

PDFlib PLOP: PDF Linearization, Optimization, Protection

**Page inserted by evaluation version
www.pdflib.com – sales@pdflib.com**

Consequences of over-prescribing on the dispensing process in rural Nepal

Kathleen A. Holloway and Bharat R. Gautam

The Britain Nepal Medical Trust, Morang, Nepal

Summary

OBJECTIVE To investigate the effect of increasing numbers of drugs prescribed on the dispensing process in rural Nepal.

DESIGN Cross-sectional survey, on average 25 exiting patients per facility in 33 government health facilities.

OUTCOME MEASURES Percentage of cases where there was a dispensing error, and where the patient knew the dosing schedules of the dispensed drugs.

RESULTS A greater number of drug items prescribed and dispensed per patient was significantly associated with a greater percentage of cases where there was a dispensing error ($P = 0.00000$), and where the patient did not know the dosing schedules of the dispensed drugs ($P = 0.00000$).

CONCLUSION The prescribing (and dispensing) of more drugs per patient, an indication of over-prescription, is associated with significantly poorer dispensing.

keywords prescribing, dispensing, developing countries

correspondence K. A. Holloway, Policy Access and Rational Use, Department of Essential Drugs and Medicines Policy, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland.
E-mail: hollowayk@who

Introduction

Over-prescription has often been described (Laing 1990; Hogerzeil *et al.* 1993) and its wastefulness and potential for unnecessary toxicity and side-effects deplored. The effects of over-prescription on the dispensing process have rarely been reported. Assessing prescribing quality, especially in developing countries, is very difficult; however the average number of drug items prescribed per patient can give an indication of the degree of over-prescription that may be present. This study examined the effects of the number of drugs prescribed and dispensed per patient with regard to the two major outcomes of the dispensing process, namely, whether the correct drugs were dispensed in the correct amounts and whether patients had correct knowledge of their dosing schedules immediately on exiting the health facility. The study took place in Nepal, a very poor developing country where health care is undermined by lack of human resources and drugs, and most prescribing is done by paramedical workers with one year of training (Tamang & Dixit 1992; World Bank 1993; Holloway 1999). Despite the lack of drugs, irrational

prescribing and over-prescription have been well documented in rural Nepal, including the area in which this study took place (Fryatt *et al.* 1994; Chalker 1996; Holloway & Gautam 1997).

Methods

A cross-sectional survey was conducted from 1995 to 1996 in all 33 government health facilities in three districts, Bhojpur, Taplejung and Panchthar, where a charitable organization, the Britain Nepal Medical Trust, supplied supplementary essential drugs. Only drugs belonging to the national Essential Drug List of Nepal (Department of Drug Administration 1992) were available and drug availability was uniform across districts with an average of 1-2 (10%) of 13 therapeutic drug groups being out of stock (Holloway & Gautam 1997; Holloway 1999). The health facilities consisted of one hospital and 9-11 health posts in each of the three districts. Between 15 and 100 (on average 22 per health post and 100 per hospital) consecutive patients per health facility were interviewed. 1.8% of patients refused interview mainly due to shortage of time.

K. A. Holloway and B. R. Gautam **Prescribing more drug items and the dispensing process**

The interviews took place outside the facilities, immediately after patients came out with their medicines. We observed a random sample of interviews and found an error rate of 1.6% (77/4905) for the manner in which interviewers asked questions or interpreted patients' answers or in what they recorded concerning the patients' drugs.

This study was part of a much larger one (Holloway 1999) which examined patient socio-economic characteristics and attitudes towards drugs as well as quality of care. Due to this reason and the fact that much of the study area was 2-3 days' walk from the nearest road, the survey was conducted over five months and local interviewers (with no previous knowledge of drugs) were trained over one month. All the prescribers and dispensers in the health facilities visited were aware of the study and the patient interviews, and were given feedback concerning the findings.

The type and quantity of drugs recorded on the patient's prescription were compared with what had been dispensed to the patient and patient knowledge concerning dosing schedules. A dispensing episode was classified as containing an error if there was any discrepancy for any drug, between what was written on the prescription and what was in the patient's hand, concerning drug name, dosage form, and total amount. A patient was classified as having incorrect knowledge of the dosing schedule if there was any discrepancy for any drug, between what was written on the prescription and what the patient could tell the interviewer, concerning number of units (e.g. tablets) per dose, number of doses per day and number of days duration of any drugs in the patient's hand. The following cases were excluded from the analysis: patients that were not prescribed any drugs; drugs that were prescribed but not dispensed – this was either due to unavailability or due to the patient refusing to pay a small user fee (equivalent to about 25%

of the average daily household income) covering a full course of treatment for each drug item for two items (Holloway & Gautam 1997); cases receiving injections because the administration of injections could not be observed; cases where the drugs given to the patient could not be identified due to lack of labelling (which was not done adequately in any facility), and, finally, cases where the prescription could not be read.

After each interview any dispensing errors or incorrect patient knowledge were corrected. The proportion of episodes where drugs were dispensed incorrectly and patients had incorrect dosing knowledge were estimated and then analysed in association with the number of drug items prescribed and dispensed per patient, using the Chi-squared test for trend. In addition, the World Health Organization (WHO) prescribing indicators (WHO 1993) were estimated from the data in order to gain some idea of prescribing quality and to compare with studies reported elsewhere.

Results

Nine-hundred and forty-three interviews were conducted in total, but 30% were excluded from the analysis due to the reasons given above. In total 1961 drug items were prescribed and 1635 items dispensed. Drugs were dispensed incorrectly in 13% of dispensing episodes and patients had incorrect knowledge of their dosing schedules in 45% of episodes. Overall, there was an error in either patient knowledge or a dispensing error in 49% of dispensing episodes.

Table 1 shows that the greater the number of drug items per patient prescribed and dispensed, the greater the number of dispensing episodes where drugs were dispensed incorrectly ($P = 0.00000$), and where exiting patients did not know their dosing schedules ($P = 0.00000$). A dis-

Table 1 Dispensing episodes where there was a dispensing error and patient incorrect dosing knowledge as a function of the number of items dispensed

Number of drug items dispensed per patient	1	2	3	4+	Significance ²
Dispensing errors 90/669 (13.4%)	12/218 (5.5%)	41/303 (13.5%)	30/127 (23.6%)	7/21 (33.3%)	$\chi^2 = 27.16$ $P = 0.00000$
Patient incorrect knowledge ¹ 290/648 (44.8%)	57/208 (27.4%)	133/300 (44.3%)	83/120 (69.2%)	17/20 (85.0%)	$\chi^2 = 66.29$ $P = 0.00000$
Dispensing error or patient incorrect knowledge 326/666 (48.9%)	65/223 (29.1%)	151/296 (51.0%)	91/124 (73.3%)	19/23 (82.6%)	$\chi^2 = 74.35$ $P = 0.00000$

¹ For drugs (e.g. antibiotics) where duration is critical, it was regarded as correct if a patient stated that s/he should finish all the drug but did not know the number of days.

² Similar statistically significant trends were observed in each individual district with regard to patient knowledge of dosing schedules, but there were insufficient numbers of dispensing errors to make any separate estimations for individual districts.

dispensing error occurred in 5.5% of episodes where one drug was dispensed, but in 30.0% of episodes where four or more drugs were dispensed. Similarly, 27% of patients had incorrect dosing knowledge when one drug was dispensed, but 83% of patients when four or more drugs were dispensed.

The dispensing errors consisted of dispensing too large a quantity (44.9%), dispensing too small a quantity (47.6%) and dispensing the wrong drug (7.5%). The most serious cases of wrong drugs being dispensed included two cases where aspirin was dispensed instead of cotrimoxazole, one case of vitamin B complex instead cotrimoxazole, two cases of cotrimoxazole instead of aspirin and one case of a nonidentified item instead of tetracycline. Interestingly, the drugs which were dispensed in insufficient quantities did not include antibiotics. The errors in patient knowledge concerned the number of tablets to be taken at any one time (15.8%), the number of times per day to take the medicine (21.4%), the duration (30.0%), the mode by which to take the medicine (0.5%) and multiple errors (32.3%).

WHO indicators of prescribing (WHO 1993) are shown in Table 2. The proportion of patients prescribed no drugs was 5.5%, one drug 20.3%, two drugs (41.1%) and three or more drugs (32.8%). The proportion of patients dispensed no drugs was 8.8%, one drug 31.6%, two drugs 40.1%, and three or more drugs 19.5%. Overall 83.3% of all prescribed drugs were dispensed.

Conclusions

The results show that the prescribing and dispensing of more drug items per patient was associated with significantly poorer dispensing in terms of dispensing errors and patient knowledge of dosing schedules. Although the majority of patients in this study were prescribed and dispensed one or two drugs, a significant proportion (20%) were prescribed and dispensed three or more drugs, with

serious levels of error either in the drugs dispensed or the patient knowledge of dosing schedules.

The prescribing quality as indicated by the average number of items prescribed per patient and the proportion of patients prescribed antibiotics is similar to that reported elsewhere for this area of Nepal (Fryatt *et al.* 1994; Chalker 1996; Holloway & Gautam 1997). Two of these other studies are particularly relevant for assessing the degree of over-prescription that may be present in the authors' study. Firstly, Chalker (1996) calculated from morbidity data that on average only 1.3–1.4 items per patient should be prescribed and that only 22–27% of patients needed antibiotics; in his study patients were actually prescribed an average of 1.7–2.5 drugs and 30–67% of patients were prescribed antibiotics. Secondly, Holloway & Gautam (1997) estimated that only 26–48% of prescriptions across the Bhojpur, Taplejung and Panchthar districts conformed to Nepali Ministry of Health standard treatment guidelines (Department of Drug Administration 1993)¹, and that 22–49% of the reasons for nonconformation was the prescription of two or more unnecessary drugs (Holloway 1999). The proportion of patients prescribed injections in the authors' study is lower than that described elsewhere and this may have been due to a 'Hawthorne effect', since prescribers knew that the researchers wished them to prescribe fewer injections.

In summary, this study shows that the two major outcomes of the dispensing process, i.e. whether the correct drugs were dispensed in the correct amounts and whether patients knew the dosing schedules of the drugs dispensed, became significantly poorer as more drug items were prescribed and dispensed per patient. It is likely that there was a significant level of over-prescription, particularly for a proportion of the patients who were prescribed three or more items. Similarity of patient and health worker characteristics across districts (Holloway 1999) supports the generalisability of these findings to elsewhere in Nepal. Since the quality of care and prescribing in Nepal is similar to that of many other developing countries (Hogerzeil *et al.* 1993; Quick *et al.* 1997), the findings may be valid for countries where the population is largely illiterate and labelling is not routinely performed.

Though it may be argued that the unnecessary prescription of harmless drugs, e.g. multivitamins, does little patient harm (apart from wasting public or private money), this study would indicate otherwise. The addition of more nonessential drugs to a prescription may reduce the chance that the essential ones are correctly dispensed or taken. This hazard may be even greater in many countries, particularly in urban areas, where the average number of drug items prescribed per patient is considerably higher

Table 2 WHO prescribing indicators

WHO indicator of prescribing	Finding
Average number of drug items per patient prescribed	2.08
Average number of drug items per patient dispensed ¹	1.73
% patients prescribed antibiotics	52.7%
% patients prescribed injections	11.6%

¹ The average number of drug items dispensed per patient in the three districts Panchthar, Taplejung and Bhojpur was 2.0, 1.4 and 1.8, respectively, and the proportion of prescribed items dispensed was 81%, 88% and 82%, respectively.

and the variety of drugs available very much greater than in this study.

Acknowledgements

The study was funded by the Inter-Church Organization for Cooperation (ICCO), Amsterdam, The Netherlands, and by John Snow Incorporated, Kathmandu, Nepal. For advice concerning the analysis and writing up of this research we thank Professor Trudy Harpham, Professor Ann Taket and Barnaby Reeves. Hans Hogerezeil and Marthe Everard read drafts and offered advice. Yam Bahadur Gurung, Sitaram Thapa and Gokul Mishra supervised the interviewing of patients, and Ramesh Pradhan, Minu Bhattarai, Gokul Thapa and Narayan Yakso entered the data. For looking after the authors, including the carrying of baggage on field trips, we are grateful to Mongol Singh Limbu and Vishnu Limbu. Professor Andrew Herxheimer gave support that was instrumental in bringing about this research. We thank the Nepali government health workers who wrote the prescriptions analysed in this research, and all the patients who were interviewed.

References

- Chalker J (1996) Effect of a drug supply and cost sharing system on prescribing and utilisation: a controlled trial from Nepal. *Health Policy and Planning* 10, 423-430.
- Department of Drug Administration (1992) *National List of Essential Drugs Nepal (First Revision)*, Ministry of Health, Katmandu.
- Department of Drug Administration (1993) *Standard Treatment Schedule for Health Posts, Nepal*. Ministry of Health, Katmandu.
- Fryatt RJ, Rai P, Crowley SP & Gurung YB (1994) Community financing of drug supplies in rural Nepal: evaluating a "fee per item" drug scheme. *Health Policy and Planning* 9, 193-203.
- Hogerzeil HV, Ross-Degnan R, Laing RO *et al.* (1993) Field tests for rational drug use in twelve developing countries. *Lancet* 342, 1408-1410.
- Holloway KA (1999) *The Effects of Different Kinds of User Fee on the Quality of Prescribing in Rural Nepal*. PhD Thesis, Southbank University, London.
- Holloway K & Gautam G (1997) Study of the effects of different charging mechanisms on rational drug use in eastern rural Nepal. *Journal of the Institute of Medicine, Nepal* 19, 89-97.
- Laing R (1990) Rational drug use: an unsolved problem. *Tropical Doctor* 20, 101-103.
- Quick J, Rankin J, Laing R *et al.* (1997) *Managing Drug Supply*. Kumarian Press. USA.
- Tamang AK & Dixit SB (1992) *Knowledge, Attitude and Practice towards Health and Essential Drugs in rural Nepal*. His Majesty's Government, Ministry of Health, Nepal, and UNICEF, New York, USA.
- World Bank (1993) *World Development Report 1993: Investing in Health*. Oxford University Press. New York.
- World Health Organization (1993) *How to Investigate Drug Use in Health Facilities, Selected Drug Use Indicators*. WHO, Geneva. WHO/DAP/93.1.