

# Promotion of condom use in a high-risk setting in Nicaragua: a randomised controlled trial

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## Summary

**Background** In Latin America, motels rent rooms for commercial and non-commercial sex. We investigated the impact of providing health-education material and condoms on condom use in Managua, Nicaragua.

**Methods** In a randomised controlled trial, in 19 motels, we gave condoms on request, made them available in rooms, or gave condoms directly to couples, with and without the presence of health-education material in the rooms. In a factorial design we assessed condom use directly by searching the rooms after couples had left.

**Findings** 11 motels were used mainly by sex workers and their clients and eight mainly for non-commercial sex. 6463 couples attended the motels in 24 days. On 3106 (48.0%) occasions, at least one used condom was retrieved. Condom use was more frequent for commercial sex than for non-commercial sex (60.5 vs 20.2%). The presence of health-education material lowered the frequency of condom use for commercial sex (odds ratio 0.89 [95% CI 0.84–0.94]) and had no effect on use for non-commercial sex (1.03 [0.97–1.08]). Condom use increased for commercial (1.31 [1.09–1.75]) and non-commercial sex (1.81 [1.14–2.81]) if condoms were available in rooms. Directly handing condoms to couples was similarly effective for commercial sex but less effective for non-commercial sex (1.32 [1.03–1.61] vs 1.52 [1.01–2.38]).

**Interpretation** In Latin America, motels are key locations for promoting the use of condoms. Making condoms available in rooms is the most effective strategy to increase condom use, whereas use of health-education material was ineffective. These findings have important implications for HIV-prevention policies.

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## Introduction

More than 30 million people are estimated to have HIV-1 infection worldwide, and 16 000 new infections, mostly acquired heterosexually, are estimated to occur each day.<sup>1</sup> Most HIV-1-infected people live in less-developed countries, mainly in sub-Saharan Africa and southeast Asia. In the absence of an effective vaccine, behavioural change is at the centre of HIV/AIDS prevention, including the promotion of condom use.<sup>1–4</sup> Little, however, is known about the effectiveness of different strategies intended to encourage and facilitate protective behaviours among people at risk of infection.

Randomised trials are recommended as the primary strategy for assessment of programme effectiveness,<sup>5</sup> but are rare. Among 1184 abstracts submitted with the keywords “behavioural interventions” to the 12th World AIDS Conference in Geneva in 1998, only 30 (2.5%) described randomised controlled trials. There are practical and political difficulties with such trials, and studies frequently require substantial investment of time, expertise, and funding. These factors have probably contributed to the generally low quality of evaluation research in the field of HIV and AIDS prevention.<sup>6–8</sup> Another factor is the “urge to do something”, coupled with strong beliefs that interventions will work, which is understandably widespread among public-health advocates, AIDS activists, and their allies.<sup>9</sup> The production and distribution of leaflets and posters, and the distribution of condoms to people perceived to be at high risk of acquiring HIV-1 infection, has been a regular component of prevention activities.

Nicaragua is a country with rapidly rising HIV-1-infection rates<sup>1,10</sup> and the prevalence of sexually transmitted infections is high.<sup>10,11</sup> In Nicaragua and elsewhere in Latin America, motels, boarding houses and hotels rent rooms for short times for discreet commercial and non-commercial sex. These establishments are called *moteles* in Nicaragua (motels in this paper). We did a randomised controlled trial with a factorial design of condom promotion by use of health-education leaflets and posters and different strategies of condom provision in motels in Nicaragua’s capital, Managua, to find out whether these factors could increase condom use.

## Methods

### Study area and selection of motels

We did this study, preceded by a pilot study in 1990,<sup>12</sup> in Managua’s district IV. This district is in central Managua and has about 200 000 residents who are mainly from lower socioeconomic strata. The district includes Managua’s largest street market (Mercado Oriental), from where many sex workers operate. We made a list of all the motels in the study area based on registers of motels from the police, the municipality, and the health centre that serves the area. We also did a street-to-street search to identify motels not known to these authorities; we identified 36 in total. We approached

owners for interview, which covered the characteristics of motels and clients (sex workers or other).

### Interventions

Three types of condom provision were tested: two condoms given on request; two condoms left on beds in motel rooms; and two condoms given to couples before they entered the room. The condoms were presented in glossy envelopes, each with a heart printed on the front and the words *cortesía de la casa* (by courtesy of the management) printed on the back. Leaflets were left on beds and posters were displayed on walls. The group given condoms on request is comparable to the normal-care group in a clinical trial, since Ministry of Health directives require motels to provide condoms. Although motel owners stressed that this was routine practice, an informal study using dummy couples showed that in most motels visited, condoms were not provided routinely. Rather they were handed only to clients who specifically requested them and were frequently unavailable. We took this group to be the control group, which, in the absence of health-education material, would provide an estimate of baseline condom use. Six different combinations of interventions were, therefore, tested: condoms given on request in the absence of printed material; condoms given on request and printed material present; condoms available in rooms and no printed material; condoms and printed material present; condoms handed out to clients and no printed material in rooms; and condoms handed out to clients and printed material present.

We collected data on the 3 busiest days of the week—Friday to Sunday or Thursday to Saturday—in each motel. We randomly assigned each motel 24 study days by use of a computer algorithm and tested each intervention combination on 4 days. Project staff visited study sites regularly to check whether the assigned interventions were in place and data were being collected according to protocol.

Clients were not aware of the study or that the extra supplies of condoms were provided by the study team. The study was approved by Berne university ethics committee in Switzerland and the review board of the non-governmental organisation in Nicaragua.

Printed materials were designed in collaboration with a local non-governmental organisation that has been active in HIV and AIDS prevention since 1993. The material was aimed at increasing knowledge of HIV and AIDS, stressing the role of condoms, and was intended to be entertaining and appropriate for the context. The leaflet also addressed skills and effectiveness in use of condoms, which was portrayed as fun. The posters measured 56×44 cm and showed a drawing of a naked couple, inspired by indigenous sculptures. The text read *tomándole sabor a la vida—el condón, tu mejor opción* (when enjoying life—the condom is your best choice). The folded leaflet measured 7×11 cm and unfolded into four pages that were printed on both sides. The illustration and text on the title page were the same as on the posters, and six pictures to show the correct use of condoms, accompanied by short captions, were inside the leaflet. Comic-book-style drawings of a condom-shaped character presented the advantages of using condoms (protection against HIV and AIDS, other sexually transmitted infections, and unplanned pregnancies). Statistics on the number of HIV-1 infections and people with AIDS in Nicaragua and Central America were also given. (Copies of the leaflet are available from ME on request.)

Condom use, the endpoint of the study, was assessed by searching the room for condoms after a couple had left. We recorded the number and characteristics (used condom containing semen or unused condom) of condoms found in the room on standard forms. We defined condom use as the retrieval of at least one condom containing semen. Field workers searched rooms covertly, disguised as cleaners.

### Statistical analysis

We calculated sample size based on the results of the pilot study<sup>12</sup> and on the interviews with motel owners. To detect a

10% difference in condom use between methods of condom provision, with 5% significance and a power of 90%, we estimated that the study had to be done on at least 330 motel-days. To balance the design and to gain additional power we decided to survey the motels for 24 days each.

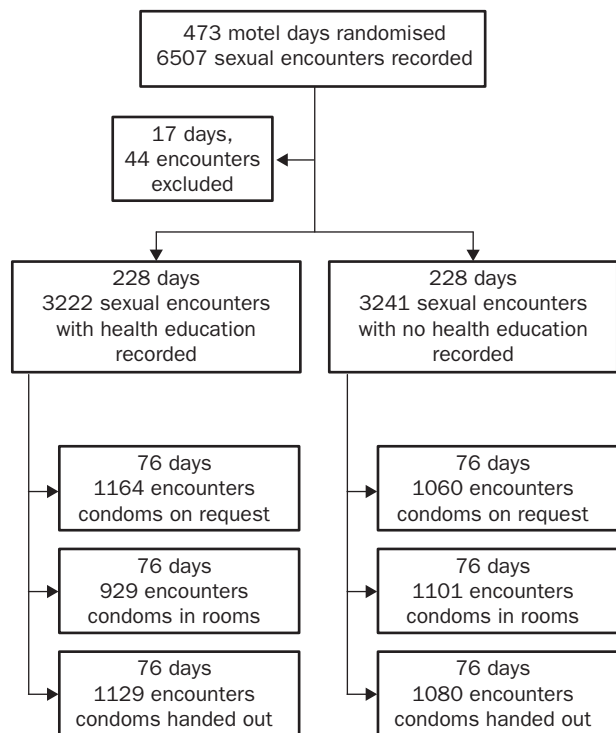
We analysed effects of condom provision and health education on the probability of condom use by multilevel logistic modelling<sup>13</sup> with MLn (version 3.0).<sup>14</sup> This method takes into account sources of variation at the level of motels and the level of couples. Main effects (condom provision and health education) were entered one at a time. The protocol planned for two separate analyses, according to type of motel: motels mainly used by sex workers and other motels.

### Results

Seven (19.4%) motel owners refused to be interviewed and nine (25.0%) were interviewed but declined to participate in the study. 20 motels were therefore included; 12 were used mainly for commercial sex and eight for non-commercial sex. Condom use for 6507 couples was recorded on 473 motel-days between July 31 and October 4, 1997. One motel closed down during the study period and the 44 (0.68% of total) couples recorded on 17 (3.6% of total) days at this motel were excluded from further analysis. The analysis was therefore based on 456 motel days and 6463 couples in 19 motels (figure).

11 motels were used mainly by sex workers and their clients and eight mainly for non-commercial sex. Motels used mainly for commercial sex were generally smaller and charged less than those used mainly for non-commercial sex. Only one motel used mainly for commercial sex but half of the other motels had en-suite flush toilets (table 1). The median time spent in rooms for commercial sex was 15 min, compared with 91 min for non-commercial sex.

One or more condoms containing semen were retrieved after 3106 (48.0%) encounters, after 152 (2.4%) encounters unused condoms were recovered, and after 3205 (49.6%) no condom was found.



**Trial profile**

	Motels used mainly for commercial sex (n=11)	Motels used mainly for non-commercial sex (n=8)
Mean number of rooms (range)	6.2 (2–15)	12.9 (4–50)
Mean room price (US\$) (range)	2.0 (0.63–3.75)	4.0 (2.5–5.63)
<b>Facilities</b>		
Air conditioned	1 (9%)	1 (13%)
Fan	9 (82%)	8 (100%)
En-suite toilet	1 (9%)	4 (50%)

Table 1: Characteristics of motels

Condom use was about three times more frequent for commercial sex than for non-commercial sex (table 2). The presence of health-education material lowered the frequency of condom use for commercial sex (odds ratio 0.89 [95% CI 0.84–0.94]) but not for non-commercial sex (1.03 [0.97–1.08]). Condoms being available in rooms and giving condoms directly to couples increased the frequency of condom use for commercial and non-commercial sex (table 3). Among couples who used motels for non-commercial sex, condom provision had the greatest effect when condoms were available in rooms ( $p=0.017$  for difference between odds ratios, table 3). The effect of the different types of condom provision did not depend on whether health education was present or absent for commercial and non-commercial sex ( $p>0.10$  for interaction).

## Discussion

Evaluation research should provide information on the development of programmes aiming to increase condom use. The choice of an adequate outcome is central to the design. New HIV-1 infection is clearly the most informative outcome in assessment of any prevention programme for HIV and AIDS. Although studies have been done with incidence of HIV-1 or other sexually transmitted infections as the outcome,<sup>15,16</sup> sample-size constraints in low-risk populations and ethical issues in high-risk groups lead to difficulties.<sup>17</sup> Behavioural outcomes are therefore used as a surrogate measure for the risk of infection. Studies assessing self-reported behavioural outcomes can be done quickly and inexpensively in small samples, but bias may be introduced by non-participation, item-specific non-response, and social desirability or recall bias.<sup>18</sup> Independent evidence by which to assess sexual behaviour is therefore important.<sup>5</sup>

In Nicaragua and other countries, crowded housing conditions mean that locations in which to have sex are scarce. Motels provide opportunities for discreet sexual encounters with a range of partners, including sex workers, and for non-commercial premarital, extramarital, and marital relations. In Managua, a

	Motels used mainly for commercial sex		Motels used mainly for non-commercial sex	
	Total couples	Number of used condoms	Total couples	Number of used condoms
<b>Health education</b>				
No	2247	1388 (61.8%)	1003	188 (18.9%)
Yes	2219	1315 (59.3%)	994	215 (21.4%)
Total	4466	2703 (60.5%)	1997	403 (20.2%)
<b>Condom provision</b>				
On request	1574	880 (55.9%)	650	100 (15.4%)
Available in rooms	1382	858 (62.1%)	648	159 (24.5%)
Handed to clients	1510	965 (63.9%)	699	144 (20.6%)
Total	4466	2703 (60.5%)	1997	403 (20.2%)

Table 2: Frequency of condom use

	Odds ratio (95% CI)	
	Commercial sex	Non-commercial sex
<b>Health education</b>		
No	1.0	1.0
Yes	0.89 (0.84–0.94)	1.03 (0.97–1.08)
<b>Condom provision</b>		
On request	1.0	1.0
Available in rooms	1.31 (1.09–1.75)	1.81 (1.14–2.81)
Handed to clients	1.32 (1.03–1.61)	1.52 (1.01–2.38)

Table 3: Effect of health education and method of condom provision on the probability of condom use

substantial proportion of all sexual encounters, and a higher proportion of sexual acts between sex workers and clients probably take place in motels. Motels are therefore key locations for sexual-health education and condom promotion. Leaflets and posters, however, failed to increase condom use in our study. For commercial sex, the presence of health-education material seemed to lead to lower frequency of condom use. This finding was unexpected and requires confirmation in future studies. The Managuan population has a good knowledge of HIV and AIDS<sup>19</sup> and, therefore, health-education material providing information rather than making the use of condoms appealing had low potential to have an effect, and might have provoked some sex workers' clients to refuse to use condoms. Material similar to that used in our study is widely used in sexual-health promotion campaigns, and this approach might, therefore, be less effective than currently believed. Our findings confirm that information alone is insufficient to change behaviour.<sup>20</sup> Culturally relevant face-to-face interventions based on theories of behaviour change that promote self-efficacy and skills have been more successful. Three controlled trials in the USA<sup>21–23</sup> and one trial from Thailand<sup>24</sup> showed that such interventions can lower the incidence of sexually transmitted infections in groups at high risk.

We saw important effects with improved condom provision. Provision of condoms in rooms, which avoided couples having to ask for them explicitly, increased condom use substantially. Provision of condoms in rooms was as effective as the unsolicited distribution of condoms for sex workers and was more effective for non-commercial sex. In our pilot study, we used direct distribution of condoms to couples because we thought that this method would facilitate successful negotiation of condom use, especially among sex workers.<sup>12</sup> Such a finding was not seen in the present study. For couples having non-commercial sex, unsolicited distribution of condoms may have led to lower frequency of condom use compared with the more discreet provision of condoms in rooms.

Our study had several limitations. First, we assessed short-term effects only and the longer-term presence of printed material might increase condom use. Second, only 19 of 36 motel owners chose to participate. Although there are potential difficulties in the generalisation of our findings, we studied motels that charged a range of prices and with differing degrees of use for commercial sex. Therefore, even if the ratio of motels used mainly for commercial and non-commercial sex differed among all 36 motels, the stratum-specific findings are probably applicable. Third, estimates of condom use are probably accurate for commercial sex, but numbers may have been underestimated for non-commercial sex because of the

presence of flush toilets in some rooms. We retrieved fewer used condoms from rooms with en-suite toilets (odds ratio 0.57). Motel rooms with en-suite toilets were, however, also more expensive than those without en-suite toilets, and therefore, the demography of couples using them might also have differed. The effects of factors associated with the choice of motel cannot be separated from those that may have affected the frequency of condom use. More importantly, it is unlikely, the randomised nature of our study means that the disposal of condoms in toilets (or removal of used condoms from the room on leaving) was unlikely to differ between methods of condom provision. Differences in absolute frequencies of condom use must be interpreted with caution for other reasons. Although some motels were clearly used mainly by sex workers and their clients, some couples who had non-commercial sex probably also used those motels, and some sex workers and clients might have visited motels used mainly for non-commercial sex. The difference in condom use between motels was, however, lessened rather than increased, and even the smaller difference was substantial.

We have previously investigated attitudes towards condom use in the general population of Managua.<sup>19,25</sup> Results show that men and women believe that condoms should be used mainly with sex workers to prevent sexually transmitted infections. The use of condoms for contraception was mentioned by about 50% of women but only by a few men. Similar results were seen in a survey of young people.<sup>26</sup> Condom use is, therefore, closely associated with sex workers. This finding was confirmed by the higher rate of condom use for commercial sex in the current study.

The effects of improving condom provision may seem small in relative terms but could be substantial in absolute terms. Our results show that making condoms available in rooms would increase use by an average of about 8% in the 19 motels studied. We recorded more than 6000 sexual encounters in 8 weeks on the 3 busiest days of each week. About half a million sexual encounters therefore take place in these motels alone every year, and up to a million encounters probably happen in the same period across all of Managua's motels. If the effect of condom provision in rooms was constant, about 80 000 additional sexual acts could be protected every year in Managua by this intervention.

Our results have important implications for HIV and AIDS prevention. First, study of intervention strategies to promote condom use is feasible in controlled trials that use an objective outcome to overcome the limitations of self-reported data on sexual behaviour. Agencies intending to invest in health education could, therefore, test the relative effectiveness of different materials before introducing intervention programmes. Studies similar to ours should be done in other countries, for example in Asia, to identify the most effective ways of promoting condoms in local high-risk settings and to monitor condom use over time. Second, a policy of making condoms discreetly available in motel rooms should be implemented widely through collaboration between motel owners, health authorities, and non-governmental organisations. This process requires monitoring, since it was already official policy in Managua, but was not being enforced. Finally, if the motels we studied are typical of motels used by

populations in urban Latin America, discreet condom provision will probably be an effective strategy for HIV and AIDS prevention in other cities.

#### Contributors

Matthias Egger and George Davey Smith conceived the study and wrote the study protocol. Josefina Pauw, Danilo Madrano, and Matthias Egger trained field workers and supervised data collection in Managua. Athanasios Lopatzidis did the statistical analyses. Matthias Egger wrote the first draft of the paper, and all investigators contributed to the final version of the paper.

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