



Partner notification of chlamydia infection in primary care: randomised controlled trial and analysis of resource use

Nicola Low, Anne McCarthy, Tracy E Roberts, Mia Huengsberg, Emma Sanford, Jonathan A C Sterne, John Macleod, Chris Salisbury, Karl Pye, Aisha Holloway, Andrea Morcom, Rita Patel, Suzanne M Robinson, Paddy Horner, Pelham M Barton and Matthias Egger

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What is already known on this topic

Gastroesophageal reflux disease (GORD) is common in adults with chronic cough

International guidelines on cough recommend empirical treatment for GORD in those with chronic cough, though evidence for an effect is conflicting

What this study adds

Drugs to reduce the effect of gastric acid in GORD are beneficial in some adults with cough associated with GORD

The effect is less universal than suggested in cohort studies and international guidelines on chronic cough, and the magnitude of the clinical effect is uncertain

effect in some adults, though the effect is less universal than reported in cohort studies. In children, the absence of data makes specific recommendations impossible, and other causes of cough should be considered first. Sufficiently powered parallel placebo controlled randomised controlled trials are required to justify international guidelines.^{2,3} Examinations of different treatments for acid and non-acid GOR are also required.

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Partner notification of chlamydia infection in primary care: randomised controlled trial and analysis of resource use

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Abstract

Objective To evaluate the effectiveness of a practice nurse led strategy to improve the notification and treatment of partners of people with chlamydia infection.

Design Randomised controlled trial.

Setting 27 general practices in the Bristol and Birmingham areas.

Participants 140 men and women with chlamydia (index cases) diagnosed by screening of home collected urine sample or vulval swab specimen.

Interventions Partner notification at the general practice immediately after diagnosis by trained practice nurses, with telephone follow-up by a health adviser; or referral to a specialist health adviser at a genitourinary medicine clinic.

Main outcome measures Primary outcome was the proportion of index cases with at least one treated sexual partner. Specified secondary outcomes

included the number of sexual contacts elicited during a sexual history, positive test result for chlamydia six weeks after treatment, and the cost of each strategy in 2003 pounds sterling prices.

Results 65.3% (47/72) of participants receiving practice nurse led partner notification had at least one partner treated compared with 52.9% (39/68) of those referred to a genitourinary medicine clinic (risk difference 12.4%, 95% confidence interval -1.8% to 26.5%). Of 68 participants referred to the clinic, 21 (31%) did not attend. The costs per index case were £32.55 for the practice nurse led strategy and £32.62 for the referral strategy.

Conclusion Practice based partner notification by trained nurses with telephone follow-up by health advisers is at least as effective as referral to a specialist

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health adviser at a genitourinary medicine clinic, and costs the same.

Trial registration Clinical trials: NCT00112255.

Introduction

Partner notification is essential to the control of sexually transmitted infections,¹ including chlamydia for which reported diagnoses have increased by 66% in the past five years.² New strategies for managing chlamydia in non-specialist settings are required as genitourinary medicine clinics in the United Kingdom are failing to cope with the increasing workload.³

In the United Kingdom, partner notification of someone with a sexually transmitted infection is usually done by specialist health advisers in genitourinary medicine clinics.⁴ We carried out a randomised controlled trial to compare the effectiveness of, and resources used by, two strategies for managing cases of chlamydia in primary care: partner notification by trained practice nurses at the time of diagnosis, with telephone follow-up by health advisers; and referral to a specialist health adviser at a genitourinary medicine clinic.

Methods

The trial was part of the chlamydia screening studies project, involving 27 general practices (see bmj.com).^{5 6} People were eligible if they had a positive chlamydia test result and received the result at their general practice (index cases). In the last eight months of the study we also asked general practitioners in the 27 practices to refer additional patients with chlamydia to the practice nurse. The nurse provided antibiotic (azithromycin) treatment, explained the trial, and obtained consent. Eligible patients were randomised individually using computer generated random numbers in permuted blocks, stratified by practice.

Interventions

Index cases randomised to the practice arm had partner notification undertaken by a trained practice nurse (see bmj.com) immediately after diagnosis. A research health adviser carried out telephone follow-up. The practice nurse strategy included a partner notification interview, which included a history of all sexual contacts in the six months before diagnosis; patient referral (infected people inform contacts themselves) using contact slips; advice on avoiding sexual intercourse until partners had completed treatment; and information on being screened for other sexually transmitted infections. Contact slips included details of the study genitourinary medicine clinics, and requested the treatment centre to return the card to the study centre. Practice nurses did not follow up index cases.

Participants randomised to referral to a clinic were given details of a research health adviser at each clinic. Health advisers carried out partner notification using standardised protocols for patient referral, provider referral (immediately informing partners on behalf of the patient), or conditional referral (contacting partners if the patient had not done so after an agreed period), and issued contact slips. Follow-up was by telephone.

Outcomes

The prespecified primary outcome was treatment of sexual contacts, expressed as the proportion of index cases with at least one sexual partner treated and the number of partners treated per case six weeks after randomisation. We defined a partner as having been treated if at telephone follow-up the index case said that the partner had been treated, a contact card was returned to the study centre, or the partner had attended a local genitourinary medicine clinic after the index case received the intervention. Secondary outcomes included the number of partners per index case elicited in the sexual history and the proportion of index cases with a positive chlamydia test result in a urine sample or vulval swab specimen six weeks after randomisation. We also compared the proportion of index cases with all sexual partners treated, as incomplete partner treatment has been shown to be a risk factor for reinfection after screening for chlamydia.^{7 8}

Statistical analysis

The primary analysis was carried out according to the intent to carry out partner notification. We included all index cases randomised and all sexual partners elicited, either during the partner notification interview or at telephone follow-up for index cases who had not attended the clinic (see bmj.com). We assumed that the sexual partners of index cases lost to follow-up had not been treated. In a further analysis we included only index cases who received partner notification (see bmj.com). We estimated the absolute and relative risks of an index case having at least one partner treated after partner notification by a practice nurse compared with referral to a clinic. We also calculated the mean (standard deviation) number of partners treated per case in the two groups and estimated the difference between means using regression models, with robust standard errors to calculate 95% confidence intervals. We took into account clustering at practice level.

Resource use

Costs were in pounds sterling at 2003 prices. We obtained hourly rates of pay and training costs from the chlamydia screening studies project. Practice nurses recorded the duration of the consultation. We used published data on the duration of clinic consultations for partner notification.⁹

We also estimated the time spent by health advisers providing support for partner notification and telephone follow-up. Research health advisers recorded the number and duration of phone calls for following up partner notification outcomes. We estimated that the initial practice visit lasted two hours and that telephone support to practice nurses averaged 0.1 hours per case. We applied these figures to a population similar to that served by Avon primary care trusts (see bmj.com; Wendi Slater, personal communication, 2005).

Results

Participants were enrolled from March 2001 to October 2002. Thirty six nurses in 25 of 27 practices involved in the chlamydia screening studies project enrolled at least one participant (median 4, range 1-13). Overall, 74% (140/190) of eligible participants

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Table 1 Outcome of partner notification by practice nurses or specialist at genitourinary medicine clinic. Values are numbers (percentages) unless stated otherwise

Variables	Practice nurse	Genitourinary medicine clinic	Difference (95% CI)	P value
No of index cases randomised (intention to treat)	72	68	—	—
Total No of contacts elicited*	119	87	—	—
No of contacts treated:	53	39	—	—
Cases with at least one contact treated†	47 (65.3)	36 (52.9)	12.4 (-1.8 to 26.5)	0.087
Mean (SD) contacts treated per case randomised†	0.74 (0.6)	0.57 (0.6)	0.16 (-0.02 to 0.34)	0.078
Cases with all partners treated‡	37 (51.4)	21 (30.9)	20.5 (4.1 to 36.9)	0.014
No of index cases interviewed (receiving treatment)	72	47	—	—
No of contacts elicited at interview only	119	64	—	—
No of contacts treated:	53	30	—	—
Cases with at least one contact treated†	47 (65.3)	27 (57.4)	7.8 (-8.4 to 24.0)	0.343
Mean (SD) contacts treated per case interviewed†	0.74 (0.6)	0.64 (0.6)	0.1 (-0.1 to 0.3)	0.325
Cases with all partners treated‡	37 (51.4)	17 (36.2)	15.2 (-3.3 to 33.8)	0.108

*Number in clinic arm includes 64 elicited at partner notification interview plus 23 partners of 10 participants randomised to clinic who did not attend appointment.

†Outcome prespecified in study protocol.

‡Outcome not prespecified in protocol.

were randomised: 72 to the practice nurse strategy and 68 to referral to a genitourinary medicine clinic (see bmj.com). We obtained outcome data on 74% (104/140) of index cases and 79% (163/206) of contacts, with similar follow-up in both arms. Twenty three contact cards were returned.

All 72 participants randomised to the practice nurse strategy had a partner notification interview on the same day. Of the 68 participants referred to the clinic, 21 (31%) did not attend, including three who were interviewed by the practice nurse. The remainder had done partner notification a mean of 13.2 (SD 18.0) days after randomisation. Sexual histories recorded by practice nurses elicited details of 1.7 (SD 1.2) contacts per case compared with 1.4 (SD 1.0) contacts per case elicited from 47 index cases who were randomised to the clinic and had done partner notification (difference 0.3, 95% confidence interval -0.01 to 0.6; $P=0.055$).

Overall, 45% (92/206) of contacts of 140 index cases were considered treated: 65.3% (47/72) of index cases seen by a practice nurse and 52.9% (39/68) of those referred to the clinic had at least one sexual partner treated (relative risk 1.2, 0.9 to 1.6, absolute difference 12.4%, -1.8% to 26.5%, $P=0.087$; table 1). In analysis restricted to index cases that had done partner notification, we found no evidence of a difference between the arms (risk difference 7.9%, -8.4% to 24.0%). In the clinic arm, similar proportions of

contacts were treated for index cases who attended the clinic (46.9%, 30/64) and those who did not (39.1%, 9/23). Half of index cases seen by a practice nurse (37/72, 51.4%) had all their partners treated compared with 30.9% (21/68) of those referred to the clinic (risk difference 20.5%, 4.1% to 36.9%; $P=0.014$).

Resource use

Partner notification and treatment undertaken by a practice nurse at the general practice was the dominant option: the cost per index case was £32.55, and 65.3% had at least one partner treated. In comparison, referral to the clinic cost £32.62 per index case, and 52.9% had at least one partner treated (table 2). For index cases managed at the general practice, nurses took an average of 41.9 minutes (95% confidence interval 37.0 to 46.7) to give the test result and treatment, enrol the patient, and carry out partner notification. For those referred to the clinic the average consultation with the practice nurse was 38.8 minutes (34.8 to 42.8). This included the time taken to give the test result and treatment, enrol the patient, and explain referral to the clinic. Index cases who attended the clinic then had a consultation with a health adviser, estimated at 12 minutes (table 2).⁹ The one day training course cost an average of £85 per practice. We estimated locum and travelling costs at £145.79 per nurse.

Table 2 Costs of partner notification strategies in primary care

Variable	Practice nurse strategy			Genitourinary medicine clinic		
	No of participants	Unit cost*	Total*	No of participants	Unit cost*	Total*
Index case treatment	72	12.00	864.00	68	12.00	816.00
Mean (95% CI) partner notification advice:						
At general practice	72	11.72 (10.37 to 13.08)†	843.84	68	10.86 (9.74 to 11.98)‡	738.48
At clinic	—	—	—	47	4.16§	195.52
Partner treatment	53	12.00	636.00	39	12.00	468.00
Mean (95% CI) cost per index case	72	—	32.55 (31.20 to 33.91)	68	—	32.62 (31.49 to 33.73)

*All costs are United Kingdom sterling in 2003 prices. Cost of nurse £16.80 per hour, health adviser £19.80 per hour, azithromycin assumed to have been used for all index cases and sexual partners.

†Costs include time for giving treatment, explaining study, gaining consent, and undertaking partner notification.

‡Costs include time for practice nurse consultation for treatment, explaining study, gaining consent, and explaining referral process to genitourinary medicine clinic for all 68 index cases.

§Costs also include time for health adviser consultation for 47 index cases who attended the genitourinary medicine clinic.

Research health advisers spent an average of 4.41 (SD 2.40) minutes on telephone follow-up with index cases who could be contacted and 3.73 (SD 1.30) minutes on unanswered phone calls to non-contactable cases. Assuming that, as in this trial, about 75% of index cases could be contacted at follow-up, we estimated that practice visits, telephone support, and follow-up for practice nurse led partner notification would require 606 hours of health adviser time for a population the size of Avon.

Discussion

Practice nurses with appropriate training and support from health advisers to carry out telephone follow-up can provide effective immediate partner notification for community diagnosed chlamydia, and this approach costs the same as standard referral. These results contradicted our hypothesis, that the outcomes of partner notification of chlamydia through referral to a specialist health adviser would be better than those of general practice nurses. This was because about a third of those referred for specialist partner notification did not attend the genitourinary medicine clinic. The costs of the two strategies were similar. Contact slips were not useful for ascertaining contact treatment. Single dose azithromycin seemed to have eradicated chlamydia among those who had follow-up tests six weeks after treatment.

Strengths and weaknesses of study

The strengths of this study were that it was a multi-centre randomised trial, included both sexes, and compared management strategies rather than simply the performance of different professionals. We minimised bias by concealing allocation to study groups, blinding the ascertainment of outcomes, and analysing data according to the intention to carry out partner notification. One limitation is that low overall uptake of home based screening for chlamydia reduced the number of eligible people.⁵

Some features of the research might have influenced the outcomes. For some participants the study clinic was not their nearest clinic: this might have contributed to the 30% default rate, although this was lower than in some studies.¹⁰ Giving antibiotics at the practice might have exaggerated the differences between groups if fewer people randomised to the clinic then attended. Conversely, nurses explained to all participants the importance of sexual contacts being treated. This is standard clinical practice, but in a trial setting the differences between groups would diminish if some index cases randomised to the genitourinary clinic acted on this advice and did not attend.

Comparison with other studies

This is the first randomised trial to have evaluated primary care based partner notification in a developed country.¹¹ In the English national chlamydia screening programme, 44% of all contacts identified were treated.¹² Practice nurse led partner notification compared favourably with these figures (0.74 partners per case, 45% of all partners treated). The combined cost of treatment and management of partners in our study was similar to estimates from the national programme.¹³ Another novel partner notification strat-

What is already known on this topic

Partner notification is essential for the control of sexually transmitted infections

In the United Kingdom it is usually done by specialist health advisers in genitourinary medicine clinics

The effectiveness of partner notification in primary care settings is unknown

What this study adds

Trained practice nurses can carry out partner notification for people with chlamydia that is at least as effective as referral to a specialist health adviser

The practice nurse led strategy costs no more than referral to a specialist health adviser

Such a strategy could be incorporated into the national chlamydia screening programme

egy to enhance patient referral involves index cases delivering antibiotics and sexual health information directly to partners without a clinical consultation, or the partner collecting treatment from a pharmacy.¹⁴

Meaning of the study

People diagnosed with chlamydia infection in primary care settings can be managed there by trained staff who are supported by sexual health advisers. Recent research suggests that ensuring that all sexual partners are treated is important for avoiding reinfection.^{7, 8} Although this outcome was not prespecified, practice based partner notification resulted in more index cases having all partners treated than the referral strategy. This strategy might contribute to improved control of chlamydia in the population if it reduced the duration of infection by decreasing delays in treatment of partners, caused by the referral process and long clinic waiting times, and achieved a reduction in reinfection from more complete partner treatment.^{7, 8} We will investigate this, and the cost effectiveness of the strategy, in a separate modelling study. The estimated costs were slightly higher than they would be in practice because trial procedures increased consultation times. These were, however, the same for both study arms. The similarity in practice nurse consultation times between the trial arms suggests that the time taken to explain the referral process to a genitourinary medicine clinic to someone with chlamydia could be spent on taking a sexual history and carrying out partner notification at the practice.

Implications for policy and practice

Practice nurse led partner notification could be incorporated into the English national chlamydia screening programme, which currently suggests referral to a genitourinary medicine clinic.¹⁵ Primary care trusts can use our results directly to plan screening because our model of care complied with the core requirements of the national programme.¹⁵ This model could be extended to other primary care settings, such as

community contraception clinics. General practitioners could also be trained.

Our study provides high quality evidence that investing in training and support for practice nurse led partner notification would be an effective use of government resources committed to improving sexual health.

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Ethical approval: South West multicentre research ethics committee (MREC/00/6/30) and all relevant local research ethics committees.

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Use of a dummy (pacifier) during sleep and risk of sudden infant death syndrome (SIDS): population based case-control study

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Abstract

Objectives To examine the association between use of a dummy (pacifier) during sleep and the risk of sudden infant death syndrome (SIDS) in relation to other risk factors.

Design Population based case-control study.

Setting Eleven counties in California.

Participants Mothers or carers of 185 infants whose deaths were attributed to SIDS and 312 randomly selected controls matched for race or ethnicity and age.

Main outcome measure Use of a dummy during sleep determined through interviews.

Results The adjusted odds ratio for SIDS associated with using a dummy during the last sleep was 0.08 (95% confidence interval 0.03 to 0.21). Use was associated with a reduction in risk in every category of sociodemographic characteristics and risk factors examined. The reduced risk associated with use seemed to be greater with adverse sleep conditions (such as sleeping prone or on side and sleeping with a mother who smoked), although the observed interactions were not significant. For example, infants

who did not use a dummy and slept prone or on their sides (*v* on their back) had an increased risk of SIDS (2.61, 1.56 to 4.38). In infants who used dummies, there was no increased risk associated with sleeping position (0.66, 0.12 to 3.59). While cosleeping with a mother who smoked was also associated with increased risk of SIDS among infants who did not use a dummy (4.5, 1.3 to 15.1), there was no such association among those who did (1.1, 0.1 to 13.4). **Conclusions** Use of a dummy seems to reduce the risk of SIDS and possibly reduces the influence of known risk factors in the sleep environment.

Introduction

The reduction in the incidence of sudden infant death syndrome (SIDS) after the Back to Sleep campaign in the United States and other countries showed that sleep environment strongly influences the risk of SIDS,^{1 2} although the underlying mechanisms remain



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