

# THE IMPACT OF PHARMACEUTICAL PROMOTIONS ON PRIMARY HEALTH CARE PHYSICIANS' PRESCRIBING BEHAVIOUR IN KAMC IN CENTRAL REGION

Hayat Saleh Al Zahrani

Family Medicine department, King Abdul-Aziz medical city, Riyadh, Saudi Arabia

Correspondence to: Hayat Saleh Al Zahrani (hayatsalzahrani@gmail.com)

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## ABSTRACT

**Background:** Doctors are the main prescribers of medication for the patients. There are many factors that affect prescribing behaviour such as pharmaceutical promotions.

**Aims & Objective:** To assess drug representatives' influence on physician's prescription, to assess physician's attitudes toward drug representative and to study other factors that may affect the prescribing behaviour of physicians.

**Materials and Methods:** A cross-sectional study was conducted among 275 GPs & family physicians working in all primary care centers in KAMC in Central Region in 2011-2012. A self-administered structured questionnaire was used. The questionnaire included questions regarding socio-demographics, clinic work load for physicians, factors influencing prescribing of a new drug including gifts offered by drug representatives, reference sources used for prescribing, CME hour characteristics and sponsorships by drug representatives and physician beliefs about impact of pharmaceutical promotions on prescribing.

**Results:** Of the physicians, 204 filled the questionnaire (response rate 74.2%), nearly 72 % were non-Saudi, 71.6% were staff physicians, and 59.8% had more than 10 years of practice. Guidelines updating and drug characteristics were the most important factors influencing physicians' prescription of a new drug (97.5%, 96.6%) while the least factor influencing their prescribing was drug representatives (41.0%). The most frequent resources used by physicians in case of any problems in prescribing process were textbooks e.g. BNF or MIMS (52.5%), Micromedix (44.7%). According to self-report of physicians, their prescribing behaviours were not affected by visits of drug representatives (43.6 %) while some of them (41.7%) stated that may be they were affected. Over 61% of physicians however believed that other physicians' prescribing pattern was sometimes affected by drug representatives' influence. There was no correlation between sponsored lectures and influence of prescribing behaviours (p-value 0.914). Although the physicians accepted gifts, drug representatives do not influence their prescription of a new drug.

**Conclusion:** A minority of physicians was partially influenced by drug representative promotions affecting their prescribing patterns. Most of the doctors were not affected by gifts or drug related information given by the representatives. Majority of physicians relied on latest guidelines from medical literature and other standard references in writing prescriptions.

**Key Words:** Pharmaceutical; Drug Prescription; Physician; Promotion; Impact; Drug Representative; Prescribing Behaviour

## Introduction

Doctors play an important role in the health system. They are the main access for prescribing medication to their patients. In both developed and developing countries, prescription of medication is one of the most important factors in the raising costs of health services.<sup>[1]</sup> A drug is prescribed for more than 60% of the population in Western Europe<sup>[2,3]</sup> compared to 75 % of consultation in Saudi Arabia that end with a prescription<sup>[4]</sup>.

Appropriate prescribing is a balance of a whole picture of patient (which includes personal biography, needs, social situation and disease status) and the choice of medication (which is scientific and pharmacological properties).<sup>[5]</sup> There are many factors that affect prescribing behaviour other than scientific knowledge.<sup>[6]</sup> Some of these factors are scientific journal articles that reports drug characteristics<sup>[7]</sup>, level of education<sup>[8]</sup>, ethnicity of doctor and of the patient<sup>[9]</sup>, behaviour of colleagues including hospital doctors<sup>[10]</sup>, patient's requests for medication<sup>[11-13]</sup>, advertising in medical journals and pharmaceutical

company promotions<sup>[11-15]</sup> and higher number of patients examined per day<sup>[16]</sup>.

Physicians believed that commercial sources had little effect on 68% of them while 54% of them believed that pharmaceutical representatives were minimally important in choosing prescriptions. In comparison 62% believed scientific evidence was very important in influencing their prescribing behaviour. However, 88% of physicians believed that training and clinical experience was the most important factor in their prescribing habits.<sup>[17]</sup>

There is a wide range of activities of these companies such as gifts, printed materials, drug sample, meals and trips. Pharmaceutical companies sometimes offer symposia, scholarships and even fellowships to physicians in hope to influence their prescribing patterns.<sup>[18-25]</sup> Several studies showed that pharmaceutical promotions had great influence on the prescribing behaviour of physicians.<sup>[26-30]</sup> In the United States, the pharmaceutical companies spent over \$12 billion in 1998 for promotional activities which increased to almost \$15.7 billion in 2000<sup>[31,32]</sup> and up to

57.5 billion in 2004.<sup>[33]</sup> The UK pharmaceutical industry spent around £1.65 billion a year on their marketing.<sup>[34]</sup> The global pharmaceutical company grows every year, and between 2006 and 2007 it increased by 6.4% to \$ 712 billion.<sup>[35]</sup>

Eric G. et al in a survey about physician ~ industry relationship found that most of these relationships involved receiving food (83%) or drug samples (78%).<sup>[36]</sup> In New Zealand, gifts have been seen as desirable by their General Practitioners.<sup>[37]</sup> Pharmaceutical companies claim that their activities provide scientific information including benefits and risks of their products<sup>[38]</sup>, although it is known that some of these information are selective and provide inadequate knowledge about their safety in the community. Furthermore, for developing countries' doctor, the quality of drug information given is poorer than those in developed countries.<sup>[39,40]</sup>

United Kingdom generated the most important body for regulation of interactions with the medical profession, which is Association of the British Pharmaceutical Industry. It included that any gifts given to physicians must be of a value of less than £6. These regulations must be more understandable and implemented to reach the goal.<sup>[41]</sup> There are limited studies from other Gulf countries talking about physicians' prescribing behaviours. MA Magzoub et al., studied the determinants of physicians' medication prescribing behaviour in primary care in Riyadh city, Saudi Arabia and found that many physicians reported that pharmaceutical companies had positive influence.<sup>[42]</sup> Research conducted on physicians attitudes and believes indicates that they are often unaware of potential impact of pharmaceutical companies' activities on their attitudes and behaviours.<sup>[43-45]</sup>

In our study, we aimed to determine the impact of pharmaceutical promotions and activities on primary health care physicians' prescribing behaviour in KAMC in central region and to assess drug companies' influence on physicians' prescription.

## Materials and Methods

This was a cross-sectional study conducted by using self-administered questionnaire. It was conducted with participation of Family Medicine specialists and Staff Physicians (generalists) working in all primary care centers in KAMC in CR (Hail, Rafha, Arar, Riyadh, Qassim and Najran). Specialists, residents, interns as well as students were excluded from participation.

For 95% Confidence Interval, a proportion of 50% of

physician being influenced by drug representatives,<sup>(16)</sup> with a desired precision of  $\pm 5\%$ , gave an estimated sample size of 160, from a finite population of 275 physician of the Department of Family Medicine & PHC. Adjusted up for response rate of 80%, the required sample size was calculated to be 200. Questionnaire was sent to all physicians (275) and 204 responded (74.2%).

Participants for the study were selected by Convenient Non-random Sampling. All physician population in the department of Family Medicine & Primary Health Care was included in the study, fulfilling the inclusion criteria. The study was conducted in 2011 & 2012. Self-administered structured questionnaires distributed to the GPs & family physicians with the help of the research coordinator in family medicine department in KAMC within a period of 3-4 months. It was ensured that physicians filled the questionnaires, by following up by emails and phone calls.

The questionnaire was designed by the researcher based on literature review and was prepared in English language. The questionnaire included the following items; Socio-demographic data that included: (Age, gender, nationality, qualification, job title, years of practice after MBBS), clinic work load for physicians, factors influencing prescribing of a new drug including gifts offered by drug representatives, reference sources used for prescribing, CME hours characteristics and sponsorships by drug representatives and physicians' beliefs about impact of pharmaceutical companies on prescribing.

Content validity was carried out by two experienced Family Medicine physicians. A pilot study was conducted on 15 physicians to check the appropriateness and clarity of the questionnaire. Based on this pilot study, the questionnaire was modified to its final version.

All data were entered in the computer using the SPSS software, version 18, followed by data cleaning. Descriptive statistics including frequency, percentages, mean and standard deviation were calculated. Variables were cross-analyzed using Chi-square. P value under 0.05 was considered to be significant.

This study was conducted on human participants. All data were maintained in a secure fashion without mentioning the names of physicians who handed in the envelope or returned it back to the secretary. All data were analyzed as a total population in a manner that we maintained individual privacy. All records with results and progress both electronic & written will be maintained with the researchers for a minimum period of two years in case of review. Upon completion of the study the final report will

be submitted to the Saudi Commission for Health Specialization. All participants who were interested in knowing our results were requested to write their e-mail addresses in the space provided in the questionnaire handed to them. Participants were informed that their contact information will stay confidential and be used for that purpose only.

Ethical approvals were obtained from the Institutional Review Board of National Guard Health Affairs and the departmental Family Medicine Research Committee prior to conducting the research. Project research proposal was approved by the King Abdullah International Medical Research Center.

## Results

Questionnaires were sent to all physicians (275) and 204 responded giving a response rate of 74.2%. Table 1 shows socio-demographic data among respondents. It shows that 71.6% of them were non-Saudi, 71.6% were staff physicians, and 59.8% had more than 10 years of practice. Most physicians (81.8%) saw between 10-40 patients per day with time spent per patient around 5-15 minutes among 90.1% of them.

Table 2 shows that updated guidelines and drug characteristics are the most important factors influencing physicians' prescription of a new drug (97.5%, 96.6%) while the least factor influencing their prescribing is drug representatives (41.0 %). The most frequent resources used by physicians in case of any problems in prescribing process were text books e.g. BNF or MIMS (52.5%), Micromedix (44.7%) while documents and drug guides from drug representatives were the least frequent used resources. Most physicians (57.4%) attended more than 30 CME hours per year. (60.3%) of these CME hours were self-sponsored, (41.7%) of physicians attended around 1-2 lectures/symposia sponsored by drug companies.

Figure 1 shows that (66.7 %) of physicians accepted office supply from drug representatives, (60.8%) accepted drug samples, (65.7%) accepted meals and (22.1 %) accepted trips. Nearly 20% of physicians feel that gifts offered by drug representatives affected their prescription of a certain drug. Nearly 60% of physicians think that they gain more information about a certain drug from drug representatives and 81.4% of physicians claim that they are confirm the accuracy of the information given to them. Almost a similar number of physicians reported that their prescription was not affected by visits of drug representatives or may be affected (43.6% Vs. 41.7%) while 61.3% of physicians believed that other physicians'

prescribing pattern is sometimes affected by drug representatives' influence. There was no correlation between socio-demographic data of physicians and drug representatives' influence in prescribing new drugs. In addition, the results demonstrates no statistical differences between busy clinics or time spent with patients and drug representatives' influence in prescribing new drugs.

As illustrated in table 3, physicians who thought that drug samples are an acceptable gift, were likely to prescribe a drug based on drug representative influence. Table 4 shows that physicians who think that they gained information from drug representatives; their prescribing may be affected by them (p-value <0.001). Physicians who think that they gained information from drug representatives were actually influenced by them in prescribing new drug (p-value 0.001). All kinds of gifts, meals, samples, and sponsored trips affected prescribing of new drug by the physicians (Table 5).

Physicians who think that they gain less information from drug representatives were less frequently visited by them (p-value 0.002) as shown in table 6. Physicians who didn't accept meals, trips or drug sample from drug representatives, their prescription were less likely to be affected by their offer (p-value < 0.05). Physicians do not seem to be impressed by office supplies offered by the drug companies (Table 7). Physicians who believed that they gained less information from drug representatives were less likely to prescribe new drug (p-value 0.010) (Table 8). Table 9 shows that physicians who believed that they gained information from drug representatives were less likely to confirm the accuracy of information, however the relationship was not significant.

**Table-1: Socio-demographic characteristics among the 204 participants of study**

	Socio-Demographic	No.	%
<b>Age Group (years)</b>	25-35	53	26.2
	36-45	64	31.7
	46-55	59	29.2
	>55	26	12.9
<b>Gender</b>	Female	96	47.1
	Male	108	52.9
<b>Nationality</b>	Saudi	58	28.4
	Non-Saudi	146	71.6
<b>Qualification</b>	MBBS	62	30.4
	FM Diploma, Membership or Fellowship	37	18.1
	FM Board	49	24.0
	Others	56	27.5
<b>Job Title</b>	Staff physician	146	71.6
	Assistant Consultant	10	4.9
	Associate Consultant	9	4.4
	Consultant	39	19.1
<b>Years of Practice After MBBS</b>	1-5	20	9.8
	6-10	62	30.4
	>10	122	59.8

**Table-2: Factors that influence physicians' prescription of a new drug**

Factors	Disagree		Don't know		Agree	
	No.	%	No.	%	No.	%
Drug characteristics	3	1.5	4	2.0	197	96.6
Journal articles	7	3.4	11	5.4	185	91.1
Guidelines	2	1.0	3	1.5	199	97.5
Specialist's opinion	16	7.9	18	8.9	169	83.3
CME	7	3.4	11	5.4	185	91.1
Colleagues	41	20.3	36	17.8	125	61.9
Drug representatives	88	44.0	30	15.0	82	41.0
Patients factor	20	9.9	18	8.9	165	81.3

**Table-3: Relationship between gifts offered by drug representative & physicians' prescribing affected by them**

Gifts offered	Prescribing Affected				$\chi^2$	P-value
	May be		No			
	No.	%	No.	%		
<b>Sponsored Lectures</b>						
Non	44	38.3	34	38.2	0.18	0.914
1-2	49	42.6	36	40.4		
>2	22	19.1	19	21.3		
<b>Office supplies acceptable</b>						
Agree or Unsure	36	31.3	19	21.3	2.53	0.112
Disagree	79	68.7	70	78.7		
<b>Drug sample as gifts acceptable</b>						
Agree or Unsure	46	40.4	17	19.3	10.24	0.001
Disagree	68	59.6	71	80.7		
<b>Trip gifts as acceptable</b>						
Agree or Unsure	38	33.3	22	25.0	1.65	0.199
Disagree	76	66.7	66	75.0		
<b>Meal gift as acceptable</b>						
Agree or Unsure	28	24.6	17	19.3	0.79	0.375
Disagree	86	75.4	71	80.7		

**Table-4: Relationship between information gained from drug representatives and physicians' prescription**

	Prescribing Affected				$\chi^2$	P-value
	May be		No			
	No.	%	No.	%		
<b>Gaining information from representative</b>						
Agree or Unsure	99	86.8	54	60.7	18.45	<0.001
Disagree	15	13.2	35	39.3		
<b>Drug information from representatives as reference</b>						
Often & more	56	49.1	39	46.4	0.14	0.708
Sometimes & less	58	50.9	45	53.6		

**Table-5: Relationship between Influence of drug representative in prescribing new drug and gifts or sponsorship offered by them**

	Influence of drug representative in prescribing new drug				$\chi^2$	P-value
	Agree or unsure		Disagree			
	No.	%	No.	%		
<b>Gaining information from representative</b>						
Agree or Unsure	99	84.6	52	63.4	11.84	0.001
Disagree	18	15.4	30	36.6		
<b>Sponsored Lectures Categories</b>						
Non	35	29.7	43	52.4	11.50	0.003
1-2	54	45.8	29	35.4		
>2	29	24.6	10	12.2		
<b>Office supplies as acceptable</b>						
Agree or Unsure	43	36.4	11	13.4	13.01	<0.001
Disagree	75	63.6	71	86.6		
<b>Drug sample gifts as acceptable</b>						
Agree or Unsure	51	43.6	12	14.6	18.68	<0.001
Disagree	66	56.4	70	85.4		
<b>Trip gifts as acceptable</b>						
Agree or Unsure	46	39.3	13	15.9	12.72	<0.001
Disagree	71	60.7	69	84.1		
<b>Meal gift as acceptable</b>						
Agree or Unsure	39	33.3	5	6.1	20.77	<0.001
Disagree	78	66.7	77	93.9		

**Table-6: Relationship between frequency of drug representatives' visits & gaining information**

Frequency of representative visits to physician	Gaining information from representative				$\chi^2$	P-value
	Agree or Unsure		Disagree			
	No.	%	No.	%		
More than once per week	29	19.0	3	6.0	11.62	0.002
Once per week	35	22.9	10	20.0		
Monthly	33	21.6	6	12.0		
Less frequently	56	36.6	31	62.0		

**Table-7: Possibility of physicians prescribing being influenced by the type of gifts offered by drug representatives**

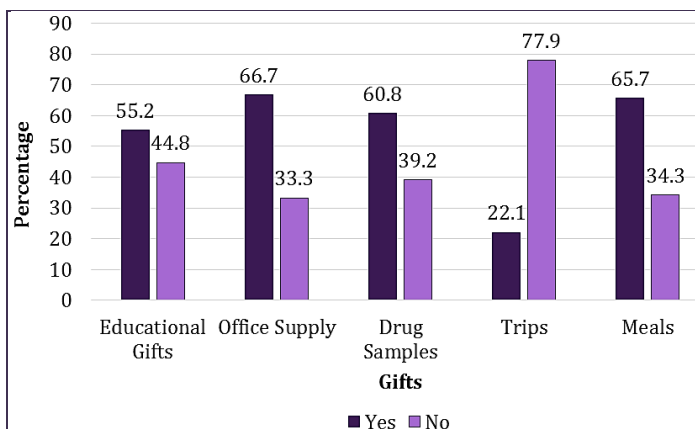
	Yes	Agree or unsure		Disagree		$\chi^2$	P-value
		No.	%	No.	%		
Meals	Yes	38	28.4	96	71.6	8.50	0.004
	No	7	10.3	61	89.7		
Trips	Yes	19	42.2	26	57.8	4.35	0.037
	No	41	26.1	116	73.9		
Office Supply	Yes	40	29.4	96	70.6	1.25	0.265
	No	15	22.1	53	77.9		
Drug Sample	Yes	46	37.4	77	62.6	5.65	0.017
	No	17	21.5	62	78.5		

**Table-8: Relationship between information gained from drug representatives and prescribing new drug**

Information gained from drug representatives as references in prescribing	Prescribing new drug				$\chi^2$	P-value
	Agree or Unsure		Disagree			
	No.	%	No.	%		
Often & more	65	55.6	29	36.7	6.71	0.010
Sometimes & less	52	44.4	50	63.3		

**Table-9: Relationship between information gained from drug representatives and confirming accuracy of information**

Information gained from drug representative	Confirm Accuracy of information				$\chi^2$	P-value
	Sometimes or less		Always			
	No.	%	No.	%		
Agree or Unsure	86	79.6	67	70.5	2.26	0.133
Disagree	22	20.4	28	29.5		



**Figure-1: Gifts offered and accepted by drug representative in percentage**

**Discussion**

Prescription of medication is one of the most important factors in the raising costs of health services. There are many factors that affect the prescribing behaviour other than the scientific knowledge. One of these factors is pharmaceutical company promotions.

We conducted this cross sectional study to explore the



impact of pharmaceutical promotions on physicians' prescribing behaviour in all PHC physicians in KAMC in CR. A total of 204 questionnaires were collected from 275 physicians in CR.

Looking at physician's characteristics, we observed that majority of them were non-Saudis, working as staff physicians, and around 59.8% had more than 10 years of practice. The age groups and the gender groups among physicians were almost equal in percentages.

According to self-report of physicians, their prescribing behaviours were not affected by visits of drug representatives (43.6 %) & some of them (41.7%) stated that may be they were affected. This was similar to other studies where drug representatives' visits were not believed by physicians to affect their prescribing behaviour & only small number of physicians reported a change in prescribing behaviour as a result.<sup>[27,42,43]</sup> For those physicians who were not affected by drug representative, the reason may be because drug representative visits were less frequent to them or may be this result does not reflect the true nature of physicians' attitude towards drug representatives since there were many studies that showed evidence suggesting that drug promotion does positively affect attitude and behaviour of doctors.<sup>[15,44,45]</sup>

There might be an underestimation of the effect of pharmaceutical promotion on the prescribing decision of physicians in our study or this could be related to the rules and regulation of our institute regarding prescribing and dealing with drug representatives that limit their influence. As mentioned before, some of physicians (41.7%) stated that might be affected by drug representatives' visits and the percentage was almost similar to those who were not affected. That can be explained that they were uncertain about the influence of pharmaceutical promotion or they were unsure about their behaviour towards them.

In our study, there was no statistical difference between socio-demographic data of physicians & drug representative's influence in prescribing new drugs. Unlike Prosser et al, where they found that if GP's were working at PHC centers & had an experience of less than 5 years after graduation, they were more likely to be influenced by drug representatives.<sup>[15]</sup> We did not find any correlation between busy clinics or limited time-per-patient & drug representative's influence in prescribing new drugs which is also an opposite finding to Prosser study.<sup>[15]</sup>

The most accepted gifts by physicians in our study were

drug samples, meals & office supply which was almost similar to other studies.<sup>[46]</sup> In our study, with the exception of office supplies, all other gifts had an influence on prescribing habits of physicians.

Most physicians (57.4%) attended > 30 CME hours/ year following the recommendation from Saudi commission for physician registration and although (41.7%) of physicians attended sponsored lectures in the last year, there was no correlation between sponsored lectures and influence of prescribing behaviours. The explanation behind these findings may be because our study was conducted in KAMC which is a big institute and it offered these sponsored activities to their physicians with no direct relationship with drug representatives and that there were strong policies regarding drug representatives' visits & prescribing process.

Guidelines updating & drug characteristics were the most important factors found in our study to have an effect on physicians' prescribing. Similar results were found by Orłowski & Wateska<sup>[27]</sup>, were physicians appeared to believe that any decision to prescribe a drug is based on scientific data, clinical experience & patient's needs rather than on promotion by pharmaceutical companies.

Furthermore, text books e.g. BNF or MIMS and micromedix were the most commonly used reference resources by physicians (52.5%) in case of having any problem in prescribing, while documents and drug guides from drug representatives were one of the least frequent used resources (29.8%). In USA, a survey was done by FDA, showed that (80%) of GP's used documents and drug guides provided by drug representatives as a source of drug information and a visit of representatives was used as an information source by (61%) of them.<sup>[47]</sup> Our finding may be explained by the strong regulations and guidelines for updating medical knowledge in our institute, the visits of drug representatives being less frequent, and the unfriendly attitude of some physicians towards drug representatives.

These findings emphasize the importance of providing physicians in Saudi Arabia with ongoing training in drug prescribing, in addition to access to relevant educational materials. As previously emphasized, the purpose was to open up this area of research and to provide guidance to other researchers who may wish to develop these analyses in Saudi Arabia and beyond.

It is important to recognize that this study had some limitations. The questionnaire reflects PHC physicians'

self-reported views, and may therefore have been biased if they reported what they considered acceptable to say rather than what they actually thought and still less of what they actually do. In addition, the results of the study cannot be generalized since there are many factors that affect these results such as character of KAMC with its rules, regulation, and restrictions of pharmaceutical promotion that may control physicians' attitude and behaviour towards them leading to less impact than what is seen elsewhere.

## Conclusion

In conclusion, a minority of physicians was partially influenced by drug representative promotions affecting their prescribing patterns. Most of the doctors were not affected by gifts or drug related information given by the representatives. Majority of physicians relied on latest guidelines from medical literature and other standard references in writing prescriptions. In the light of our results, we recommended providing training in drug prescribing to PHC physicians, in addition to access to relevant educational materials. Also, we recommended studying the true impact of pharmaceutical promotion through conducting another research measuring the direct effect of drug promotion by checking prescription of a specific drug pre and post exposure to drug representative visit or to promotion of any kind of that specific drug.

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## References

- Forder AA. How best to utilize limited resources. *J Hosp Infect*. 1995;30 Suppl:15-25.
- Kroenke K. Polypharmacy. Causes, consequences, and cure. *Am J Med*. 1985;79(2):149-52.
- Fraser RC, Gosling JT. Information systems for general practitioners for quality assessment: II. Information preferences of the doctors. *BMJ*. 1985;291(6508):1544-6.
- al-Faris EA, al-Dayel MA, Ashton C. The effect of patients' attendance rate on the consultation in a health centre in Saudi Arabia. *Fam Pract*. 1994;11(4):446-52.
- Barber N, Bradley C, Barry C, Stevenson F, Britten N, Jenkins L. Measuring the appropriateness of prescribing in primary care: are current measures complete? *J Clin Pharm Ther*. 2005;30(6):533-9.
- Ladd EC, Mahoney DF, Emani S. "Under the radar": nurse practitioner prescribers and pharmaceutical industry promotions. *Am J Manag Care*. 2001;16(12):e358-62.
- McGettigan P, Golden J, Fryer J, Chan R, Feely J. Prescribers prefer people: The sources of information used by doctors for prescribing suggest that the medium is more important than the message. *Br J Clin Pharmacol*. 2001;51(2):184-9.
- Wilson RP, Hatcher J, Barton S, Walley T. Influences of practice characteristics on prescribing in fundholding and non-fundholding general practices: an observational study. *BMJ*. 1996 7;313(7057):595-9.
- Gill PS, Dowell A, Harris CM. Effect of doctors' ethnicity and country of qualification on prescribing patterns in single handed general practices: linkage of information collected by questionnaire and from routine data. *BMJ*. 1997;315(7122):1590-4.
- Allery LA, Owen PA, Robling MR. Why general practitioners and consultants change their clinical practice: a critical incident study. *BMJ*. 1997;314(7084):870-4.
- Fischer MA, Keough ME, Baril JL, Saccoccio L, Mazor KM, Ladd E, et al. Prescribers and pharmaceutical representatives: why are we still meeting? *J Gen Intern Med*. 2009;24(7):795-801.
- Avorn J, Solomon DH. Cultural and economic factors that (mis)shape antibiotic use: the nonpharmacologic basis of therapeutics. *Ann Intern Med*. 2000;133(2):128-35.
- Chren MM, Landefeld CS. Physicians' behavior and their interactions with drug companies. A controlled study of physicians who requested additions to a hospital drug formulary. *JAMA*. 1994;271(9):684-9.
- Prosser H, Walley T. Understanding why GPs see pharmaceutical representatives: a qualitative interview study. *Br J Gen Pract*. 2003;53(489):305-11.
- Prosser H, Almond S, Walley T. Influences on GPs' decision to prescribe new drugs-the importance of who says what. *Fam Pract*. 2003;20(1):61-8.
- Vancelik S, Beyhun NE, Acemoglu H, Calikoglu O. Impact of pharmaceutical promotion on prescribing decisions of general practitioners in Eastern Turkey. *BMC Public Health*. 2007;7:122.
- Avorn J, Chen M, Hartley R. Scientific versus commercial sources of influence on the prescribing behavior of physicians. *Am J Med*. 1982;73(1):4-8.
- Norris P, Herxheimer A, Lexchin J, Mansfield P. Drug promotion: What we know, what we have yet to learn Reviews of materials in the WHO/HAI database on drug promotion. Amsterdam: WHO/HAI; 2005.
- Semin S, Güldal D, Özçakar N, Mevsim V. What patients think about promotional activities of pharmaceutical companies in Turkey. *Pharmacy World & Science*. 2006;28(4):199-206.
- Mahan D. Profiting from pain: where prescription drug dollars go. Families USA Publication No. 02-105. Available from URL: <http://www.familiesusa.org/site/DocServer/PPreport.pdf?docID=249>. Accessed December 8, 2013.
- Mintzes B, Health Action I. Blurring the boundaries: new trends in drug promotion. Amsterdam: Health Action International. 1998.
- Güldal D, Semin S. The influences of drug companies' advertising programs on physicians. *Int J Health Serv*. 2000;30(3):585-95.
- Arora U, Taneja G. An analytical study of physician's behaviour towards marketing of pharmaceutical products. *Indian Journal of Marketing*. 2006;36(11):10-3.
- Jayakumar PB. Drug firms may stop freebies to doctors. *Business standard*. Available from URL: <http://www.business-standard.com/india/storypage.php?autono=329395>. Accessed December 8, 2013.
- Mehta PN. Drugmakers and continuing medical education. *Indian Pediatr*. 2000;37(6):626-30.
- Wazana A. Physicians and the pharmaceutical industry: is a gift ever just a gift? *JAMA*. 2000;283(3):373-80.
- Moser RH. Editorial: The continuing search: FDA drug information survey. *JAMA*. 1974;229(10):1336-8.
- Murray E, Lo B, Pollack L, Donelan K, Lee K. Direct-to-consumer advertising: public perceptions of its effects on health behaviors, health care, and the doctor-patient relationship. *J Am Board Fam Pract*. 2004;17(1):6-18.
- Orlowski JP, Wateska L. The effects of pharmaceutical firm enticements on physician prescribing patterns. There's no such thing as a free lunch. *Chest*. 1992;102(1):270-3.
- Peay MY, Peay ER. Innovation in high risk drug therapy. *Soc Sci Med*. 1994;39(1):39-52.
- Gonul FF, Carter F, Petrova E, Srinivasan K. Promotion of prescription drugs and its impact on physicians' choice behavior. *The Journal of Marketing*. 2001:79-90.
- Manchanda P, Honka E. The effects and role of direct-to-physician marketing in the pharmaceutical industry: an integrative review.

- Yale J Health Policy Law Ethics. 2005 Summer;5(2):785-822.
33. Ma J, Stafford RS, Cockburn IM, Finkelstein SN. A statistical analysis of the magnitude and composition of drug promotion in the United States in 1998. *Clin Ther.* 2003;25(5):1503-17.
  34. Rosenthal MB, Berndt ER, Donohue JM, Epstein AM, Frank RG. Demand Effects of Recent Changes in Prescription Drug Promotion. In *Frontiers in Health Policy Research*, v. 6, David M. Cutler and Alan M. Garber, editors. MIT Press. 2003.
  35. Gagnon MA, Lexchin J. The cost of pushing pills: a new estimate of pharmaceutical promotion expenditures in the United States. *PLoS Med.* 2008;5(1):e1.
  36. House of Commons. *The Influence of the Pharmaceutical Industry. Fourth Report of Session 2004–2005, HC 42-I.* London, UK: The Stationery Office Limited. 2005.
  37. IMS Health Reports Global Prescription Sales Grew 6.4 % in 2007, to \$712 Billion. *PharmaLive* 2008 April 15. Available from URL: <http://pharmalive.com/news/index.cfm?articleID=531327&categoryid=9&newsletter=1>. Accessed December 8, 2013.
  38. Campbell EG, Gruen RL, Mountford J, Miller LG, Cleary PD, Blumenthal D. A national survey of physician-industry relationships. *N Engl J Med.* 2007;356(17):1742-50.
  39. Thomson AN, Craig BJ, Barham PM. Attitudes of general practitioners in New Zealand to pharmaceutical representatives. *Br J Gen Pract.* 1994;44(382):220-3.
  40. Pharmaceutical Research and Manufacturers of America. *PhRMA code on interactions with healthcare professionals.* Washington, DC; 2008.
  41. Gitanjali B, Shashindran CH, Tripathi KD, Sethuraman KR. Are drug advertisements in Indian edition of BMJ unethical? *BMJ.* 1997 Aug 23;315(7106):459.
  42. Rane W. How ethical is the pharmaceutical industry in India. *Rational Drug Bulletin.* 1998;8(4):4-5.
  43. Chimonas S, Brennan TA, Rothman DJ. Physicians and drug representatives: exploring the dynamics of the relationship. *J Gen Intern Med.* 2007;22(2):184-90.
  44. Rutledge P, Crookes D, McKinsty B, Maxwell SR. Do doctors rely on pharmaceutical industry funding to attend conferences and do they perceive that this creates a bias in their drug selection? Results from a questionnaire survey. *Pharmacoepidemiol Drug Saf.* 2003;12(8):663-7.
  45. Morgan MA, Dana J, Loewenstein G, Zinberg S, Schulkin J. Interactions of doctors with the pharmaceutical industry. *J Med Ethics.* 2006;32(10):559-63.
  46. Chakrabarti A, Fleisher WP, Staley D, Calhoun L. Interactions of staff and residents with pharmaceutical industry: a survey of psychiatric training program policies. *Ann R Coll Physicians Surg Can.* 2002;35(8 Suppl.):541-6.
  47. Walley T. Therapeutic conservatism. *J R Coll Physicians Lond.* 1994;28(1):86-7.

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