PharmAware

Creating professional + ethical doctors

Interactions between the pharmaceutical industry and health professionals:
The impact of drug promotion on prescribing decisions

A consultation document for PharmAware UK campaign working group

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Table of Contents

Abbreviations	
ABPI	Association of the British Pharmaceutical Industry
BNF	British National Formulary
DTB	Drugs and Therapeutics Bulletin
FDA	Food and Drugs Administration
GP	General Practitioner
HAI	Health Action International
MIMS	Monthly Index of Medical Specialties
PPA	Prescription Pricing Authority

1. Search Strategy

An Ovid Medline search was conducted using the search terms *Advertising*, *Continuing Education, Drug Information Services*, *Drug Industry*, *Health Personnel*, *Drug Prescriptions*, *Great Britain* mapped to subject headings, and *drug representatives* as a keyword search. Results were restricted to the last five years and selected according to their relevance.

Further evidence was obtained by cross-referencing citations from relevant studies. In particular, the evidence-base drew substantially upon the vigorous WHO/HAI strategic review *Drug promotion: what we know, what we have yet to learn* (Norris P et al, 2005). The main body of evidence in this field comes from North America, however, only those studies considered relevant to the UK context were included in this review. The literature search was limited by difficulty in accessing some specialised journals and unpublished reports.

2. Introduction

There is an enormous disparity between public and commercial sector expenditure on drug information. In 2005, the House of Commons Health Committee estimated that the Department of Health spends £4.5 million annually on providing independent drug information to prescribers. This figure is dwarfed by the estimated £1.65 billion a year spent by the UK pharmaceutical industry on drug promotion and marketing (House of Commons Health Committee, 2005). It is therefore unsurprising that the evidence described in this review points to a heavy reliance by prescribing health professionals upon commercial sources of drug information, in particular the 8,000 pharmaceutical representatives operating in the UK. In spite of the availability of independent drug information, the shear volume, targeted approach, and accessibility of the media employed by the commercial sector enable the industry to disproportionately influence prescribing decisions.

When commercial drug information is appropriate and critically appraised it may have the potential to play a positive role in public health. However, a grave conflict of interest is apparent in the current interactions between health professionals and the pharmaceutical industry. Prescribing decisions are frequently heavily, even solely, informed by as source whose primary motivation is profit, not health. Furthermore, prescribing decisions are clouded by marketing techniques, such as instilling reciprocity through gifts and hospitality. This report identifies serious shortcomings in the methods used to regulate drug promotion in the UK. Regulation of drug promotion largely relies on voluntary, self-regulatory guidelines issued by the pharmaceutical industry and medical bodies, with limited government control. Non-statutory guidelines issued by medical bodies are difficult to enforce. The WHO highlights that trade associations, such as the ABPI, are primarily concerned with increasing profit and deterring anti-competitive practices. Their voluntary codes are therefore deliberately non-specific and lack meaningful sanctions.

The evidence suggests that drug promotion leads to less rational prescribing. In particular, vigorous marketing of new drugs leads to their prescription without adequate knowledge of their safety in the community, their therapeutic benefits or their cost-effectiveness compared with the older drugs they replace. The link between exposure to drug promotion and higher prescribing

costs, described in this report, has major implications for public health in the context of a rationed health service. The purpose of this review is to generate recommendations for use by Hospital and Primary Care Trusts in order to better regulate drug promotion to health professionals.

3. The role of the commercial sector as a source of drug information

3.1 Accuracy of promotional drug information

Zeigler et al (Zeigler M et al, 1995) quantified the inaccuracies in pharmaceutical representatives presentations by analysing 106 statements made during 13 presentations. 11% of the statements were inaccurate in favour of the promoted drug. Of the 15 statements about competitors' drugs, none were favourable. 49% of accurate statements about the promoted drugs were favourable, 31% were neutral and 15% were unfavourable. A questionnaire was distributed to a sample of 27 residents who had attended the presentations. Only 26% of residents recalled having heard a representative make an inaccurate claim.

Avorn el al (Avorn et al, 1982) examined the contribution of scientific and commercial sources on drug use by comparison of physician's beliefs on two very similar drugs, one prescription and one available over the counter. Both drugs have high levels of commercial advertising and poor scientific evidence to help eliminate self-reporting bias. Those physicians who believed that the drugs were effective stated that their information was most likely to come from scientific sources. Physicians who believed the prescribed drug to be effective were also more likely to find the over the counter drug more effective. 68% of physicians believed commercial sources had little effect on their prescribing habits and 54% believed pharmaceutical representatives were minimally important in choosing prescriptions (Avorn et al, 1982). In comparison 62% believed scientific evidence was very important in influencing their prescribing choice. However, 88% believed that training and clinical experience was the most important factor in their prescribing habits.

The inaccuracy and selective bias of promotional drug information have been demonstrated (Zeigler et al, 1995 and Avorn et al, 1982). Given this situation, it is pertinent to investigate the extent to which prescribers rely upon biased commercial information sources in their clinical practice.

3.2 Value of promotional drug information

McGettigan et al (McGettigan P, 2001) investigated the importance of different information sources on doctors' prescribing. 200 GPs selected randomly from a national register and all prescribing hospital doctors (n=230) working in three teaching hospitals were asked to rate the relative importance of a range of information sources for prescribing "new" and "old" drugs. Amongst GPs, academic references, such as the Drugs and Therapeutics Bulletin and medical journals, were the most frequently cited sources. Pharmaceutical representatives were important for 62% of GPs for "new" drugs and 26% for "old" drugs. Amongst hospital doctors, the BNF was most valuable for "old" drugs and senior colleagues for "new" drugs. Pharmaceutical representatives were important for 47% of hospital doctors for "new" drugs and 18% for "old" drugs. Both GPs and hospital doctors more frequently cited academic references and colleagues as important sources of prescribing information than commercial sources. However, the paper

revealed that, in practice, pharmaceutical representatives are more heavily utilised than doctors realise. GPs are more likely than hospital doctors to underestimate the relative influence of pharmaceutical representatives, which may reflect lower reliance on advice from colleagues due to different social networks in the working environment. This difference between theory and practice may indicate that doctors are unaware of the extent to which commercial information sources influence their prescription decisions.

A 1974 survey of USA doctors undertaken by the FDA (Moser R, 1974) revealed that 64% of all doctors and 80% of general practitioners and paediatricians used materials provided by pharmaceutical representatives as a source of drug information. Additionally, package inserts and journal advertisements were commonly used. Personal contact with representatives was used as an information source by 61%. Doctors also valued information from other personal contacts, including consultants, clinical meetings and courses, as well as journals and periodical newsletters. Although preferences for information sources may have changed since this survey, the large sample size of almost 15, 000 physicians makes it a valuable source.

There is some evidence that there is a difference in the source of drug information between different ages of doctors. McCue et al (McCue J et al, 1986) found that commercial sources of drug information were thought to be less accurate than non-commercial sources, but were still more frequently used. Doctors who had been practising for longer than 15 years were more likely to use pharmaceutical representatives as a source of drug information. Similarly, Murray-Lyon's survey of 131 GPs in Scotland (Murray-Lyon N, 1977) found that those who qualified between 1950-1959 ranked pharmaceutical representatives first as their preferred source of drug information and medical journals second. The reverse was true for those who had qualified after 1960. It seems possible that these differences may be due to cultural attitudes and habits instilled during medical training.

Strickland-Hodge and Jeqson (Strickland-Hodge, B. and Jeqson, M, 1980) found that longer-qualified GPs cited industrial sources of information as being useful significantly more often than those who had qualified more recently. This may be due to differential preference for two publications: MIMS, an industry-derived reference, was cited more often by longer-qualified doctors; whilst the DTB was significantly rated more useful by more recently qualified doctors, who would have received the publication without subscription since 1976.

In the above studies the relationship between drug promotion and prescriber knowledge is self-reported. Studies measuring self-reported reliance on commercial information sources provide evidence about doctors' perceptions of where their knowledge of drugs comes from, and may not be an accurate indication of the actual influence of the pharmaceutical industry on doctors' knowledge. A review by Williams et al (Williams R et al, 1991) concluded that the relative importance of commercial sources of drug information for physicians had declined in the USA over the latter half of the twentieth century. However, it has been suggested that this is more likely to reflect the decreasing social acceptability of reliance on commercial sources, and hence a decline in self-report, rather than a real trend in utilisation of such sources (Norris P et al, 2005). The following study measures self-reported knowledge and attitudes following a known exposure to drug promotion. This approach establishes a concrete relationship between exposure

to drug promotion and the uptake of knowledge, though the measurement of knowledge is still limited by the self-report method.

Spingarn et al (Spingarn R et al, 1996) used a retrospective cohort study design to evaluate the effect that a pharmaceutical grand round presentation had on the knowledge and attitudes of attendees. 75 house officers, of whom 22 had attended the presentation on Lyme disease, were followed up three months later with a questionnaire. They were asked to identify a suitable drug therapy for four different hypothetical presentations of Lyme disease. Attendees were more likely to name a more expensive, parenteral therapy for the advanced cases of Lyme disease in which it is indicated. However, they were also significantly more likely to inappropriately name this therapy for milder cases, when a cheaper oral antibiotic is indicated. Attendees were also more likely to name the cephalosporin manufactured by the speaker's pharmaceutical company than non-attendees. These findings were in spite of the fact that the presentation had been factually accurate and the speaker had referred to the cephalosporin by its generic name for the majority of the presentation. Furthermore, although the speaker had been introduced as an executive of the pharmaceutical company, most house officers denied being aware of this affiliation during follow-up. The authors observed that "*even if not biased, education so supported may still be preselected*", speculating that the inappropriate prescribing knowledge may have arisen from the disproportionate time spent by the speaker in discussing those infrequent, advanced cases of Lyme Disease that would require the cephalosporin.

Conclusions

- *Promotional drug information is often inaccurate and selectively biased*
- *Doctors are more likely to rely upon commercial information for the prescription of new drugs than older ones*
- *GPs are more likely than hospital doctors to cite pharmaceutical representatives as a useful source of information*
- *Pharmaceutical representatives are the most frequently cited source of information about drugs*
- *Doctors qualified for longer are more likely to cite commercial information as sources of drug information than more recently qualified ones*
- *Even when information provided by commercial sources is accurate, its selectivity may still lead to inappropriate prescribing decisions*

4. The role of drug promotion in adopting new drugs

Prescription of drugs without critical analysis of the evidence for its efficacy and safety has obviously harmful outcomes for the health of individual patients. Furthermore, heavily promoted new drugs are often the most expensive, and prescribing which is not cost effective is harmful to the health of the whole population in the context of a rationed national health service. Several studies indicate that the pharmaceutical representatives facilitate a more rapid uptake of new drugs. Some view this in a positive light as it may improve patient access to innovative therapies. However, the majority of "new" products are in fact "me too" drugs, providing limited additional health benefit to existing products, and inflating prescription costs when cheaper alternatives are available. Decisions to prescribe such "new" drugs are largely motivated by psychosocial factors influencing doctors, rather than the biomedical needs of patients. In this light a more conservative approach to the uptake of new therapies is economically desirable, in order that resources may be allocated according to the health needs of the population.

Strickland-Hodge and Jeqson (Strickland-Hodge, B and Jeqson, M, 1980) used a questionnaire to investigate the relative usefulness of various sources of drug information reported by 252 GPs in the UK. The importance of each source was analysed at two stages: the "awareness" of a new drug and the "evaluation" of a new drug. There was a marked difference, with industry-derived sources, primarily representatives, being used almost exclusively at the awareness stage, and professional sources including medical journals and consultant recommendations dominating the evaluation stage. The information sources were ranked into "active" and "passive", depending on whether the information had been actively sought. Passive sources were ranked more useful in becoming aware of the existence of a new drug, while active sources were also used at the evaluation stage.

A more recent study indicates that GPs rely heavily on pharmaceutical representatives for both awareness and evaluation of new drugs and that, in many cases, little evaluation of the drug occurs before prescribing. Prosser et al (Prosser et al, 2003) collected data from 107 GPs in two health authorities, including high, medium and low prescribers of new drugs. A critical incident interview technique was used to obtain factual accounts of the decision process involved in prescribing new drugs. 616 critical incidents were analysed, where the prescribing event had been an internal decision by the GP rather than "proxy" prescribing for consultants. The first stage in the decision was awareness of the new drug; the pharmaceutical industry was the initial information source in 49% of events, most frequently in the form of a representative. This compared to professional contacts in just 13% of events and academic or professional literature in just 17% of events. Exposure to drug information was generally reactive and opportunistic; GPs rarely performed an active information search to support their decision. Evaluation of the drug, the next stage in the decision, involved multi-factorial influences from several sources. Professional colleagues, patient acceptability, literature, cost, and biomedical factors were all important. However, the most frequently cited influence at this stage was, again, the pharmaceutical representative (39%). It is of concern that in 37% of cases, the initial informant, usually a representative, was the sole information source consulted in the prescription decision, without recourse to academic literature. The reasons cited referred to a lack of time, information overload, and lack of skills for interpretation of scientific literature, as well as a preference for relying on personal clinical experience. The perceived credibility of the information source

emerged as an important factor in its influence. Hospital consultants played a major role in leading GPs opinions about new drugs, particularly when they were known and respected. Little interchange occurred within the primary care team itself. Long-standing and trusting relationships with pharmaceutical representatives also lent perceived credibility to this source. The critical incident technique for defined events used in this study reduces the limitations subjective recall, though social desirability bias may have affected the responses.

Taylor and Bond (1991) examined the first time prescriptions made by general practitioners and the influences there are behind these prescriptions. Any changes in the patterns were noted and influences behind these examined. Samples of one hundred prescriptions were tracked every seven to seven and a half weeks for a period of 12 months. The general practitioners were asked whether the prescription was new to their usual repertoire and if it was what influenced them to make this change. New drugs only accounted for 5.4% of the general practitioners prescriptions. The main influences for these changes in prescription were "limited list regulations, pharmaceutical company representatives and hospital doctors." The paper concluded that general practitioners were not overly induced into prescribing drugs due to pressure from commercial sources.

McGettigan et al (McGettigan P, 2001) asked UK doctors to recall their first exposure to information about a "new" drug that they had most recently prescribed. Among GPs, 42% cited pharmaceutical representatives as the first source of information, while a large proportion also cited recommendations by hospital consultants. Among hospital doctors, 18% cited pharmaceutical representatives while a large proportion had relied on information from senior colleagues and clinical meetings. Both groups relied substantially on pharmaceutical representatives for information to prescribe "new" drugs, but GPs were significantly more likely to do so. Pharmaceutical representatives were more influential in prescribing a new drug than other commercial sources such as sponsored meetings or journal advertisements. Hospital doctors were significantly more likely than GPs to cite colleagues as the source of information for the last prescribed "new" drug, and consulted a wider range of resources, which may reflect the different social structure of the hospital working environment. Although academic references were rated highly as theoretically important sources of information, none of the GPs and only 2% of hospital doctors reported that the BNF had informed their latest decision to prescribe a "new" drug. None had used the DTB or MIMS, and only a small proportion had used medical journals. The more recently qualified GPs were more likely to have used a medical journal or a primary care colleague to inform their prescribing.

The authors suggest that a hierarchy of "communication media" may exist, whereby information from personal contacts is most successfully utilised, and unaddressed written documents are least successfully utilised. The hypothesis is supported by the greater reliance on pharmaceutical representatives, colleagues and clinical meetings over academic reference tools, journals and print advertisements for prescribing decisions. This suggests that the medium may be more important than the content of the message. The implication is that the pharmaceutical industry has long employed the most successful medium for communication while academia relies heavily on the least successful. Formal and informal networks for information sharing between hospital doctors may be the most important medium for communicating unbiased academic messages. Academic detailing by independent academic representatives has also been successful in some

instances and may present a useful way for academic messages to compete with, or even replace, commercial information.

In a rare qualitative study, Jones et al (Jones M et al, 2001) conducted semi-structured interviews with 38 consultants and 56 GPs in Birmingham to investigate their perceptions of the factors that influence their decisions to start prescribing new drugs, including attitudes to drug information sources. They were asked to comment on drugs they had prescribed from a predetermined list of eight new drugs, as well as any other new drugs they had recently introduced into their clinical practice. Commercial sources of information, in particular pharmaceutical representatives, were an important information source for both consultants and GPs. Consultants reported good personal relationships with pharmaceutical representatives; one describing a representative as *"an old friend"*. Consultants often said that representatives were useful for gaining sponsorship. Consultants frequently cited other information sources including academic literature, colleagues, and clinical meetings, while many GPs relied solely on information from representatives. GPs sometimes followed the lead of hospital consultants in their decision to introduce a new drug into their practice, and one cited an annual visit from a pharmaceutical adviser as a partial influence. Only a few individuals said that they did not see representatives. The DTB was the most popular source of independent information, highly regarded by most GPs. The BNF and MIMS were also sometimes consulted. GPs reported browsing medical journals in a haphazard manner, without any evidence of critical appraisal. Consultants' use of academic literature was often limited to articles provided to them by representatives.

Conclusions

- *Prescription of new drugs must rely on evidence of efficacy and safety to ensure that individuals and populations are being provided with the most effective treatments*
- *Pharmaceutical representatives are the most frequently cited source of initial information about new drugs by GPs*
- *Hospital doctors also cite pharmaceutical representatives as an important source of information, second to senior colleagues*
- *A large proportion of GPs prescribe new drugs solely on information from pharmaceutical representatives, without recourse to academic literature*
- *Doctors prescribing new drugs from outside their specialty are more likely to be influenced by pharmaceutical representatives*
- *Doctors are more likely to learn about new drugs from personal contacts, including representatives, colleagues and meetings, than from literature, suggesting a potential role for "academic representatives"*

5. Attitudes of health professionals towards drug promotion

Most evidence about attitudes towards drug promotion comes from survey data. This is often limited by low response rates. There is a deficiency in qualitative, in particular ethnographic, research on the subject. This research would provide a more nuanced understanding of health professionals' attitudes. Attention to attitudinal and behavioural 'risk factors' associated with irrational prescribing may illuminate the way for developing appropriate interventions, including regulation and education. However, doctors' reported attitudes towards prescribing and sources of drug information are not a good predictor of their behaviour in practice. An Australian study (Peay M & Peay E, 1984), for example, demonstrated that although pharmaceutical representatives were not a highly evaluated information source, they were still the most frequently cited source of first information about a new drug, and were prominent among the information sources consulted in order to prescribe. This suggests that factors other than the perceived worth of the information source are at play in a doctor's decision to rely on it for drug information and legitimising prescribing decisions.

Prosser and Walley (Prosser and Walley, 2003) collected qualitative data from 107 GPs in two health authority areas, in order to investigate the reported reasons why GPs choose to receive pharmaceutical representatives. Interview topics included GPs' reasons for seeing or not seeing representatives, the perceived advantages and disadvantages, the perceived quality of the information provided, and the perceived need for such an information source. There was considerable diversity in attitudes towards pharmaceutical representatives among GPs. Preference for face-to-face communication for the sake of convenience, time saving, and more effective uptake of knowledge were commonly expressed. Most GPs considered the quality of representatives' information to be variable and biased, yet they were confident in their own abilities to critically appraise the messages. Most expressed their immunity to marketing techniques, only a few acknowledging an impact on their prescribing behaviour. GPs expressed approval for representatives who appeared credible and knowledgeable as information providers, and disapproved of those employing aggressive sales techniques. In several instances, long-standing familiar social relationships with representatives had been formed, and some GPs admitted that this affected their prescribing decisions. Some GPs reported that interactions with representatives were motivated by gifts, sponsorship or hospitality. Many GPs viewed representative visits as part of a wider organisational and social norm, and some felt obliged to meet them by practice colleagues in spite of holding negative individual attitudes towards representatives. This indicates the potential for policy interventions at the practice level in primary care. GPs did not agree on whether a useful resource would have been lost if they stopped seeing representatives. Overall, the study demonstrates that GPs, consciously or subconsciously, legitimise interactions with pharmaceutical representatives by conceptualising them as culturally accepted, convenient, credible and familiar sources of drug information. Social desirability bias may have led to under-reporting of some reasons for entertaining pharmaceutical representatives, such as the use of gifts.

Carthy et al (Carthy P et al, 2000) obtained semi-structured interviews with 17 GPs from one region to investigate their attitudes towards prescribing influences. Most GPs reported that their prescribing quality was limited by insufficient time to access information. Most drew upon their own clinical experience, and were more likely to prescribe a familiar drug from their 'mental

formulary' than to research alternatives. There was some degree of animosity towards policy level "interference" in prescribing, partly because the least costly drugs were not perceived to be in the interests of individual patients. Most GPs acknowledged that commercial sources of information might omit unfavourable messages, yet they felt confident in their own abilities to withstand the pressure of marketing techniques. Sponsored meetings were considered useful because of the perceived high quality of the expert speakers they attracted. Hospital consultants and patient demand were also mentioned as important influences on prescribing.

A survey of 29 residents in a USA teaching hospital (Zeigler M et al, 1995) who regularly attended pharmaceutical representative presentations found that 85% of residents reported that representatives provided useful information, 44% said that they provided misleading information and 26% thought that the information was both useful and misleading. Again, this indicates that a source may be regarded as useful because of the convenience and accessibility of the medium, in spite of the inferior worth of the message content. 52% of residents reported seeking information from representatives, and 37% said that this information influenced their prescribing decisions. All residents reported that they were more likely to attend presentations where lunch was provided.

Watkins et al undertook a national survey (Watkins C, 2003b) to determine the attitudinal characteristics of GPs who reported frequent contact with pharmaceutical representatives. They found that frequent contact with pharmaceutical representatives was significantly ($p<0.05$) and independently associated with greater readiness to prescribe newly available drugs without reference to the BNF, willingness to prescribe upon a patient' request without clinical indication, dissatisfaction with consultations which ended only with giving advice, and greater receptiveness to drug advertisements and promotional literature. This study provides evidence for a relationship between pharmaceutical representative visits and irrational prescribing. However, the direction of causality is not proven; pharmaceutical representatives may influence GPs to prescribe irrationally, or GPs who are already less skilled prescribers may be more likely to seek interactions with, and be targeted by, pharmaceutical representatives.

Sandberg et al (Sandberg W et al, 1997) interviewed 166 residency applicants to one department in the USA to investigate the impact of gifts to medical students on their recall of company names and products. The study found that although 90% of students had received one or more free textbooks from pharmaceutical companies, only 25% of those who named a book could accurately recall the name of the company. Students were also asked about their attitudes towards pharmaceutical representatives. They reported that those representatives who conversed with students and supplied gifts were considered helpful, while those who ignored them because they were students were criticised. The inability of most students to recall company names does not necessarily indicate that gifts to students do not influence future prescribing. The key issue is that medical students were being 'groomed' by the industry, instilling a culture of accepting gifts and hospitality, and encouraging them to perceive the industry as an accessible and useful source of information. The goal of the industry at this stage may be name recognition, rather than recall.

Conclusions

- *GPs commonly believe they are immune to marketing techniques of representatives, and yet many of the positive reasons they give for seeing representatives are textbook marketing tactics such as establishing credibility, social interaction, and reciprocity through gifts and sponsorship*
- *Most doctors consider information from pharmaceutical representatives to be biased but find them useful in spite of this. The reasons given for using representatives include time constraints, convenience difficulty in appraising the literature.*
- *Some GPs see pharmaceutical representatives because of cultural pressures from colleagues in their practice, and practice policies, in spite of disapproving of them*
- *GPs who are frequently visited by representatives are significantly more likely to express irrational attitudes to prescribing decisions*
- *Medical students are being 'groomed' by the industry, instilling a culture of accepting gifts and hospitality, and encouraging them to perceive the industry as an accessible and useful source of information*

6. Behavioural changes of health professionals after drug promotion

Data for actual prescribing before and after a known exposure to drug promotion is difficult to obtain in practice. Many studies are limited by reliance on self-assessed prescribing habits or self-reported exposure.

6.1 The relationship between exposure to drug promotion and changes in prescription habit

6.1.1 Self-reported exposure

Mapes (Mapes R, 1977) studied the rational (appropriate, economic, effective and safe) prescribing of drugs. The paper examines two of these rational criteria, effectiveness and safety. 900 GPs were interviewed and scripts from a period of one month examined for 116 GPs. The doctors were split into two categories conservative prescribers and incautious prescribers, however doctors may fall into both or neither categories at times. Characteristics of the doctors were noted and these related to their group of prescribing habits. Those doctors who were more conservative prescribers held a lower respect for the information provided to them by pharmaceutical companies and do not see the information as teaching materials or beneficial to knowledge.

Prescriptions for cimetidine written by GPs were examined over 15 months in one study (Strickland-Hodge and Jepson, 1982). The authors tracked when the doctor made the first prescription and assessed whether the doctor was quick or slow at taking up a new drug. It was found that doctors with larger list are more likely to prescribe a drug earlier. There are three reasons proposed for this: the increased numbers of patients mean the doctor is more likely to come across diseases for which new drugs are released; they are more likely to act in an innovative way thereby attracting more patients; or are busier thus relying on more commercial sources as they do not have time to read all the relevant literature. On questioning the doctors, it was found that those doctors who were early prescribers were more likely to be use commercial information, especially pharmaceutical company representatives, and less likely to rely on journals.

Stolley et al (Stolley P et al, 1972) examined the appropriateness of prescriptions using interviews and questionnaires for 37 GPs. The interview asked about their prescribing for five common illnesses, five common complaints and five drugs (knowledge on drug contraindications was also examined). The questionnaire assessed demographic information about the doctors and their practice and attitudes and sources of drug information. The authors found that younger doctors who have completed their training more recently, those with post-graduate qualifications, GPs with larger group practices and those consulting academic materials and colleagues prescribe more appropriately. GPs prescribing appropriately were more likely to consider their pharmacology training to be adequate and thus were more likely to prescribe generic drugs as they saw no difference between those and the branded ones. Appropriate prescribers believed there were too many drugs available with similar modes of actions for the same illnesses. They also tended to believe pharmaceutical representatives are not good source of information as it not always clinically justified and that the representatives visit too frequently.

Haayer (Haayer F, 1982) investigated rational prescribing practices in 116 GPs in the Netherlands though a questionnaire and interviews. Case histories were given to the GPs and the rationality of prescribing scored on a 4-point scale. Age was found to be a strong indicator of prescription rationality; the younger the GP, the more rational the prescribing. The study found that reliance on information provided by pharmaceutical companies led to less rational prescribing, whereas, use of up-to-date drug compendiums and attending professional meetings led to increased rational prescribing.

Cormack and Howells (Cormack M A and Howells E, 1992) examined GPs' prescriptions of benzodiazepines by distributing a questionnaire before and interviewing participants after a training course on benzodiazepine use. A record was made of prescriptions of benzodiazepines and the doctors separated into two groups, high and low prescribers. The interview then divided the doctors into "empathic" and "unsympathetic" groups. High prescibers of benzodiazepines stated they felt that workload had an impact on their prescribing rates as providing a prescription led to shorter consultations. There was no apparent affect of list size on prescription rates. Those doctors who prescribed benzodiazepines more regularly were less sceptical about the information they received from pharmaceutical companies in comparison to their counterparts. High prescribers were also less likely to attempt other treatments with their patients before starting benzodiazepines.

6.1.2 Measured exposure

Peay et al (Peay MY et al, 1988) analyses doctors', both GPs and specialists, knowledge of temazepam at different stages in the drug adoption process. During the promotion of temazepam, the main emphasis was on the advantages it holds in comparison to other existing drugs within the same class. 124 doctors were interviewed one year after the release of temazepam in Australia from a broad range of specialities. 71% of doctors were familiar with temazepam and 68.2% of these stated their information about temazepam came from commercial sources and the remaining 28.2% stated their information was from professional resources. Meetings with pharmaceutical representatives lead to earlier awareness, increased and earlier prescription and an increased sense of importance of the new drug.

Orlowski et al (Orlowski JP et al, 1992) examined the use of two drugs before and after physicians attended a pharmaceutical-sponsored fully expense paid symposium in well-known vacation destinations. Use of the two drugs was examined retrospectively from the hospital pharmacy inventory for 22 months before the symposia and 17 months after. It was found use of both drugs increased after invitation to, and attendance at, the symposium. Comparison with national statistics showed that increases did not follow any national trend. 10 physicians who attended each of the symposia were interviewed informally and the majority believed such a trip would not affect their prescribing habits.

Gonul et al (Gonul FF et al, 2001) conducted an American study into marketing practices, using data sets from Scott-Levin inc. These data sets were drug and diagnosis data, personal selling data and retail price data and were gathered from information provided by physicians. The study examined one condition and seven different drugs used for its treatment. It was shown visits from

a sales representative and free samples of a drug increased the likelihood that the drug would be prescribed. Excessive marketing had no increased effect. The type of insurance coverage of a patient has an effect on prescription; those doctors who saw patients with private insurance were more likely to be influenced by marketing. However, there is one major flaw in this study in that it is not stated whether the seven drugs are the same drug under different brand names or are different drugs, which makes it difficult to evaluate. This study was not reported clearly.

In a study comparing the relationship between advertising and prescription patterns, (Walton H, 1980) physicians examined advertisements that were in at least one published medical journal. 100 physicians, randomly selected and from a wide variety of specialities, examined each of the 354 advertisements. Data was collected by interview and physicians were asked if they recognised advertisements after all product and company details had been removed. The interviewee was given the names of all the drugs for which they were shown the advertisements and asked if they had recommended or prescribed the drug in the past month. It was shown that those physicians who recognised advertisements were more likely to prescribe the products. Ninety five percent of the advertisements were shown to lead to positive prescribing behaviour patterns. There was no difference between recently released products and older more established products.

The paper by Matalia (Matalia N, 1994) is a review examining the effectiveness of advertising on prescription habits. The first trial examined whether a doctor who previously had not prescribed a certain drug was more likely to prescribe it after seeing advertisements. It was found that once familiarity with a product increased the willingness to trial a drug increased. The second study looked at whether physicians were more likely to prescribe a particular drug if they were exposed to increased advertising. The doctors were sent journals with varying amount of marketing for the drug. It was found increased marketing led to increased prescription. In the last study reviewed, advertising of certain products was stopped then restarted after four months. It was found doctors who had seen the adverts were more likely to remember the product.

6.2 The relationship between drug promotion and drug sales

Dieperink et al's paper (Dieperink ME, 2001) relies on quantitative methods to measure the practices of the prescribing panel at the Minneapolis Veterans Affairs Medical Centre. The most valuable aspect of this study was that the researchers had access to data on the prescribing panels actions from before the drug went on the market, after it was released, and after exposure to pharmaceutical company representatives. As representatives had to sign in on entry to the centre, they also had data on the frequency of visits. It was found that after a grand round had addressed the topic of a particular drug, quetiapine fumarate, a 3-fold increase in prescriptions was observed. There were limitations to this study, due to their inability to take into account other reasons for this increase in prescriptions; the grand round may have simply corrected a phase of under-prescribing of the drug.

Mackowiak and Gagnon (Mackowiak J and Gagnon JP, 1985) performed a quantitative survey of the pharmaceutical industry's marketing of diuretics, attempting to find a correlation between marketing and prescribing practices. It found that more aggressive marketing did not necessarily

mean an increase in use, or an increase in market share. However, this study is limited by the fact that it measures the use of diuretics, an already well established sector of the pharmaceutical industry, where prescribing practices are now very well established, and change very little.

Also in 1985, Krupta and Vener (Krupta LR and Vener AM, 1985) found that without great investment in advertising, many new drugs would not have the market share they enjoy now. Many drugs like Valium and Dyazide were very aggressively marketed when they first appeared, and eventually faired better than those drugs that were not supported so strongly.

There seems to be a trend in the evidence that shows a strong connection between increased drug promotion and increased sales. After all, if this was not the case, companies would certainly not be so keen to market all of their new drugs so forcefully.

6.3 The relationship between drug promotion and prescribing costs

Watkins et al (Watkins C. 2003a) used a quantitative survey to investigate modifiable factors associated with higher prescribing costs among GPs. The study included a national sample (n=1714) of GPs containing equal numbers belonging to the upper, middle and lower quintiles of adjusted prescribing costs based on Prescription Pricing Authority data. Multivariate analysis of self reported attitudes and behaviours revealed that GPs with low prescribing costs were significantly less likely to see pharmaceutical representatives frequently (OR 0.68, $p<0.01$) and prescribed newly available drugs less readily. They were significantly more likely to consider their colleagues' criticism a useful resource in prescribing, and significantly more likely to check the BNF when uncertain about the use of a drug. The study is limited since individual attitudes and behaviours were correlated with aggregate prescribing costs measured at practice level. A causal link between reported attitudes and prescribing costs cannot be assumed.

Conclusions

- *Self-reported and measured exposure to drug promotion encourages quicker uptake of new drugs, more frequent and less rational prescribing*
- *Drug promotion leads to an increase in drug sales*
- *Frequent contact between GPs and pharmaceutical representatives is strongly and independently associated with high prescribing costs*

7. Current UK regulation on interactions between the pharmaceutical industry and the medical profession

The most important body for regulation of interactions with the medical profession in the United Kingdom is the ABPI (ABPI Code of Practice, 2005). This body introduced a Code of Practice for promotion of medicines in 1958, which was enforced by a code of practice committee consisting of various representatives from member companies, two independent doctors and a barrister (Herxheimer and Collier, 1990). Recently a representative from a patients' organisation was also added to the group. The committee works by examining adverts in randomly selected journals with the criteria of the code. The ultimate aim of this code of practice was to ensure that patient care was not compromised by the promotional practices of the pharmaceutical industry.

If a breach of the code was detected, informal correspondence was made with the company that placed the advertisement. If the problem was not resolved, the Code of Practice committee would deal with the case. However, this process was largely secret, and some research argued that this process of self-regulation had done little to serve the public in the way it had apparently intended (Coombes R, 2005). It was generally felt that the ABPI's system of self-regulation was more of a service to the industry than the public, and many suggested involving more members of the public and the medical profession in the committee would make it more effective (Hilliard and Chambers, 2005).

The Code of Practice was recently reworked and the changes came into effect on January 1st 2006. Changes included the requirement that any gifts given to medical professionals must be of a value of less than £6. It also stated that gifts would be more acceptable if they were of a clear benefit to patient care (ABPI Code of Practice, 2005).
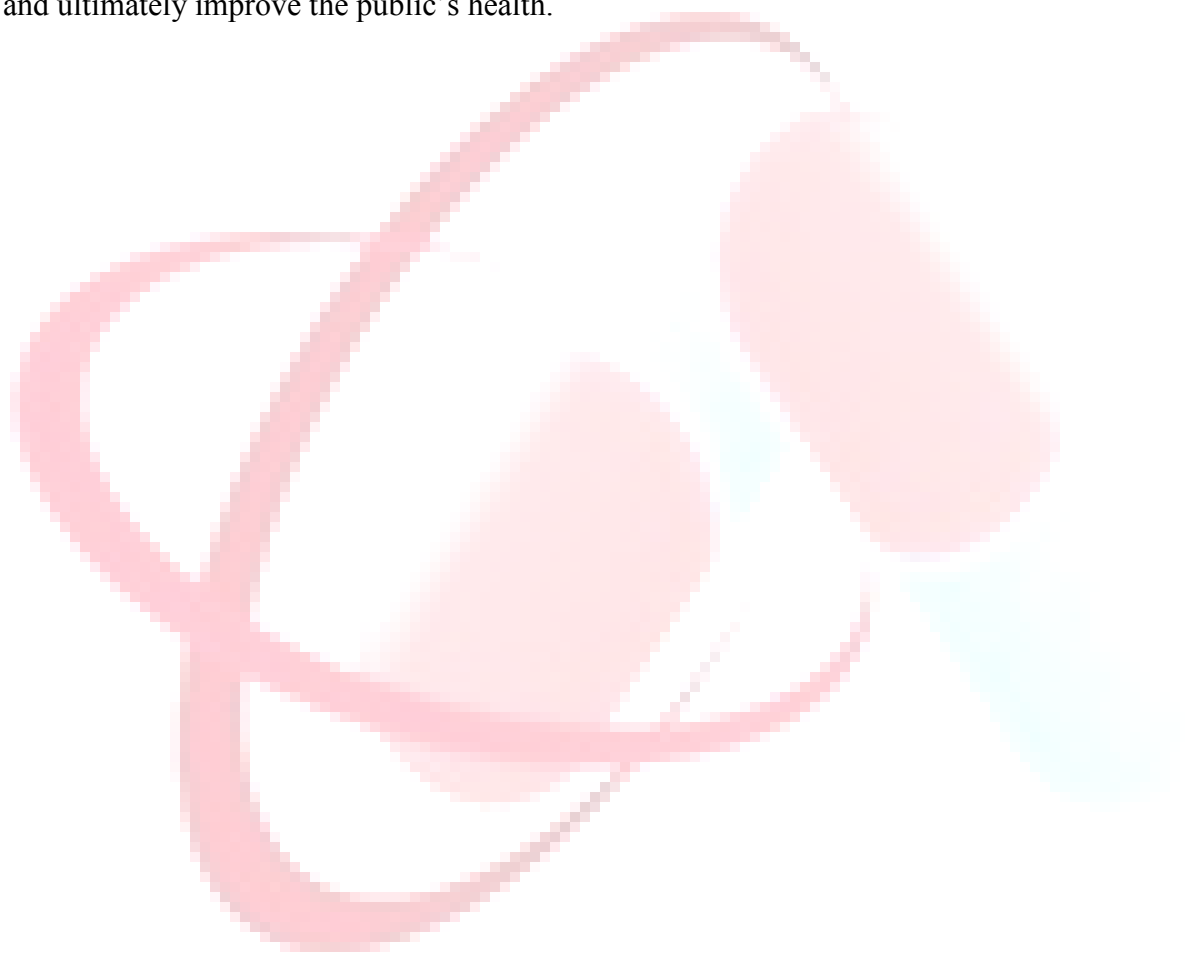
To this date there has been little research into the effectiveness of the changes that have been made to the code of practice, but some papers suggest that these changes are futile. It is the way that the code is enforced, rather than the code itself, that needs to be changed (Brennan et al, 2006).

Some journals have tried to enforce policies on pharmaceutical advertisements within their publications. However, in one survey, only 8 out of 221 editors of medical journals had ever felt the need to change an advertisement shown in their pages (Wilkes and Kravitz, 1995). Therefore, it seems that self-regulatory systems and journal editing do not provide adequate controls on drug advertising (Bishop et al, 1976). The codes that these systems promote are broken very often with very little, if any, repercussion. No bad publicity or need for retraction of advertisement was caused by breaches of these codes, undermining the argument for their existence.

GMC guidelines state that "You must act in your patients' best interests when making referrals and when providing or arranging treatment or care". Apart from this, there is very little guidance and what is present is vague and open to interpretation. More clarification on the matter would make the GMC's position clearer and would make it easier for doctors to follow the guidelines. There are clear guidelines on sales representative interactions, but these guidelines do not seem to be enforced very well (Schneider et al, 2006). Sales representatives should limit their doctor visits to 3 visits a year, but this limit is often ignored.

Currently the BMA and Leeds Teaching Hospitals Trust do not have a policy on pharmaceutical industry interactions with the medical profession. For doctors to become more aware of the dangers to patients that can occur due to these interactions, these organisations must formulate a policy that will be clear and easily accessible.

In conclusion, for interactions to be more regulated, and, in turn, improve patient care, current guidelines must be made more explicit and understandable, and must be enforced more diligently. Self-regulatory organisations are not sufficient to control actions of a whole industry. Legislative policies must be put into place by organisations like the GMC, BMA and, at a local level, Leeds Teaching Hospitals Trusts, to truly affect the way we interact with the pharmaceuticals industry and ultimately improve the public's health.

8. Conclusions and Recommendations

In conclusion, at present, doctors in the UK are relying heavily on the pharmaceutical industry for information on new and current drugs. This heavy reliance on industry leads to quicker uptake of new drugs along with more frequent and less rational prescribing and higher prescription costs. There is evidence that the medical profession is improving in its search for non-biased information as younger doctors who are qualified for shorter periods of time are less likely to rely on industry drug information. However, medical students are still being targeted by the industry and groomed to accept hospitality in the future. Until this practice is changed and medical schools take action to regulate this contact, future doctors will continue to rely on industry information. In addition to this change, doctors must be sensitised to the methods of persuasion used by pharmaceutical representatives and develop their individual capacity to counter them. Several studies report a small minority of doctors who never see pharmaceutical representatives. A positive deviance approach might be taken to investigating the characteristics of this group, in order to replicate their attitudes, skills or professional role structures on a wider scale.

GPs are more likely than hospital doctors to cite pharmaceutical representatives as a useful source of information, especially for new drugs. Since a large proportion of prescriptions in primary care are initiated or recommended in hospitals or by consultants (McGettigan P, 2001), interventions to promote rational prescribing in the hospital trust are likely to extend benefits to patients continuing care by GPs. Hospital doctors are more likely to initiate the use of a new drug, so prescribing decisions made in this setting are a priority area for intervention. Since hospital prescriptions are so heavily influenced by information from senior colleagues and clinical meetings (McGettigan P, 2001), consultants are presumably the most powerful opinion leaders in prescribing decisions, and should be targeted specifically for interventions.

Personal contact is the most influential communication medium, regardless of the content of the message. Networking between doctors through formal meetings, teaching and professional relationships should be utilised as a vehicle for rational prescribing messages. This mode of communication is already strong in hospitals but is lacking within GP practices. Community and hospital pharmacists are an underutilised resource for communicating rational prescribing messages. Academic detailing is also a possible strategy.

Lastly, current guidelines for the interactions between the pharmaceutical industry and health professions must be made more explicit and be enforced more carefully. In addition, organisations such as the GMC, BMA and individual trusts must create and enforce their own guidance to better improve public health on a national and local level.

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