Cost effectiveness of a screen-and-treat program for asymptomatic vaginal infections in pregnancy: towards a significant reduction in the costs of prematurity

Kiss H, Pichler E, Petricevic L, Husslein P

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
A simple screen-and-treat programme for vaginal infection in pregnant women without clinical signs or symptoms of common vaginal infections was compared with no screen-and-treat programme. Women were presenting for their routine prenatal visit. All women had a vaginal Gram stain, which was evaluated by the scoring criteria proposed by Nugent and classified as normal, intermediate, or bacterial vaginosis. Evaluations also included screening for the presence of Candida species and Trichomonas vaginalis. Each woman with a positive result was treated specifically for each infection.

Type of intervention
Screening and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised pregnant women, without clinical signs and symptoms of vaginal infection, presenting for their routine prenatal visit at 17 (standard deviation 1.6) weeks of gestation.

Setting
The setting was primary care. The study was conducted in the metropolitan area of Vienna, Austria.

Dates to which data relate
The effectiveness and cost data were taken from the study period (i.e. 1 January to 31 December 2002). The price year was 2002.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was apparently conducted outside of the trial, using data from Austria's largest perinatal unit at Vienna General Hospital.

Study sample
Only limited details of the parent clinical study (Kiss et al. 2004) were reported. The sample totalled 4,429 women, of which 2,058 in the intervention group and 2,097 in the control group were included in the final analysis.
Study design
This was a multi-centre, randomised controlled trial (see Kiss et al. 2004 for further details).

Analysis of effectiveness
The main outcome parameters were the rates of preterm delivery by birth weight and gestational week. Again, only limited data were described in the present report (see Kiss et al. 2004 for further details).

Effectiveness results
There were 12 (0.5%) preterm infants with a birth weight below 1,900 g in the intervention group versus 29 (1.3%) in the control group, (p=0.009).

The preterm birth results were also reported according to infant weight and gestational age.

There were 35 (1.7%, 95% confidence interval, CI: 1.2 to 2.4) preterm infants with a birth weight of <= 2,500 g in the intervention group versus 74 (3.5%, 95% CI: 2.8 to 4.4) in the control group, (p=0.0002).

There were 15 (0.7%, 95% CI: 0.4 to 1.2) preterm infants with a birth weight of <= 2,000g in the intervention group versus 33 (1.6%, 95% CI: 1.1 to 2.2) in the control group, (p=0.011).

There were 5 (0.2%, 95% CI: 0.1 to 0.6) preterm infants with a birth weight of <= 1,500g in the intervention group versus 17 (0.8%, 95% CI: 0.5 to 1.3) in the control group, (p=0.012).

There were no significant differences among the rate of infants with a birth weight of <= 1,000 g.

In terms of the gestational age (in weeks):

births from week 33 + 0 to 36 + 6 occurred in 48 (2.3%, 95% CI: 1.7 to 3.1) in the intervention group and in 88 (4.2%, 95% CI: 3.4 to 5.1) in the control group, (p=0.0007);

births from week 23 + 0 to 32 + 6 were 13 (0.6%, 95% CI: 0.3 to 1.1) in the intervention group and 24 (1.1%, 95% CI: 0.7 to 1.7) in the control group, (p=0.079).

Clinical conclusions
A simple preterm programme, which consisted of the screening and antibiotic treatment and follow-up of women with asymptomatic vaginal infection, was associated with a significant reduction in the rate of preterm births.

Measure of benefits used in the economic analysis
The measure of benefit used was the preterm births (of <= 1,900 g) prevented.

Direct costs
The cost categories included were those of the screening examination and eventual treatment, the initial hospitalisation of both mother and infant (with birth weight below 1,900 g: the cut-off chosen to evaluate as they all go to the neonatal intensive care unit), and follow-up care throughout the first 6 years of the child's life (as provided by the hospital outpatient department). Calculations used data from Austria's largest perinatal unit at Vienna General Hospital, obtained in the observation period between 1 January 2002 and 31 December 2002 (price year 2002). The quantities and the costs were not reported completely separately. Hospitalisation costs were derived from the Austrian diagnosis-related hospital reimbursement system, while follow-up care was based on the following requirements of the outpatient departments of the hospital. Despite having a long-term horizon (greater than 2 years), the authors stated that they excluded discounting since they based their analysis on conservative cost estimates.
Statistical analysis of costs
The costs were treated deterministically and no statistical tests were performed. The number and duration of hospitalisations were treated stochastically and compared using a chi-squared test.

Indirect Costs
No indirect costs were included.

Currency
Euros (EUR).

Sensitivity analysis
No sensitivity analysis was reported.

Estimated benefits used in the economic analysis
As the study showed a 50% reduction in preterm births, extrapolating the results to Vienna would mean that the number of preterm infants with birth weights below 1,900 g would be reduced from 376 to 188 during that period.

Cost results
There were 132 hospitalisations for preterm infants with birth weights of ≤ 1,900 g in the intervention group (6.4%) versus 166 (7.9%) in the control group, (p=0.06).

Likewise, the duration of hospitalisations and sick leaves during pregnancy was generally lower in the intervention group than in the control group, though not statistically significant.

The expected total average cost per preterm birth totalled EUR 60,262. This comprised the following:

- Prenatal hospitalisation of the mother, EUR 3,354;
- Hospitalisation of the infant, EUR 9,409;
- Neonatal intensive care unit, EUR 27,343;
- Neonatal intensive monitoring unit, EUR 6,118;
- Prolonged hospitalisation, EUR 3,815; and
- Outpatient follow-up care throughout the first 6 years of life, EUR 10,223.

The expected screen-and-treat costs per pregnant woman were EUR 46.

The total costs of the screen-and-treat programme amounted to EUR 754,096.

Synthesis of costs and benefits
Extrapolating these results to the Vienna area on the basis of official preterm birth statistics for the city of Vienna during the observation period, the expected total cost-savings resulting from a 50% reduction in the number preterm infants with a birth weight below 1,900 g amounted to more than EUR 11 million.

The screen-and-treat costs were EUR 4,034 per preterm birth prevented, while the reduction in direct treatment costs was EUR 60,262 per preterm birth prevented. Thus, the net savings resulting from the screen-and-treat programme were EUR 56,228 per preterm birth prevented. This would mean a saving of EUR 620 per woman screened.
The costs of screening and treatment per preterm birth prevented and per woman screened amounted to 7% of the direct costs saved as a result of the programme.

Authors’ conclusions
The screen-and-treat programme for asymptomatic vaginal infection led not only to a significant reduction in the rate of preterm births but also to substantial savings in the costs of prematurity.

CRD COMMENTARY - Selection of comparators
The choice of the comparator was explicitly justified, being based on the lack of current consensus in detecting a treating asymptomatic vaginal infection and a comparison of no screening and a screen-and-treat protocol. You should decide if this is a widely used health technology in your own setting.

Validity of estimate of measure of effectiveness
The measure of effectiveness was based on a multi-centre, randomised controlled trial, which was an appropriate study design for the study question. Limited details of the clinical trial were provided in this paper. To fully assess the quality and validity of the effectiveness data, the reader is referred to the parent study (Kiss et al. 2004).

Validity of estimate of measure of benefit
The authors chose to measure the benefits in terms of preterm births prevented, using a cut-off of 1,900 g because of the local practice of admitting all patients with this criterion to the neonatal intensive care unit.

Validity of estimate of costs
As the study perspective was not explicitly stated (it seems to have been that of the hospital), it was hard to tell whether all the relevant categories were included. Relevant categories included were those of screening examination and eventual treatment, the initial hospitalisation of both mother and infant (weighing below 1,900 g), and the costs of outpatient follow-up care. The costs and the quantities were not reported completely separately, which would make extrapolation of the results to other settings difficult. Resource use was derived from the parent study as well as from locally representative data. No statistical analysis of the quantities or costs was performed. The prices came from published local sources or data provided by a large hospital. Despite having a long-term horizon (more than 2 years), the authors stated that they excluded discounting since they based their analysis on conservative cost estimates. Though prematurity imposes a significant cost burden in other categories (special education, social services, work lost), the figures were a conservative estimate of the wider impact of prematurity for wider perspectives.

Other issues
The authors made some comparisons of their results with other studies. The issue of generalisability to other settings was addressed. The authors do not appear to have presented their results selectively and their conclusions seem to reflect the scope of the study. With the exception of the unusual weight cut-off chosen, which was explicitly justified, the authors did not report any study limitations.

Implications of the study
Despite the authors’ conservative estimates, implementation of the screen-and-treat strategy could result in potential cost-savings of over EUR 11 million in the Vienna healthcare budget in one year. Since this is the first large trial to demonstrate a beneficial effect of this strategy in preventing prematurity, it would be important to replicate the results in order to confirm the external validity to other settings.

Source of funding
Funded by the "Healthy Austria" fund and the Federal Ministry of Education, Science and Culture.
Bibliographic details

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Anti-Bacterial Agents /therapeutic use; Austria; Birth Weight; Cost Control; Cost-Benefit Analysis; Female; Health Care Costs; Hospital Costs; Humans; Infant, Newborn; Infant, Premature; Infant, Very Low Birth Weight; Intensive Care Units, Neonatal /economics; Length of Stay; Male; Mass Screening; Obstetric Labor, Premature /economics /prevention & control; Pregnancy; Pregnancy Complications, Infectious /diagnosis /drug therapy; Vaginitis /diagnosis /drug therapy

AccessionNumber
22006001706

Date bibliographic record published
28/02/2007

Date abstract record published
28/02/2007