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Explanations for social inequalities in preterm delivery in the prospective Lifeways cohort in the Republic of Ireland

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Background: Social inequalities in pregnancy outcomes have been extensively described but studies that explain these inequalities comprehensively are lacking. This analysis evaluated the contribution of material, psychosocial, behavioural, nutritional and obstetrical factors in explaining social inequalities in preterm delivery. **Methods:** The data were based on a prospective cohort of 1109 Irish pregnant women. Preterm delivery was obtained from clinical hospital records. Socio-economic status was measured using educational level. The contribution of the above factors in explaining the association between educational level and preterm delivery was examined using Cox models. **Results**: Educational level was found to be a significant predictive factor of preterm delivery; women with low educational level were more likely to have a preterm delivery [hazard ratio (HR) = 2.14, 95% confidence interval (95% CI): 1.04–4.38)] after adjustment for age and parity. Rented and crowded home, smoking, alcohol consumption and intake of saturated fatty acids displayed educational differences and were predictive of preterm delivery. Material factors (rented and crowded home) reduced the HR of preterm delivery for low compared with highest educated women by 33%. The additional independent contribution of behavioural factors (smoking and alcohol consumption) was 5% and of saturated fatty acids intake was 4%. All these factors combined reduced the HR of preterm delivery for low educated women by 42% (HR = 1.66, 95% CI: 0.76–3.63). **Conclusion**: This study underlines the importance of material, behavioural and nutritional factors in explaining social inequalities in preterm delivery. These findings have cross-sectoral public policy implications.

Introduction

Pregnancy outcomes such as low birthweight and preterm delivery are considered to be major risk factors for subsequent morbidity and mortality of newborns. Low birthweight may be related to a variety of causes including premature birth, intrauterine growth retardation or a combination of both. These outcomes may be linked to different aetiological mechanisms and risk factors may differ according to the outcome studied. Thus, separate analyses for each outcome seem important when considering social inequalities in pregnancy outcomes.[1,2]

Social differences have been reported repeatedly for preterm delivery including very preterm delivery,[3–7] lower social groups being at higher risk for this outcome. These inequalities in early life may predict health in later life and may explain, at least in part, the accumulation and addition of risk factors over time and across generations.[8,9] Consequently, understanding the mechanisms underpinning these inequalities is a major public health issue.

Yet, comprehensive studies exploring precisely the underlying mechanisms linking socio-economic status (SES) to preterm delivery are still lacking. To our knowledge, only a few studies have attempted to explain social inequalities for this outcome but they were not able to cover the full range of potential explanatory factors and focused on a very limited number of factors such as smoking or body mass index (BMI).[4,5,7,10] Kramer[1] was one of first authors to summarize the range of potential explanatory factors that should be considered in 1987, including those related to medical, behavioural, nutritional, material and psychosocial aspects and again in 2000[2] pointed out that such studies were still lacking. Recently, Jansen *et al.*[6] found that pregnancy characteristics, financial concerns, long-lasting difficulties, psychopathology, smoking, alcohol consumption and BMI explained a substantial part of the increased risk of preterm birth among low-educated women.

In proposing theories that may explain social inequalities in health, some authors emphasize the materialist aspects (material conditions i.e. access to goods and services and exposures to material risk factors in the living and working environment), the psychosocial aspects (psychosocial and stress-related influences with a variety of risk factors such as those related to social support, etc.) and the behavioural and biomedical factors.[11,12] Other authors developed a simplified causal model to disentangle the interrelations between these different groups of factors, their direct (independent) effects, as well as their indirect effects through other factors in order to explain social inequalities in all-causes mortality.[13,14] We took inspiration from this causal model and its typology of explanatory factors to initiate this comprehensive explanatory study on social inequalities in preterm delivery.

The objectives of this study were to explore the association between SES, measured using educational level and preterm delivery, measured using hospital records and to evalute the contribution of various potential explanatory factors (material, psychosocial, behavioural, nutritional and obstetrical factors) to social inequalities in preterm delivery, using data from a prospective cohort study of Irish pregnant women established in the Republic of Ireland in 2001. This study includes descriptive and explicative analyses on social inequalities in preterm delivery and contains detailed information on various types of potential explanatory factors. A key strength is that it contains detailed dietary information collected prospectively during pregnancy, as nutritional factors may be a potential pathway in explaining social inequality in health outcomes.[15]

Methods

Sample

The Lifeways cohort is a prospective linkage study established in 2001, whose methodology and recruitment strategy was described previously.[16,17] Its objective was to address the influence of early life and cross-generational factors on children's health outcomes in the first years of life, particularly the role of socio-economic circumstances. From October 2001 to February 2003, the aim was to recruit at least one thousand pregnant women at their first maternity hospital booking visit. Women were selected randomly and all women were Irish born, the study would have been under-powered to conduct a meaningful subanalysis of immigrant women, who were excluded. Two regions were chosen, one urban, one rural and within those regions two major hospitals providing maternity services were selected: University College Hospital Galway (West Ireland) and Coombe Women's Hospital in Dublin (East Ireland). These two hospitals are among the biggest units in Ireland with over 7000 babies born annually in the Coombe Hospital. Ethical approval was obtained both from the hospitals and from the Irish College of General Practioners ethical committees. Consent was obtained from the pregnant women at recruitment when attending their first antenatal care visit at the maternity hospital. The final cohort included a sample of 1124 pregnant women. A comparison between the Lifeways sample and a nationally representative sample of women of the same age group in the National Survey of Lifestyles, Attitudes and Nutrition (SLAN) suggests a satisfactory representativeness of the Lifeways sample in terms of work status, occupational categories and means-tested general medical services eligibility.[16] The Lifeways cohort is the first cross-generational prospective study in Ireland and one of few such cross-generation cohort studies globally.

Baseline data for mothers were collected using a self-completed questionnaire for health, lifestyle behaviours, demographic, social and living characteristics. Dietary intake information was collected using a validated Food Frequency Questionnaire, derived from the EPIC study instrument.[18] Daily intakes of the 149 food items and 36 nutrients were computed using a specifically designed computer programme (FFQ Software Version 1.0©). Hospital medical records provided information relating to mothers' health during pregnancy and pregnancy outcomes.

Measures

Preterm delivery (<37 gestation weeks) was based on gestational age at birth calculated from the mother's expected delivery date recorded at the booking visit (that was derived from last menstrual period and clinical examination, as well as in some cases from ultrasound examination) and the baby's actual date of birth.

Educational level, derived from the self-completed questionnaire, was used as a marker of SES. It included three categories: lower than secondary, complete secondary and higher than secondary (reference category).

Five sets of potential explanatory factors of social inequalities in preterm delivery were explored, selected on the basis of the report by Kramer *et al.*[2] and among the factors that have been found or suspected as risk factors of this outcome:[1]

(i) material factors: household work, financial problems (not being able to pay for a substantial meal, heating, rent, bills or debts), no car, owned/rented home, housing problems (damp, condensation or mould), crowded home (defined as the number of persons in the household higher than the number of rooms) and neighbourhood problems (rubbish, vandalism, insults, breaks-in, poor public transport, poor access to shops, pollution and lack of open public spaces);

(ii) psychosocial factors: marital status (being alone or not), social support (support received from spouse, parents, children, relatives and friends), social network (number of close relationships), planned pregnancy, depressive symtoms and psychological distress (measured by CES-D and GHQ-12 scales, respectively);[19]

(iii) behavioural factors: smoking status, alcohol consumption calculated from number of days and number of drinks during a typical week, marijuana/cannabis use, drug (e.g. amphetamine, LSD, cocaine, heroin, ecstasy) use within the last 12 months, physical activity (>60 min a week of strenous or moderate exercise such as sport activities, running, swimming, cycling) and BMI [pre-pregnant weight in kilos/(height in metres)^2];

(iv) nutritional factors: intakes of related foods were grouped into a set of 14 variables (bread, cereals, dairy products, oils/spreadable fats, eggs/egg products, fish, fruit, meat, milk, potatoes, rice/pasta, soups/sauces/spreads, sweets/snacks, vegetables) and a set of 21 nutrients (calcium, carbohydrate, cholesterol, total fat, fibre, folate, iodine, iron, kilocalories, monounsaturated fatty acids, polyunsaturated fatty acids, protein, retinol, saturated fatty acids, selenium, starch, sugar, vitamins E, B12, B6, C) were selected based on previous reports of pregnancy-related maternal nutrition.[20,21] All variables were studied in quartiles; and

(v) obstetrical factors: complications during pregnancy (bleeding and/or fetal problems) and longstanding illness (angina, heart disease, stroke, high blood pressure, diabetes and/or high cholesterol).

Statistical analysis

The associations between educational level and potential explanatory factors (material, psychosocial, behavioural, nutritional and obstetrical factors) were studied using the chi-square test. The hazard ratio (HR) of preterm delivery according to educational level was estimated using Cox models. Gestational age in days was used as the underlying time. We used a model with delayed entry, so women entered the cohort on the day of her first hospital visit. The follow-up ended at birth or by the time she completed 37 weeks of gestation (258 days), whichever came first. Deliveries that occurred after 258 days were censored at that time. As maternal age and parity did not modify the effect of educational level on preterm delivery, the results were adjusted for age and parity. The associations between the potential explanatory factors and preterm delivery were also studied using Cox models. The contribution of a given factor in the explanation of the educational differences in preterm delivery was evaluated only if the factor was predictive of preterm delivery at a 10%

significance level and displayed educational differences at a 5% significance level.[2] A basic model (Model 1) was performed to study the predictive effect of educational level on preterm delivery after adjustment for age and parity using Cox model. The explanatory factors retained were first introduced separately to Model 1. The contribution of each factor (or a set of factors) to the explanation of the educational differences was estimated by the change in the HR for the lowest educational group (reference category: highest educational group) after inclusion of the variable(s) in the model, i.e. explained fraction calculated by the formula: $(HR_{model\ 1} – HR_{extended\ model})/(HR_{model\ 1} – 1)$.[22] Positive percentage values indicate reductions in the HR. These models were adjusted for combinations of two or more groups of factors and finally adjusted for all factors simultaneously, allowing to calculate independent contributions of a given group of explanatory factors from one or more other group(s).[13,14] Statistical analysis was performed using SAS.

Results

The Lifeways cohort included a sample of 1124 pregnant women, of whom 1109 delivered a single baby. Miscarriages, stillbirths, neonatal deaths and twins were excluded from the present analysis. Our study was consequently based on a sample of 1109 women. A total of 44 preterm deliveries occurred during the follow-up among 924 women with complete linkage data for preterm delivery. Consequently, the incidence rate of preterm delivery was 4.76% in this sample.

The associations between potential explanatory factors and preterm delivery showed that rented home, crowded home, smoking, alcohol consumption ($P < 8\%$), high intake of saturated fatty acids and pregnancy complications predicted preterm delivery (table 1). A borderline significant association ($P < 8\%$) was also observed between intake of selenium and preterm delivery, but this association was not linear.

The associations between educational level and potential explanatory factors are shown in table 2. Women with low educational level were more likely to be alone, smoker and drug user and to have heavy household work, financial problems, no car, rented home, crowded home, housing problems, unplanned pregnancy, depressive symptoms, no alcohol consumption, high intakes of meat, potatoes, cholesterol, total fat, folate, kilocalories, monounsaturated fatty acids, saturated fatty acids, sugar, vitamin E and low intakes of cereals, dairy products, fruit, rice/pasta, vegetables and vitamin C.

Table 3 presents the predictive effect of educational level on preterm delivery. The HR of preterm delivery for the lowest educational group was found to be significant before and after adjustment for age and parity.

On the basis of the results of tables 1 and 2, rented and crowded home, smoking, alcohol consumption and saturated fatty acids intake were both predictive of preterm delivery and displayed educational differences. Consequently, these five factors were retained and introduced in the Cox model (table 4). Rented and crowded home accomodation contributed to a reduction of the educational disparity in preterm delivery outcome (respectively, 26 and 13%). These two material factors together reduced the educational difference by 33%. Smoking and alcohol consumption reduced the HR of preterm delivery for the lowest educated women, the magnitude of these reductions being larger for alcohol consumption (14%) than for smoking (2%). Including these two behavioural factors together led to a reduction of 10% of the HR of preterm delivery for the lowest educational group. Saturated fatty acids intake contributed to an explanation of the educational difference for preterm delivery by 14%.

Additional models were performed to combine two or more groups of factors. Adjustment for both material (rented and crowded home) and behavioural (smoking and alcohol consumption) factors lowered the HR of preterm delivery for the lowest educational group by 38%. Full adjustment for all factors, including saturated fatty acids intake, lowered the HR by 42%. The independent contribution of behavioural factors (smoking and alcohol consumption) from material factors was 5% (38–33%) and the independent contribution of saturated fatty acids intake from material and behavioural factors were 4% (42–38%).

Table 1 Predictive factors of preterm delivery (Cox model)

	N	Preterm delivery HR (95% CI)	*P*-value
Material factors			
Rented home	900		*
Yes		1.98 (1.06–3.70)	
No		1	
Crowded home	916		*
Yes		2.56 (1.23–5.32)	
No		1	
Behavioural factors			
Smoking	901		$
Smoker		2.24 (1.07–4.71)	
Ex-smoker		1.22 (0.58–2.60)	
Non-smoker		1	
Alcohol consumption (drinks/week)	916		**
0		**2.89** (1.26–6.62)	
1–7		1	
8–14		0.75 (0.19–2.90)	
>14		**3.79** (1.27–11.28)	
Nutritional factors (quartiles)			
Saturated fatty acids	910		*
Q1		**0.41** (0.18–0.94)	
Q2		**0.32** (0.13–0.81)	
Q3		0.56 (0.27–1.18)	
Q4		1	
Selenium	911		$
Q1		1.56 (0.74–3.26)	
Q2		0.57 (0.22–1.46)	
Q3		0.66 (0.27–1.61)	
Q4		1	
Obstetrical factors			
Pregnancy complications	916		***
Yes		**3.59** (1.98–6.52)	
No		1	

The other potential explanatory factors were not associated with preterm delivery.

$ $P < 0.10$, * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Bold HR, significant at 5%; Q1, lowest quartile (low intake); Q4, highest quartile (high intake)

Discussion

Social differences were confirmed in this study for preterm delivery, the lowest educated women being more likely to have such an outcome. This finding is consistent with previous studies although different measures for SES were used.[3–7,10] Women belonging to the lowest educational group were more likely to be at risk for most potential explanatory factors, material, psychosocial, behavioural and nutritional, in our study. These results are also consistent, therefore, with previous studies showing social differences in various risk factors and especially the accumulation of risk factors in the lowest SES categories[6] and underlying the need to focus on these categories for preventive actions.

The novel contribution of this analysis was to attempt to cover all potential explanatory factors for social inequalities in preterm delivery, as recommended by Kramer *et al.*[2] We found that some material, behavioural and nutritional factors played a role in explaining social inequalities in preterm delivery. These factors together explained 42% of the social differences in preterm delivery, the highest contribution being observed for material factors.

Smoking was found to be predictive of preterm delivery and socially graded. It contributed to explaining social inequalities in preterm delivery but its independent contribution was low in this study. Strong social differences in smoking have been observed previously and the effects of smoking on pregnancy outcomes, including preterm delivery, have been largely acknowledged in the literature.[23,24] Consequently, its contribution to social inequalities in preterm delivery is fully expected and in line with several previous studies.[4–7,10]

Table 2 Education differences in potential explanatory factors (chi-square test)

	N	Lower than secondary	Complete secondary	Higher than secondary	*P*-value
Material factors					
Heavy household work (%)	1076	52.3	40.4	28.5	***
Financial problems (%)	1100	34.8	26.1	20.2	***
No car (%)	1069	27.6	14.0	5.7	***
Rented home (%)	1085	43.0	24.0	15.3	***
Crowded home (%)	1100	18.4	12.4	5.1	***
Housing problems (%)	1100	22.2	12.6	11.0	***
Psychosocial factors					
Alone (%)	1100	43.0	24.7	13.6	***
Unplanned pregnancy (%)	1100	47.3	34.3	27.4	***
Depressive symptoms (%)	1065	35.6	25.9	22.4	**
Behavioural factors					
Smoking (%)	1084				***
Smoker		46.1	25.6	15.6	
Ex-smoker		26.0	34.8	39.2	
Non-smoker		27.9	39.6	45.3	
Alcohol consumption (drinks/week) (%)	1100				**
0		50.2	50.0	37.6	
1–7		25.1	25.0	35.2	
8–14		16.4	19.0	18.5	
>14		8.2	6.0	8.7	
Drug use (%)	1100	8.2	4.7	3.6	*
Nutritional factors					
Foods					
Cereals-Q4 (%)	1098	19.8	22.0	29.2	*
Dairy products-Q4 (%)	1067	16.7	24.1	30.6	***
Fruit-Q4 (%)	1098	23.2	20.4	29.6	***
Meat-Q4 (%)	1097	30.6	29.5	20.3	**
Potatoes-Q4 (%)	1098	26.1	27.8	20.1	***
Rice/Pasta-Q4 (%)	1078	20.1	20.0	31.6	***
Vegetables-Q4 (%)	1098	23.2	20.4	29.6	***
Nutrients					
Cholesterol-Q4 (%)	1098	31.4	28.1	20.8	*
Total fat-Q4 (%)	1097	31.4	29.6	19.5	**
Folate-Q4 (%)	1098	27.5	24.5	25.0	*
Kilocalories-Q4 (%)	1098	32.4	27.8	20.4	**
Monounsaturated fatty acids-Q4 (%)	1098	31.4	28.9	19.9	**
Saturated fatty acids-Q4 (%)	1097	31.4	29.2	20.1	**
Sugar-Q4 (%)	1098	28.0	25.6	23.5	**
Vitamin E-Q4 (%)	1094	25.6	24.6	24.8	*
Vitamin C-Q4 (%)	1098	17.4	19.8	32.0	***

Educational level was not associated with the other potential explanatory factors
$*P<0.05$, $**P<0.01$, $***P<0.001$
Q4, highest quartile (high intake)

Table 3 Educational level and subsequent preterm delivery (Cox model)

	N	HR (95% CI)	*P*-value
Unadjusted HR			
Educational level	913		*
Higher than secondary		1	
Complete secondary		0.79 (0.37–1.71)	
Lower secondary		**2.21** (1.12–4.35)	
Adjusted HR for age and parity			
Educational level	913		*
Higher than secondary		1	
Complete secondary		0.78 (0.36–1.68)	
Lower secondary		**2.14** (1.05–4.38)	

$*P<0.05$
Bold HR, significant at 5%

Table 4 The contribution of explanatory factors to social inequalities in preterm delivery (Cox model)

OR for the lowest educational level (ref: the highest educational level)	*N*	Preterm delivery HR (95% CI)	%[a]
Model 1 (adjusted for age and parity)	913	**2.14** (1.05–4.38)	
Material factors			
Model 1 + rented home	900	1.84 (0.87–3.88)	26
Model 1 + crowded home	913	1.99 (0.97–4.10)	13
Model 2 (Model 1 + material factors)	900	1.76 (0.83–3.73)	33
Behavioural factors			
Model 1 + smoking	901	2.12 (0.98–4.54)	2
Model 1 + alcohol consumption	913	1.98 (0.98–4.01)	14
Model 3 (Model 1 + behavioural factors)	901	2.03 (0.96–4.32)	10
Nutritional factors			
Model 1 + saturated fatty acids	910	1.98 (0.96–4.07)	14
Model 4 (Model 1 + nutritional factors)	910	1.98 (0.96–4.07)	14
Model 1 + 2 + 3	888	1.71 (0.78–3.76)	38
Model 1 + 2 + 3 + 4	885	1.66 (0.76–3.63)	42

Bold HR, significant at 5% (HR significant at 5% for Model 1 only)
a: Positive percentage means reduction in HR computed with the following formula $(HR_{model\ 1} - HR_{extended\ model})/(HR_{model\ 1} - 1)$

One of the biggest strengths of our study was the opportunity to explore nutritional factors as potential explanatory factors in the social gradient observed in preterm delivery. Several authors have urged this issue be addressed in the recent past.[2,6] Social inequalities in nutritional factors have been observed in previous studies, which reported increasing diet quality with social position.[25,26] The predictive effects of dietary factors on pregnancy outcomes have been suspected but the evidence is often conflicting.[27,28] Studies have suggested that intakes of protein, fat, carbohydrate,[29] cholesterol, iron, retinol, vitamin C, folate,[20,28,30] green leafy vegetables, fruit, dairy products,[31] long chain fatty acids,[32] oily fish and vegetable oil sources[33] may be associated with birth outcomes. Our findings confirmed educational differences in nutritional factors but only saturated fatty acids intake was observed as predictive of preterm delivery and contributed to explaining the social gradient in preterm delivery, something not shown before. Energy (calorie) intake and BMI were not predictive of preterm delivery and BMI did not display educational differences.

Another behavioural factor, alcohol consumption, played a role in explaining social differences in preterm delivery. Other authors[6,7] observed that alcohol consumption explained a part of the association between maternal education and preterm birth. Alcohol consumption displayed educational differences in our study but the association suggests that women belonging to the lowest educational level were more likely to have no consumption at all. Previous analyses suggest that older, more affluent women continue to drink moderately in pregnancy, rather than abstaining fully.[34] We found significant predictive effects of both no consumption and high consumption of alcohol on preterm delivery (J-shape association). This result might be explained by at least two factors: a healthy drinker effect in that women with health problems like chronic diseases or in the case of pregnancy, with history of adverse pregnancy outcomes, may be more likely to abstain from having alcoholic drinks during their pregnancy and an under-reporting of alcohol consumption and even a complete denial of consumption for the women who had the highest alcohol intakes. Consequently, caution is needed in interpretating the results for this group of women. The aetiological role of alcohol consumption in preterm delivery, has been confirmed.[24,35]

Two material factors contributed to explaining social differences in preterm delivery: accomodation in a rented and a crowded home. These factors may be an indicator of economic circumstances in that least well off, single mothers may still reside in their childhood home. These factors are likely to be markers of poor living conditions that may increase physical fatigue, as well as stress, for pregnant women. They displayed both significant associations with educational level and significant predictive effects on preterm delivery. Reviews have mentioned that physical demands at work may be a risk factor for pregnancy outcomes.[36,37] Living in more crowded households was reported as an explanatory factor of educational inequalities in birth weight.[38] Housing tenure was retained as an explanatory factor of educational inequalities in mortality.[14]

Some limitations of this study should be mentioned:

(i) The sample size of the Lifeways cohort may be considered as modest for this outcome analysis and the number of cases of preterm delivery low. This limitation may have led to low statistical power to detect significant differences and consequently led to missing some explanatory factors in explaining educational differences in preterm delivery.
(ii) Although the cohort members were comparable with general population counterparts in Ireland and a clear social gradient exists within the cohort, nonetheless response bias may not be precluded definitively in the Lifeways cohort, as no information was collected on the number and characteristics of the non-participant pregnant women. It is commonly recognized that non-respondents or non-participants may be more likely to have poorer socio-economic conditions, health behaviours and health outcomes than respondents/participants.[39,40] Arguably, this may lead to an underestimate of educational inequalities in preterm delivery in the present analyses and the relative contribution of some explanatory factors to these inequalities.
(iii) The explanatory factors were measured at the beginning of pregnancy and were based on exposures at the time of the completion of questionnaires. Consequently, no information was available about lifetime exposures in our study. This limitation may in fact tend to underestimate the contribution of the factors as underlined by other authors.[41]
(iv) Our study attempted to follow Kramer's suggestions on the explanatory factors to be included but the list of these factors may not be exhaustive and some clinical factors such as for instance genital tract infection/inflammation are not included. In addition, we were not able to study spontaneous and non-spontaneous preterm deliveries separately because of too few cases.
(v) As the study did not include migrant women, the results can only be generalized to Irish-born women. Further generalization of these results to other countries should be made with caution, given sociocultural differences between countries.

This study has several strengths:

(i) It was based on a prospective cohort, leading to no ambiguity about causal ordering as all factors were collected before any outcome occurred.
(ii) The assessment of preterm delivery was achieved using hospital records, i.e. independently of women.
(iii) Different types of explanatory factors were explored.[2,42] Finally, detailed information on each set of factors was available within the same cohort, something not done before.

This analysis contributes to a better understanding of the social inequalities in preterm delivery and suggests that public health policy cannot be confined to the healthcare setting as cross-sectoral factors are important. Adequate education of women could improve disparities in maternal and health outcomes. Furthermore, our findings underline that material factors may be important explanatory factors of educational differences in preterm delivery. Rented and crowded homes probably act as indicators of general lifetime material disadvantages and our results suggest that general improvements in the material situation among low educated women and in particular housing policies reducing overcrowding and increasing ownership, might lead to less educational differences in preterm delivery. Prevention policies oriented towards behavioural risk factors especially reducing smoking and alcohol consumption and improving diet among low educated women might also contribute to reducing these differences.

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Key points

- This study examined the contribution of various material, psychosocial, behavioural, nutritional and obstetrical factors in the explanation of social inequalities in preterm delivery in a prospective cohort of Irish pregnant women.

- Significant differences in preterm delivery were found between low- and high educated women, low educated women having a 2-fold higher risk of preterm delivery.
- Material factors (rented and crowded home) explained a substantial part of the association between educational level and preterm delivery. Behavioural (smoking and alcohol consumption) and nutritional (intake of saturated fatty acids) factors were also found as explanatory factors.

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