Reducing Use of Injections Through Interactional Group Discussions: *A Randomized Controlled Trial*

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Objective: To determine whether "interactional group discussions" could reduce prescriptions of injections by physicians.

Study design: Randomized controlled trial.

Setting: Rural public health care facilities, North 24 Parganas district, West Bengal, India.

Subjects: 72 medical officers, 36 each in intervention and control groups.

Intervention: Interactional group discussions.

Outcome measure: Proportion of prescriptions including at least one injection.

Results: In the intervention group, 249 of 1,080 prescriptions (23%) included at least one injection compared with 79 of 1,080 prescriptions (7%) before and after the intervention, respectively. (RR: 0.32, 95% CI: 0.25-0.40). In the control group, 231 of 1,080 prescriptions (21%) included at least one injection before the intervention *vs* 178 of 1,080 prescriptions (16%) after the intervention (RR 0.77, 95% CI: 0.65-0.92).

Conclusion: Interactional group discussions reduce prescription of injections.

Keywords: *India, Injection use, Interactional group discussion, Public health care facilities.*

In 2000, in transitional and developing countries, 16 billion injections were given (95% therapeutic)(1-3). Of these, 40% were given with reused devices, accounting for 40%, 30% and 2% of new hepatitis C virus, hepatitis B virus and HIV infections, respectively(3). High rates of injection use amplify transmission of blood borne pathogens(2,4). Thus, reducing injection use is key to prevent injection-associated infections(5-7).

Some patients prefer injections(8-9). However, qualitative research suggests that prescribers overestimate the preference for injections among patients, and that in most cases, patients are open to use of oral medications(10,11). In fact, the second International Conference on Improving Use of Medicine (ICIUM) underlined that prescribers are the key target for interventions to reduce injection use(6). In 1992, the first "interactional group discussions" intervention study conducted in Indonesia suggested that physicians prescribe fewer injections when confronted with the actual absence of preference for injections among patients(12). As a result, WHO designed an "interactional group discussions" intervention guide that could be applied to countries facing injection-associated infections(11-15).

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In India, many therapeutic injections are unnecessary and unsafe(16-23). We conducted a study to determine whether an "interactional group discussions" intervention was effective at reducing injections use among public sector medical officers in India.

METHODS

Study population: Medical officers, formally trained with MBBS degree, working in government rural health care facilities of the North 24 Parganas district, West Bengal, India.

Operational definitions: A therapeutic injection was defined as a skin-piercing procedure performed with a syringe and needle to introduce a curative substance into a patient by the intramuscular, intravenous or subcutaneous route. We excluded blood transfusions, surgery, tattoos and vaccines.

Study design: We conducted a randomized controlled trial from June to November 2007. The study consisted of three stages: (*i*) a pre-intervention prescription survey; (*ii*) the "interactional group discussions" intervention four weeks later during which medical officers were confronted to community members (who according to past experience with the method usually express to prescribers their absence of preference for

injections); and (*iii*) a post-intervention prescription survey two months later. We randomized medical officers to the intervention and control groups using a computer-generated random number list and used quality assurance procedures to prevent any mix-up after randomization. While we made use of qualitative methods for the intervention, the study was quantitative in nature as we aimed at measuring a reduction in injection use. We conducted seven interactional group discussions to distribute medical officers in groups small enough to interact with community members.

Sampling: We sampled medical officers on the employment list from the 135 working in rural facilities (*i.e.,* block primary health centres and primary health centres) (*Fig. 1*). For each selected medical officer, we sampled every third prescription on the day of the survey. We calculated the sample size on the basis of the number of prescriptions to be analyzed before and after the intervention, using the Epi Table Software. Our
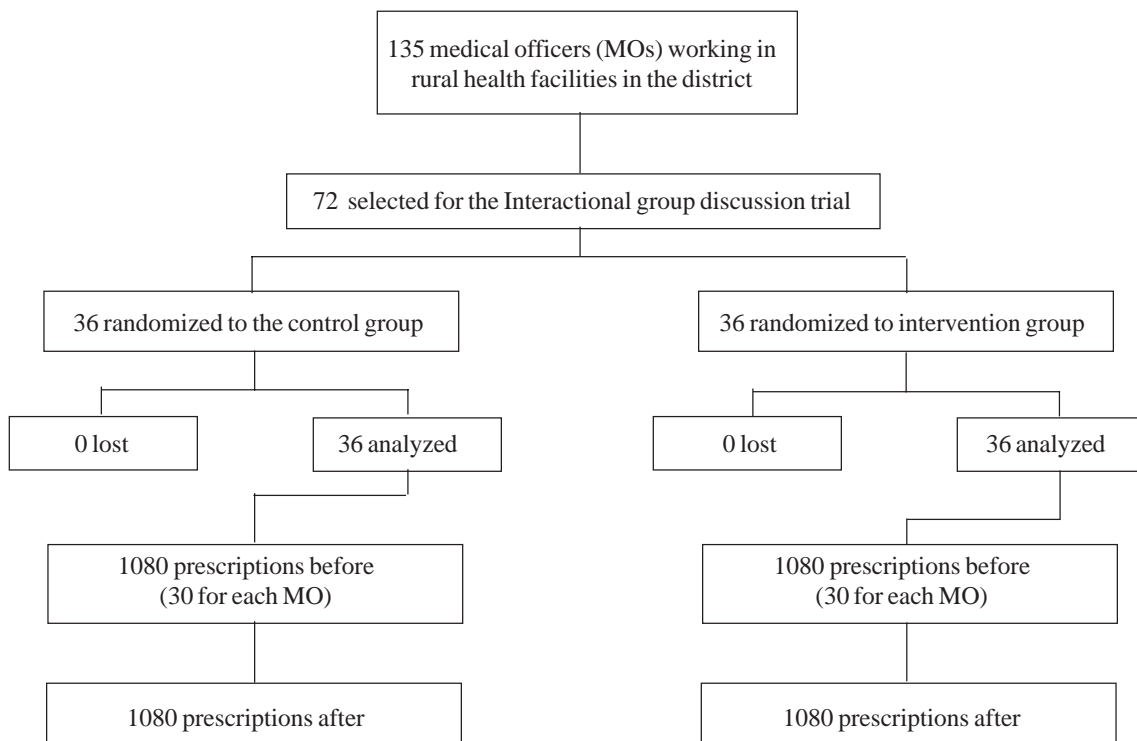
FIG. 1 *Diagram summarizing the randomized controlled trial.*

assumptions included a proportion of prescriptions including at least one injection of 50% and 40% before and after the intervention, respectively; an alpha error of 5% and a power of 99%. As the software generated an estimate of 925 prescriptions, we anticipated 5% of non-response and therefore aimed at surveying 971 prescriptions before and after, for the intervention and the control group. To round up and obtain an even count, we included 30 prescriptions for 36 medical officers in the intervention and control groups, before and after ($30 \times 36 = 1,080$, twice)

Data collection and analysis: Health workers unaware of the intervention/ control status surveyed prescriptions of medical officers from outpatient register without interviewing the medical officer. The principal investigator verified 15% prescriptions. We calculated the crude frequency of prescriptions, injections, the WHO "OT8 indicator" (i.e., the number of prescriptions including at least one injection), the effect size [(% after - % before) intervention – (% after - % before) control] and relative risks. We tested the significance of the differences in the ratio of injections per 100 prescriptions before and after in the two groups using a paired MacNemar Chi square(24).

Human subjects protection: We explained the voluntary nature of participation and collected written informed consent from participants, including medical officers (who were the target of the intervention) and community members who took part in the discussions. We ensured confidentiality through codes. The ethical committee of the National Institute of Epidemiology, Chennai cleared the protocol.

RESULTS

Age and sex distribution was comparable in the control and intervention group (mean (±SD) age: 35 (±6.3) y *vs* 35 (±7.3) y; M:F ratio: 33.3 *vs* 31.5; respectively). Overall, 17% of outpatients were under 15 age group. Before the intervention, there were 37 injections per 100 prescriptions in the intervention group versus 33 in the control group (*Table* I). Commonly prescribed injections included antiemetics, H_2 blockers, antibiotics and vitamins.

After the intervention, the ratio of injections per 100 prescriptions decreased to 11 and 21 per 100, in the intervention and control groups, respectively ($P = 0.009$). The proportion of prescriptions including at least one injection decreased in both the intervention and control group (Effect size: -11%). However, in the control group, the reduction was larger among the 15 medical officers who shared their assignment location with a medical officer who was part of the intervention group than among 21 others (RR: 0.47, 95% CI: 0.36 – 0.63 *vs*. RR: 1.1, 95% CI: 0.86-1.4, respectively).

DISCUSSION

Before the intervention, a high proportion of prescriptions included injections in both the intervention and control groups. After intervention, the proportion of prescriptions including at least one injection reduced significantly in both groups. However, the decrease was more marked in intervention group. Furthermore, in the control group, the reduction was more marked among medical officers who were assigned at a facility where a medical officer of the intervention group worked.

TABLE I PROPORTION OF PRESCRIPTIONS INCLUDING AT LEAST ONE INJECTION BEFORE AND AFTER THE INTERVENTION

Stage of the study	Proportion of prescriptions including at least one injection		
	Intervention group (n=1080) No. (%)	Control group (n=1080) No. (%)	Relative risk (95% CI)
Pre-intervention	249 (23)	231 (21)	1.1 (0.92-1.3)
Post-intervention	79 (7)	178 (16)	0.44 (0.35-0.57)

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WHAT IS ALREADY KNOWN?

- "Interactional group discussions" between patients and prescribers is an effective strategy to reduce use of medical injections.

WHAT THIS STUDY ADDS?

- "Interactional group discussions" were effective in reducing prescriptions of injections among medical officers in West Bengal, India.

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Unsafe and high level of use of injections has been reported previously in India(16-23). The effectiveness of our intervention is consistent with the results of similar "interactional group discussions" intervention studies conducted in Indonesia(12), Pakistan(13) and Cambodia(14). In 1992, a controlled trial in Indonesia led to a significant decrease in injection use in the intervention group compared to the control group. However, in that study, there was also a decrease in injection frequency in the control group, probably as a result of a contamination of the intervention to the control group(13). More recently, in Pakistan(25, 26), an intervention in a different target group -the informal private sector-led to a significant reduction of injection use in the intervention group in the absence of change in the control group(14). A similar study in Cambodia led to a reduction in injection use in the intervention group while there was no change in the control group(27).

The difference of effect between the intervention and the control group was lower (–11%) in our study, than in Indonesia (–19%), Pakistan (–32%) and Cambodia (–20 to –23%). A reduction in the proportion of prescriptions including at least one injection in the control group in our study may partly explain this smaller effect size. In the control group, the reduction of injection use mostly occurred among those who shared their health care facility of assignment with a medical officer of the intervention group. This finding supports the hypothesis of a contamination of intervention, as was the case in the Indonesian study(12). This contamination is a limitation of our study from a methodological standpoint (although observing an effect despite the contamination that would dilute it suggests that the effect does occur). However, from a public health standpoint, it suggests that communication of results of the "interactional group discussions" can be beneficial by itself, even though a prescriber did not participate personally in the discussions.

Our study had two main limitations. First, the post-intervention survey was conducted only once. Unlike the Indonesian study, we were unable to conduct those at regular intervals for a prolonged period to assess the sustainability of the intervention. As a result, we could not conclude about the sustainability of the effect we measured. Second, our post-intervention prescription survey was based on outpatient registers only and was not validated by observations. Thus, we could not exclude that the difference among groups exposed and unexposed to the intervention was in fact a consequence of a desire to satisfy the interviewer or of an observer-induced bias ("Hawthorne effect"). However, even if that was the case, the differences in two groups suggest that the intervention was at least successful in communicating the acceptable standards to the target audience.

Our results support the findings of three comparable trials in other countries and suggest that 'interactional group discussions" were also effective as an intervention to reduce prescriptions of injections in the rural public health care facilities in West Bengal, India. Our study also suggested that prescriber-to-prescriber dissemination of the outcome of discussions could be effective by itself in reducing injection prescription habits. On the basis of these conclusions, we recommended scaling up similar intervention through "interactional group discussions" sessions for more medical officers. Dissemination of this message should help reducing injection use and prevent injection-associated infections.

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