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## **Measuring socio-economic differentials in low birth weight: looking beyond parental employment and educational attainment**

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### **BACKGROUND**

Low birth weight (LBW) is one of the most important indicators in Epidemiology since it refers both to mothers and children health. LBW is therefore a mother's reproductive outcome as well as a new-born's health predictor, to the extent that it is associated to his early life mortality (Wilcox, 2001), adult morbidities and specific causes of death (Barker, 1995).

Mother's socioeconomic status (SES), and its associated lifestyles, play a key role in the probability of delivering LBW babies. Accordingly, any intention of reducing its prevalence implies narrowing socioeconomic inequalities. In spite of the agreement existing between the relationship mother's SES-LBW child, measuring socioeconomic inequalities still involves some challenges.

SES is not a directly observed measure and, although it is widely known that variables such as income, education and occupation of both father and mother cover different aspects of the social stratification, they tend to be taken isolated, as if they were interchangeable. This working approach clearly dissociates model specification from theory, since it does not contemplate the complexity existing between these different dimensions of life, especially for women in reproductive ages. In other words, it is necessary to somehow capture the lack of

identity existing between occupation and education in the population of young adults in general, and the specificity of female vital trajectories in that context.

On the one hand, for populations in reproductive ages education and income are not interchangeable at all. Establishing a direct correlation between income level and maximum level of education attained is very problematic in a population of young adults as an optimum economic situation may not have been reached yet while the educational level may have already been acquired. However, the lack of identity between income and education is not necessarily only restricted to that younger ages and it can appear also later in life. This lack of correspondence between education and income can be found in several contexts caused by intrinsic characteristics of the labour market.

On the other hand, women's life, work and reproductive trajectories have a set of particularities that differentiate them from men's (Borrell, Rohlf's et al. 2004) and that complicate further this lack of correspondence, thus making occupation a particularly defective measure to study their socio-economic status. As women's professional careers develop in parallel to their reproductive project, for some women the family project may determine the rhythms and sequences of the work trajectory while for others work opportunities may condition their access to maternity (Baizán 2006; Cordero 2009). This situation, direct or indirectly, affects contextual indicators as occupation and income but not necessarily affect her socio-economic status. For example, a newborn can provoke a temporary exit of the labour market conditions for a series of years with no decrease in living conditions or socio-economic status.

This paper aims to improve the understanding of social inequalities in low birth weight by considering the complexity existing behind the SES concept. This paper applies structural equation modeling, measuring SES as a latent class variable, which is able to capture the common components of the individual indicators.

## **DATA AND METHODS**

### *Data set*

This study uses the Population Registry of Andalucía (REPA), a source compiled from the nominative linkage of administrative records (Padron de habitantes), vital statistics (Movimiento Natural de la Población –MNP) and census data (2001) developed by the Institute of Statistics of Andalucía (IEA) to follow the vital trajectories of the population that

at some point in time resided or experienced a vital event in the Autonomous Community of Andalusia (Spain). Andalusia, with almost 8 million inhabitants, represents around 20% of total population of Spain.

### *Selection criteria and sample size*

From the vital statistics we selected: a) vital events experienced only by mothers residing in Andalucía; b) births taking place in 2002 (in order to link them back to 2001 census and obtain information before childbirth); c) live and singleton births. Taking these criteria into consideration, we reduced the sample to 79.437 cases from the original 83.202 births that took place in the Autonomous Community of Andalucía in 2002. From that total, 87% of cases were successfully linked with the census information, allowing a final sample of 69.280 births. There is a slight tendency for foreign, single and unemployed women and homemakers to be less likely to be linked with their census information. The assessment of the linkage, though, suggests that this slight bias is not a serious problem for the analysis as perinatal indicators do not differ sensibly between linked and un-linked cases.

### *Variables*

The dependent variable used in our analysis is birth weight. Low birth weight was defined using the common threshold adopted by the literature (below 2,500 grams - 5lb 8oz). However, we have computed the optimal threshold following Wilcox's proposal (2001), that takes on the value 2.250 grams for the whole population. The models have been fitted for the two thresholds but, in this work, we have only included those estimated for 2,500 grams to be consistent with the literature as the effects that we have found do not vary significantly.

Three main socio-economic indicators were used: mother's education, mother's occupation and father's occupation. Mother's variables have been extracted completely from the census while father's information has been extracted from the statistical bulletins.<sup>1</sup> Maximum level of attained education has been divided in three levels: Primary School (including those who did not even complete it), Secondary and University, (with a residual category of cases with missing information -15- that have been excluded from the final models). Mother's occupation has been classified in four categories: low qualified

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<sup>1</sup> Despite the scant missing information for census variables, 16% of specific questionnaires (from which individual information is derived) were imputed. To control for this source of uncertainty, we have re-estimated all models for the non-imputed population with no significant changes.

employment (technicians and associate professionals, public administrative employees, workers in services, skilled workers in agriculture and fisheries, craftsmen and skilled workers in manufacturing, construction and mining, unskilled workers), high qualified employment (Army, management of private companies and civil servants, technicians and professionals); homemakers; and students and unemployed women; plus a residual category with missing information (237 cases).. In the case of fathers, due to the problems described in the registration occupation in the birth bulletin, we have classified it in slightly different categories, trying to keep a certain degree of homogeneity with mother's classification: high and medium qualified employment; low qualified employment; and unemployed and homemakers (although it is likely that not all unemployed have been captured in that variable and some of them extend to the missing category); and a large residual category including "persons whose employment cannot be classified" and cases actually missing.

Due to the absence of income as an explanatory variable, we considered the possibility of using household tenancy system as a proxy for the income level (rent/property) but we have found no statistical differences. However, it has been included among the possible confounding variables.

### *Statistical analysis*

We presented some descriptive about the prevalence of low birth weight according to the explicative and independent variables of the model. We use structural equation modeling (SEM) to estimate the odd ratios and their confidence intervals at 95% of having low birth weight babies and then compare them with the estimates obtained when using the variables separately or in a joint introduction.