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The effect of school screening on surgery for adolescent idiopathic scoliosis

Reanalysis is needed

SIJMEN A. REIJNEVELD, REMY A. HIRASING *

We read the paper of Wiegiersma et al.¹ regarding the effect of school screening on surgery for adolescent idiopathic scoliosis with much interest. It is based on a comparison of the number of cases of surgery for idiopathic scoliosis in Dutch regions in which the youth health care (YHC) department screens and does not screen for this disorder. The topic is important as scoliosis is disabling and may require extensive surgery. An intervention which effectively prevents extensive surgery at reasonable costs should thus be encouraged. Regarding school screening for idiopathic scoliosis (and subsequent conservative treatment) Wiegiersma et al.¹ concluded that this does not reduce population rates for scoliosis surgery and should thus be reconsidered. Unfortunately, this conclusion seems to be based on a flawed interpretation by the authors of their own data. Central in the study of Wiegiersma et al.¹ are the data as presented in table 1 of their paper, which is reproduced

here. In their calculations they first assumed that screening for scoliosis of children aged 12 or 13 years will prevent surgery for scoliosis in the age group 12–19 years. On the basis of this, they concluded that screening for scoliosis

Table 1 Distribution of cases and referents across YHC departments which screen (screening) and do not screen (non-screening) for idiopathic scoliosis

Cases by age (years)	Screening	Non-screening	OR ^a	95% CI
12	6	7	1.00	0.74–1.35
13	15	15	0.97	0.71–1.33
14	14	27	0.86	0.61–1.23
15	17	25	0.87	0.57–1.32
16	8	19	0.71	0.40–1.26
17	7	9	0.74	0.34–1.62
18	2	10	0.30	0.07–1.34
19	0	1	–	
Total cases	69	113		
Referents total	413,152	676,840		

a: Odds ratio (OR) regarding the number of surgery cases among children of this age and older (but <20 years); the odds ratios and 95% confidence intervals (CI) for each age group refer to the number of cases and referents of that age and older

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has no preventive effect regarding surgery for scoliosis: the odds ratio (OR) comparing regions in which screening is performed with regions in which this is not done is 1.00 (whereas only values between 0 and 1 indicate a preventive effect). However, their assumption in constructing this table is that screening of children aged 12–13 years should have an immediate effect for children aged 12 or 13 years as well. This is very unlikely: it means that after detection of early scoliosis, a conservative treatment should be started immediately and should have immediate effects too. In some instances, the screening should even have an effect before the child could actually have been screened.

Wiegersma et al.¹ recognised that this line of thinking is logically impossible and, therefore, performed a second calculation in which they excluded children with surgery sooner than 1 year after possible screening. However, this calculation seems to be seriously flawed. It is based on 58 cases with surgery in the screening regions and 92 cases in the non-screening regions. We cannot derive these numbers of cases in any way from their tables: to be unbiased, regarding cases and controls from similar age groups should be excluded. We do not know the exact age at which children in the non-screening regions would have been screened if there had been screening in these regions. However, assuming like Wiegersma et al.¹ do that screening occurs in the age group 12–13 years and that the effects of a conservative treatment can only be expected after at least 1 year, children aged 12–14 years should be excluded from the analysis. In this case the resulting OR (95% confidence interval) is 0.87 (0.57–1.32).^{2,3} This implies a somewhat preventive effect, though clearly without statistical significance due to the small number of cases involved. If the cut-off is set at a higher age, this preventive effect increases though it remains without statistical significance (table 1, last columns).

On the basis of this reanalysis we conclude that the data of Wiegersma et al.¹ indicate that screening for idiopathic scoliosis may have some preventive effect. However, their study is too small to yield an accurate estimate of this effect. Furthermore, the design of their study will lead to an underestimation of this preventive effect. Firstly, children may move from a screening to a non-screening region (and vice versa) in the period during which the effect of the screening on surgery rates would occur. This will always lead to an underestimation of the actual effects of this screening. Secondly, in the study period almost all Dutch children aged 12, 13 or 14 years received either a screening for scoliosis or a preventive examination by a YHC.⁴ Examination of the trunk is usually also part of the latter too. This implies that they compared the effect of specific screening for scoliosis with the effect of a combined examination, again leading to an underestimation of the net effect of such a screening. Thirdly, even in regions labelled as screening, some children will not be invited or not participate, again giving an underestimation. We invite Wiegersma et al.¹ to reformulate their conclusion in the sense that their study gives some, though inconclusive, evidence for effectiveness of screening on idiopathic scoliosis.

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The effect of school screening on surgery for adolescent idiopathic scoliosis

Response to readers' comments

P.A. WIEGERSMA, A. HOFMAN, G.A. ZIELHUIS *

Sir,

We were pleasantly surprised to learn that more than 1 year after its publication our article still generates enough interest to give rise to letters to the editor. Furthermore, we are grateful to the authors of the letter for bringing forward the interesting point concerning the age differ-

ence at surgery and its possible explanation. It provides new insights into the reasons behind the inadvertently adverse effects of youth health care activities discussed in other publications,^{1–3} although we doubt this was the authors' intention.

Before explaining this in more detail, we will first address the comments of the authors. In their letter Reijneveld and Hirasing state that we should have excluded the 12–14 year olds *in toto*, because the effect of screening of scoliosis on surgery could only be expected 1 year after such a screening. This, of course, is a rather curious line

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