

Letters to the Editor

Comment on “Induced abortion in Denmark: effect of socio-economic situation and country of birth”

A recent study by Rasch *et al.* in this journal concluded that ‘Immigrant women comprise a vulnerable group, with a poor socio-economic status. This situation exposes immigrant women to increased risk of induced abortion’.¹ This statement seems to suggest that the excess risk of induced abortion experienced (particularly by immigrants from non-Western countries) are due to their poor socio-economic status (SES). I think that the support for this conclusion as based on the methods used and data presented by the authors is weak. In the following, I will explain why I think this is the case. Based on the data reported by the authors, I provide a reanalysis to support my argument.

The strategy used by Rasch *et al.* (see table 4) is to compare the odds ratios (ORs) for ethnicity before and after control for the putative mediators occupation and income. I want to point out that the approach of comparing ORs before and after adjustment for mediators have been repeatedly shown to be error prone.^{2,3}

An important, but implicit assumption made by Rasch *et al.* is that the effect of occupation and income on the risk of

abortion is the same across ethnic groups, i.e. no interaction between ethnicity occupation/income. I do not think that this is a reasonable *a priori* assumption to make.⁴ In a Danish context, it has recently been shown that education and income have different effects on several reproductive outcomes in different ethnic groups.⁵ However, due to the careful reporting of data by Rasch *et al.*, it is easy to produce the estimates for occupation and income stratified by ethnicity and visa versa. I read the data from Table 2 into a spreadsheet application and reanalysed it. Confidence intervals were omitted for the sake of brevity.

If we first consider the effects of SES within each ethnic group it appears that the socio-economic gradient in induced abortion is less among non-Western immigrants than among Danes. If we then look at the ethnic disparity within SES groups, the ORs do not appear to be constant. For example, within the two most disadvantaged occupational groups the ethnic difference between non-Western immigrants and Danes is absent (among the unemployed) or even inverse (among the unskilled). However, in all other strata of occupation the OR between Danes and non-Western immigrants are higher than the marginal OR of 2.09 between these two groups. I note that the interaction between occupation and ethnicity is statistically significant at conventional levels of significance.

So what happens when the authors assume that effects of SES are constant within the ethnic groups (and visa versa) when in fact they are not? Because the group of Danish women constitutes the majority of the sample (82% of cases, 89% of controls), this group has the biggest ‘say’ in what the effect of SES on the risk of induced abortion is. This can be seen by comparing the column labelled ‘All’ with the ones for each of the three ethnic groups in table 1: the ‘Danish’ estimates are quite close to that of ‘All’. In essence this means that in the SES-adjusted analyses ethnic differences are calculated *as if* SES has the effect on abortion that it has among Danish women. The consequence is that the value of SES in explaining the ethnic disparities in abortion is not correctly assessed.

In conclusion, I do think that the paper by Rasch *et al.* is a valid and important contribution, but I think that one should exert caution with regards to the paper’s conclusions on the role of SES in explaining the ethnic disparities in induced abortion: the role of ethnicity and SES in relation to induced abortion might be slightly more complicated than what is indicated by Rasch *et al.*

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Table 1 OR of induced abortion according to ethnicity, occupation and income

	Effect of SES within ethnic groups			Effect of ethnicity within SES groups			p ^b	
	All ^a	Danish	Other Western	Non-Western	Danish	Other Western		Non-Western
Occupation								
Unemployed	3.75	3.79	4.60	1.50	1.00	1.69	1.01	0.01
Professional	1.00	1.00	1.00	1.00	1.00	1.39	2.54	
Skilled	1.72	1.63	2.17	2.07	1.00	1.85	3.24	
Unskilled	4.11	4.80	–	0.73	1.00	–	0.39	
Student	3.73	3.61	2.17	3.24	1.00	0.83	2.28	
Other	2.47	2.44	0.81	2.31	1.00	0.46	2.40	
Missing	3.07	2.68	1.63	2.67	1.00	0.84	2.53	
Monthly income (DKK)								
≤6999	1.79	1.82	1.56	1.16	1.00	0.76	1.33	0.21
7000–9999	2.61	2.42	2.88	2.28	1.00	1.06	1.97	
10 000–14 999	1.00	1.00	1.00	1.00	1.00	0.89	2.09	
≥15 000	0.83	0.80	3.64	1.03	1.00	4.04	2.70	
Missing	3.16	3.29	3.31	1.53	1.00	0.89	0.97	

Reanalysis of data from Rasch *et al.*¹, ‘–’ indicate no abortions observed in their group.

a: These ORs are identical to those presented in the original paper and were include here to make sure that the ORs could be reproduced. The only OR that was not reproducible in this manner was that of age <19 years because of a discrepancy between the *n*’s reported in table 2 (166 abortions and 2 births) and table 3 (176 abortions and 8 births).

b: Likelihood ratio test of an interaction between ethnicity and, respectively, occupation and income.

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Reply to induced abortion in Denmark: effect of socio-economic situation and country of birth

Laust Mortensen points out that the role of socio-economic status in explaining the ethnic disparities in induced abortion might be slightly more complicated than what we indicate in our article 'Induced abortion in Denmark: effect of socio-economic situation and country of birth'. We agree that studying the effect of ethnicity is complex. The outcomes of Laust Mortensen's reanalyses of the data presented in table 2 in our article, which indicate that non-Western women who are unemployed or unskilled are less likely than Danish born women in the

same situation to request an induced abortion, are interesting and deserve attention. We will, however, question whether the findings, as Laust Mortensen stipulates, should be considered significant. We have redone the analyses and calculated confidence intervals and it results in wide and insignificant confidence intervals. This reflects one of the limitations of the questionnaire part of our study; as it is based upon a survey which included in all 1384 women requesting abortion and 1306 women intending birth. Only 384 of these women were immigrant women from either Western or non-Western countries and therefore the strata become rather thin. To get a more valid picture of the association between ethnicity, socio-economic status and induced abortion,

it would be interesting to redo the analyses but based on a larger study population. The research team has access to register data which may facilitate a study exploring how socio-economic situation impacts the occurrence of induced abortion compared to birth within different ethnic groups. Although the criteria for country of origin is slightly different from those used in the questionnaire data, an analysis of the large amount of data (approximately 110 000 immigrants and descendents in 2001) will allow the research team to conduct the analyses stratified to adjust for the effect of ethnicity within the socio-economic strata.

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