Kind en Gezin	Office de la Naissance et de l'Enfance (ONÉ)
Communities covered	Flanders, Dutch-speaking in Brussels	Wallonia, French-speaking in Brussels
Years covered	2001/2-2004	2000/1-2002
# of records	131,517 births	94,721 births
Common child variables	Birth weight; gestational age; gender; parity; multiple birth	
Dataset specific child variables		Vaccination status; psycho-motor development
Timing of measurement	Time of birth and regular follow-up	Time of birth, primary follow-up, around 1 year
Common maternal variables	Age; nationality/ethnicity	
Dataset specific maternal variables	Education; kansarmoede (poverty)	Marital status; living arrangement; smoking; infant feeding; delivery method
Attrition	51 percent left	17 percent left

3 Data and method (2)

- Research question 1 (maternal age and birth weight):
 - Dependent variable: 2500g or below VS above 2500
 - Independent variables: Various perinatal/socio-economic factors
- Research question 2 (maternal age and child health after birth – DIRECTION)
 - Dependent variable: Drop in weight category (defined on basis of growth curves) VS maintain or increase
 - Independent variables: Same as above + infant-feeding (ONE)
- Research question 3 (maternal age and child health after birth – STRENGTH)
 - Dependent variable: Drop/increase of more than 2 weight categories (defined on basis of growth curves) VS no or moderate (≤ 2) drop/increase
 - Independent variables: Same as above + infant-feeding (ONE)

3 Data and method (3)

- o Logistic regression analysis
- o Analysis:
 - o All children
 - o Restrictions where applicable:
 - o Children of women aged 20 or more
 - o Children of women aged 35 or more
 - o Children of primiparous women
 - o Children of primiparous women aged 20 or more
 - o Children of primiparous women aged 35 or more
 - o LBW children
 - o LBW children of women aged 20 or more
 - o LBW children of women aged 35 or more
 - o LBW children of primiparous women
 - o LBW children of primiparous women aged 20 or more
 - o LBW children of primiparous women aged 35 or more

3 Data and method (4): Description of data K&G

Birth weight	Normal: 88% // 1500-2500g: 6.0%
Gestational age	37 wks or more: 88.5%
Multiple birth	Singleton: 94.4%
Parity	First: 46.8% // Second: 34.5% // Third: 18.8%
Maternal age	20-34: 82.9% // 35 or more: 11.5%
Maternal education	ISCED 5: 30.8 // ISCED 3/4: 21.5% (# of missing cases high, +/- 30%)
Maternal nationality	Belgian: 78.4% // Other EU: 6.4% // Moroccan: 3.7% // Turkish: 2.9%
Kansarmoede (poverty)	6.7%

3 Data and method (4): Description of data ONE

Birth weight	Normal: 91% // 1500-2500g: 7.4%
Gestational age	37 wks or more: 88.7%
Multiple birth	Singleton: 96.9%
Parity	First: 43.9% // Second: 32.4% // Third: 23.0%
Expulsion method	Natural: 66.5% // Caesarian: 16.6%
Maternal age	20-34: 81.4%; 35 or more: 13.9%
Marital status	Married: 55.6% // Single: 24.9%
Maternal living arrangement (self-calculated)	Legally married & living together: 51.2% // Legally single & living together (cohabiters): 21.8% // Unknown: 16.8%
Maternal ethnicity*	Belgian: 62.8% // Other EU: 6.3% // Moroccan,: 3.4% // Turkish: 2.0 // Unknown: 20.6%
Smoking	Non-smokers: 53.5% // Unknown: 31.8%

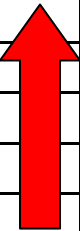
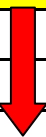
4 Results – 1 Maternal age and birth weight - K&G

	B	Sig	Exp(B)
Gest. Age		0.00	
28-36 wks	-1.93	0.00	0.14
37 wks or more	-5.36	0.00	0.00
Female	0.52	0.00	1.68
Twin or more	2.39	0.00	10.87
Parity		0.00	
Second	-0.51	0.00	0.60
Third or more	-0.60	0.00	0.55
Mat. Age		0.00	
20-34 years	0.19	0.08	1.21
35 or more	0.48	0.00	1.62
Unknown	1.08	0.43	2.95
Mat. Educ.		0.00	
ISCED 2	0.22	0.05	1.25
ISCED 3/4	-0.08	0.45	0.92
ISCED 5	-0.49	0.00	0.61
Unknown	-0.14	0.20	0.87
Mat. Nat.		0.00	
Other EU	-0.01	0.90	0.99
Morocco	-0.30	0.00	0.74
Turkish	-0.26	0.01	0.77
Other	-0.21	0.01	0.81
Unknown	0.76	0.09	2.14
Kansar mode	-0.69	0.00	0.50
Constant	2.35	0.00	10.44




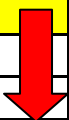

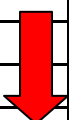

4 Results – 1 Maternal age and birth weight - ONE

	B	Si g.	Exp(B)
Gest. Age		0.00	
28-36 wks	-2.60	0.00	0.07
37 wks or more	-5.71	0.00	0.00
Unknown	-5.19	0.00	0.01
Female	0.40	0.00	1.49
Mult. Birth		0.00	
Twin or more	2.16	0.00	8.66
Unknown	4.08	0.00	59.33
Parity		0.00	
Second	-0.39	0.00	0.67
Third or more	-0.35	0.00	0.71
Unknown	0.22	0.16	1.24
Mat. Age		0.01	
20-34 years	-0.02	0.81	0.98
35 or more	0.13	0.13	1.13
Unknown	0.49	0.38	1.64
Mat. Liv. Arr.		0.09	
Cohabiting	-0.13	0.29	0.87
Living alone	-0.06	0.71	0.95
Other	0.10	0.44	1.11
Unknown	-0.16	0.15	0.85
Mat. Eth.		0.04	
Other EU	-0.13	0.04	0.88
Morocco	-0.13	0.17	0.88
Turkish	-0.13	0.27	0.88
Other	-0.12	0.10	0.88
Unknown	0.05	0.24	1.06
Tobacco		0.00	
1-10 cig/day	0.69	0.00	1.98
11 or more/day	1.20	0.00	3.33
Unknown	0.38	0.00	1.46

4 Results – 1 Maternal age and birth weight – ONE

Mt. Mr. S's			0.00	
Single	0.33		0.01	1.40
Legally sep'd	0.64		0.00	1.90
Widowed	0.69		0.03	1.99
Divorced	0.46		0.00	1.58
Unknown	0.10		0.36	1.11
Exp'n Method			0.00	
Ventouse	-0.53		0.00	0.59
Forceps	-0.60		0.00	0.55
Césarienne	0.72		0.00	2.06
Manoœuvre sur siège	0.69		0.04	1.99
Constat	1.45		0.00	4.26

4 Results – 2 Maternal age and child health after birth – Direction – K&G

	B	Sig	Exp(B)
Gest. Age		0.00	
28-36 wks	-0.48	0.64	0.62
37 wks or more	1.85	0.07	6.35
Female	 0.46	0.00	1.59
Twin or more	-2.65 	0.00	0.07
Parity		0.00	
Second	 0.53	0.00	1.69
Third or more	0.77	0.00	2.17
Mat. Age		0.42	
20-34 years	0.09	0.43	1.09
35 or more	0.03	0.79	1.03
Unknown	0.81	0.49	2.25
Mat. Educ.		0.00	
ISCED 2	-0.27	0.01	0.76
ISCED 3/4	-0.12 	0.18	0.89
ISCED 5	 0.19	0.04	1.21
Unknown	-0.07	0.45	0.93
Mat. Nat.		0.00	
Other EU	-0.07	0.30	0.93
Morocco	-0.24	0.00	0.78
Turkish	-0.61 	0.00	0.54
Other	-0.26	0.00	0.77
Unknown	-0.14	0.78	0.87
Kansar node	 0.24	0.00	1.28
Constant	-4.43	0.00	0.01




4 Results – 2 Maternal age and child health after birth – Direction - ONE

	B	Si g.	Exp(B)
Gest. Age		0.00	
28-36 wks	16.18	1.00	XXX
37 wks or more	18.11	1.00	XXX
Unknown	17.98	1.00	XXX
Female	0.47	0.00	1.60
Mult. Birth		0.02	
Twin or more	-1.65	0.00	0.19
Unknown	-17.75	1.00	0.00
Parity		0.00	
Second	0.60	0.00	1.82
Third or more	0.65	0.00	1.92
Unknown	0.07	0.91	1.07
Mat. Age		0.37	
20-34 years	0.33	0.22	1.40
35 or more	0.33	0.25	1.40
Unknown	1.80	0.13	6.02
Mat. Li v. Arr.		0.22	
Cohabiting	0.59	0.11	1.80
Living alone	0.13	0.78	1.14
Other	-0.09	0.80	0.91
Unknown	0.48	0.13	1.62
Mat. Eth.		0.01	
Other EU	-0.36	0.04	0.70
Morocco	-0.27	0.21	0.76
Turkish	-1.05	0.00	0.35
Other	-0.32	0.08	0.73
Unknown	-0.12	0.32	0.89
Tobacco		0.00	
1-10 cig/day	-0.77	0.00	0.46
11 or more/day	-1.00	0.00	0.37
Unknown	-0.01	0.92	0.99

4 Results – 2 Maternal age and child health after birth – Direction - ONE

Mat. Mar. Status		0.23	
Single	-0.55	0.13	0.58
Legally sep'd	-1.62	0.04	0.20
Widowed	0.21	0.80	1.24
Divorced	-0.91	0.07	0.40
Unknown	-0.44	0.17	0.64
Exp'n Method		0.01	
Ventouse	0.41	0.00	1.51
Forceps	0.21	0.30	1.23
Césariennes	0.15	0.15	1.17
Manoeuvre sur siège	1.71	0.03	5.55
Breastfeeding		0.00	
1-4 Months	-0.05	0.65	0.95
5-12 Months	0.01	0.97	1.01
13 or more mo	0.55	0.00	1.73
Unknown	0.21	0.19	1.23
Constant	-22.46	1.00	0.00





4 Results – 3 Maternal age and child health after birth – Strength – K&G

	B	Sig	Exp(B)
Gest. Age		0.00	
28-36 wks	 1.40	0.00	4.06
37 wks or more	1.02	0.01	2.78
Female	-0.19	0.00	0.82
Twin or more	 0.14	0.01	1.16
Parity		0.00	
Second	-0.18	0.00	0.83
Third or more	-0.22	0.00	0.81
Mat. Age		0.16	
20-34 years	-0.14	0.03	0.87
35 or more	-0.12	0.08	0.88
Unknown	0.16	0.86	1.17
Mat. Educ.		0.00	
ISCED 2	0.06	0.38	1.06
ISCED 3/4	-0.03	0.61	0.97
ISCED 5	-0.23	0.00	0.80
Unknown	-0.04	0.48	0.96
Mat. Nat.		0.00	
Other EU	0.20	0.00	1.22
Morocco	 0.37	0.00	1.44
Turkish	0.64	0.00	1.90
Other	0.26	0.00	1.29
Unknown	0.34	0.34	1.40
Kansar mede	0.04	0.39	1.04
Constant	-1.51	0.00	0.22

4 Results – 3 Maternal age and child health after birth – Strength – ONE

	All children		
	B	Si g	Exp(B)
Gest. Age		0. 00	
28- 36 wks	1. 60	0. 01	4. 97
37 wks or more	1. 21	0. 04	3. 34
Unkno wn	1. 36	0. 02	3. 88
Female	-0. 24	0. 00	0. 78
Mult. Birth		0. 84	
Twin or more	-0. 06	0. 56	0. 94
Unkno wn	-21. 17	1. 00	0. 00
Parity		0. 00	
Second	-0. 30	0. 00	0. 74
Third or more	-0. 35	0. 00	0. 71
Unkno wn	-0. 10	0. 64	0. 90
Mat. Age		0. 92	
20- 34 years	0. 05	0. 58	1. 05
35 or more	0. 07	0. 49	1. 07
Unkno wn	-0. 04	0. 97	0. 96
Mat. Li v. Arr.		0. 08	
Cohabiting	-0. 12	0. 46	0. 89
Living alone	0. 02	0. 92	1. 02
Other	0. 12	0. 46	1. 12
Unkno wn	0. 12	0. 46	1. 12
Mat. Eth.		0. 00	
Other EU	0. 15	0. 03	1. 17
Morocco	0. 53	0. 00	1. 70
Turkish	0. 66	0. 00	1. 93
Other	0. 63	0. 00	1. 87
Unkno wn	0. 04	0. 45	1. 04
Tobacco		0. 00	
1- 10 ci g/ day	0. 48	0. 00	1. 62
11 or more/ day	0. 46	0. 00	1. 59
Unkno wn	0. 08	0. 04	1. 09

4 Results – 3 Maternal age and child health after birth – Strength – ONE

Mat. Mar. Status			0.33	
Single	0.06		0.69	1.07
Legally sep'd	-0.17		0.47	0.84
Widowed	0.42		0.31	1.52
Divorced	-0.09		0.67	0.92
Unknown	-0.13		0.42	0.88
Exp'n Method			0.00	
Ventouse	-0.08		0.19	0.92
Forceps	-0.19		0.02	0.82
Césariennes	-0.15		0.00	0.86
Manoeuvre sur siège	0.87		0.09	2.39
Breastfeeding			0.00	
1-4 Months	0.04		0.35	1.04
5-12 Months	-0.16		0.00	0.85
13 or more mo	-0.44		0.00	0.64
Unknown	-0.16		0.01	0.85
Constant	-1.01		0.08	0.36

4 Results - Summary

- o Research question 1 (maternal age and birth weight):
 - o High maternal age and standard perinatal factors confirmed as risk factors (increase risk)
 - o High education and stable parental relationship decrease risk
 - o Results mixed for ethnicity/nationality
- o Research question 2 (maternal age and child health after birth - **DIRECTION**)
 - o Results for age not significant
 - o Perinatal factors: higher parity increases, multiple birth decreases risk
 - o Smoking increases risk
 - o Higher education/poverty increase risk; non-Belgium ethnicity/nationality decrease it
 - o Limited findings for LBW

4 Results - Summary

- o Research question 3 (maternal age and child health after birth - STRENGTH)
 - o Results for age not significant
 - o High gestational age and multiple birth increase risk (not parity)
 - o Non-Belgian ethnicity/nationality increase risk, high education decreases it
 - o Contradictory findings for LBW

5 Conclusion (1)

- o Analysis:
 - o High maternal age critical before birth, not so after birth
- o Data:
 - o High attrition rates (especially LBW babies), which hampers analysis
 - o Can strategies be developed? (e.g. statistical, vital registration data, hospital data, etc.)
 - o Information missing for socio-demographic variables or recorded in a non-standardized manner
 - o Information needs to be recorded systematically and in a standardized manner
 - o Limited socio-demographic information available in both datasets
 - o More for both mother and father

5 Conclusion (2)

- o Follow-up research
 - o Different operationalisation dependent variable
 - o Different kind of statistical analysis
 - o Internationally comparative study
 - o Longer-term follow-up (kindergarten, elementary, secondary, etc)