

A survey of pharmaceutical company representative interactions with doctors in Libya

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Objectives: To examine the frequency of pharmaceutical company representative (PCR) interactions with doctors in Libya and review possible associations between these interactions and the personal and practice setting characteristics of doctors.

Method: An anonymous survey questionnaire was circulated to 1,000 Libyan doctors in selected public and private practice settings in Tripoli, Benghazi and Sebha.

Results: A questionnaire return rate of 61% (608 returned questionnaires) was achieved. Most respondents (94%) reported that they had been visited by PCRs at least 'once' in the last year. Fifty per cent of respondents met with PCRs at least once a month, and 20% at least once a week. The following characteristics were significantly associated with meeting with a representative more than once a week: age, gender (male > female), years of practice, being a specialist (other than an anaesthesiologist) or working in private practice. Ninety-one per cent of doctors reported that they had received at least one kind of relationship gift during the last year. Printed materials (79%), simple gifts (73%) and drug samples (69%) were the most common relationship products given to respondents. Reimbursements or sponsored items were reported by 33% of respondents. Physician specialists were more likely to receive drug samples or sponsored items than residents, general practitioners, anaesthesiologists or surgeons ($P < 0.01$). Participants working in private practice alone or in both sectors were more likely to receive printed materials, simple gifts or free samples from PCRs than doctors working in the public sector ($P < 0.05$).

Conclusion: Libyan doctors are frequently visited by PCRs. Doctors, working in private practice or specialist practice, are especially targeted by promotional activities. An agreed code of conduct for pharmaceutical promotion in Libya between doctors and PCRs should be created.

Keywords: *pharmaceutical promotion; gift giving; pharmaceutical representative visits*

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Expenditure on pharmaceuticals is a substantial component of the health care budgets of most nations. In 2009, the expenditure on prescription drugs in the United States was approximately \$300 billion (1).

Marketing and promotional activities constitute a large proportion of the budgets of pharmaceutical companies, and approximately 30% of the employees in pharmaceutical companies are engaged in marketing activities (2). In the United States, companies spend more than \$11 billion annually on pharmaceutical promotion, and in 2004 alone they spent \$7 billion on direct marketing to clinicians (3).

Amongst the marketing techniques employed by the pharmaceutical industry, the use of pharmaceutical company representatives (PCRs) constitutes one of the most

expensive and extensively used promotional tools (2, 4, 5). A PCR can be defined as a drug company employee who regularly visits physicians to provide information on the company's products. A successful PCR has a high sales rate, dominates his or her business region and has an ability to maintain clients (6). It has been estimated that pharmaceutical companies spend approximately \$8,000–13,000 per doctor per year (7), and of the \$11 billion spent annually on promotion, 45% is allocated to PCR activities (8, 9).

Contact between a PCR and a medical practitioner is therefore viewed by drug companies as a vital part of their marketing strategy. Evidence suggests that in most countries 80–90% of doctors are frequently visited by PCRs (10). Wazana reviewed 16 studies from the international literature and reported that the majority of

medical practitioners usually meet with PCRs approximately four times a month (11).

To establish or maintain their relationship with prescribers, PCRs employ many techniques. Gift-giving is a common practice in many cultures and industries. Pharmaceutical companies spend between \$12 and 15 billion a year on gifts and payments (12, 13). PCRs often offer doctors a variety of simple gifts during visits such as stationery supplies bearing company product trade names during their visits. Moderately priced gifts (\$20–100), such as textbooks or meal invitations, are also common inducements offered by PCRs. ‘Noteworthy’ or expensive gifts such as travel for attendance of conferences or invitations as speakers in pharmaceutical-sponsored activities are sometimes provided (14). Distributing ‘free’ drug samples to physicians is also a commonly employed practice. In 2004 alone, the Kaiser Family Foundation reported that pharmaceutical companies spent \$15.9 billion marketing drug samples to physicians and that this represented the largest component of their promotional budget (57%) (3).

Visits and gifts from PCRs are designed to increase prescription sales for specific products (15) and can cultivate subconscious commercial or conflict of interest relationships with prescribers (13). From an industry perspective companies assert that the interactions between their PCRs and medical practitioners result in raised awareness of their products and therefore have direct benefits for patients (16). The difficulty with gift giving, however, centres around the perception that accepting gifts can imply a social relationship and this obligation relationship may generate a potential conflict of interest (17). Studies have reported that pharmaceutical promotional interactions with doctors can have a negative impact on prescribing practice (11).

The majority of pharmaceutical marketing occurs in developed countries, and in 2006 as a proportion of the international market for pharmaceuticals, the Middle-East and North Africa regions contributed only 1.8% (18). In Libya, pharmaceutical supplies were previously provided to both the public and private sectors by the National Pharmaceutical and Medical Supplies Company, but currently international pharmaceutical companies are also permitted to market and supply their products through both public and private health sectors via local agencies (19). In 2009, over 300 multinational pharmaceutical manufacturers from Europe, Asia and the Middle East were registered as permitted drug suppliers to Libya (20). Pharmaceutical promotion guidelines exist in many developed countries to prevent or discourage potentially unethical practices (21–25), but most developing countries do not have official policies or codes of conduct to regulate the conduct or content of visits.

It has been demonstrated that doctors’ personal, demographic and professional practice settings can influence their involvement in promotional activities (11, 26–30). Since there has been little or no research to investigate the extent and determinants of doctors’ participation with the marketing and promotional activities used by PCRs in Libya, the aim of this study was to examine the extent of doctors’ involvements in PCRs’ activities and determine whether demographic or practice characteristics were associated with engagement in these activities.

Method

An anonymous survey was conducted to investigate Libyan doctors’ interactions with PCRs. As the central database of practicing doctors in Libya was not accessible, it was decided to use a convenience sample to target medical practitioners of the major hospitals of Tripoli, Benghazi and Sebha, the three main Libyan cities that represent a diversity of geographical areas and population size. Hospitals approached included public, private and university hospitals. Medical practitioners from each city’s major public and private hospitals and health services (see Appendix) were invited to participate in the study. All types of primary and secondary care providers were targeted; however, some specialties were excluded because doctors in these specialties (radiologists, pathologists, medical geneticists and preventive medicine physicians) typically prescribe few medications to patients and would therefore potentially be targeted less by PCRs.

A self-administered questionnaire was developed based on previous published studies (28, 29, 31–33) to examine the characteristics of the respondents and their practices, the frequency of promotional visits and the range of pharmaceutical promotional activities experienced. For the purposes of this study, printed materials were defined as any journal, brochure or pamphlet. A simple gift was defined as any stationery item (such as a pen, notepad, diary or calendar). A sponsored item was defined as travel, luggage and assistance with conference attendance or provision of meals. An inducement referred to direct payment or reward for prescribing the promoted drug.

The questions assessed in this publication were as detailed in Fig. 1.

Survey administration

A letter from the Libyan embassy in Australia endorsing the researcher was provided to the administration departments of the major hospitals in Tripoli, Benghazi and Sebha. The chief researcher then asked permission from each institute to distribute the questionnaires. He was granted access to each of the institutions listed in the Appendix and personally invited participation.

1. *General Demographic data*

Age:

- 25–35
 36–45
 46–55
 56–65

Gender

- Female
 Male

2. *Physician practice characteristics*

Years of practice:

- 1–3
 4–6
 7–9
 ≥10

Location

- Tripoli
 Benghazi
 Sebha

Practice setting:

- Public
 Private
 Both

Area of practice

- Resident Medical Officer
 Anaesthesiologist
 General Practitioners
 Surgeon
 Physician Specialist
 Other

3. *How often do you communicate with pharmaceutical representatives?*

- Never
 >1–2/year
 >1/3months
 >1/month

- >2/month
 >1/week
 >2/week
 >1/day

4. *How often were you given any of the following promotional tools over the last 12 months?*

Printed materials (journal articles, brochures or pamphlets)

- Never
 Once
 2–5 times
 >5 times

Textbooks

- Never
 Once
 2–5 times
 >5 times

Simple gifts (pens, note pads, stationery items)

- Never
 Once
 2–5 times
 >5 times

Sponsored travel, luggage, assistance with conference attendance, meals.

- Never
 Once
 2–5 times
 >5 times

Drug samples

- Never
 Once
 2–5 times
 >5 times

Direct Inducements for prescribing the promoted drugs

- Never
 Once
 2–5 times
 >5 times

Fig. 1. Questions employed to examine visiting frequency, personal characteristics, practice characteristics, visiting frequency and receipt of promotional tools.

Doctors were invited to voluntarily participate in the anonymous survey, and each survey form was accompanied by a cover letter, supplied with a sealed envelope that contained the questionnaire. The objectives of the study were also personally explained to all participants as well as explanations regarding the techniques employed to assure confidentiality and anonymity. If agreeable to participation, the doctors were provided with the questionnaire to complete at a convenient time. As detailed previously, the questionnaire was provided to the doctors in a sealed envelope (with no personally identifiable labels on the survey form) to ensure the confidentiality and anonymity of the survey. After completion, the survey was handed to the hospital medical secretary in a separate sealed anonymous envelope for collection by the chief researcher at a later date. If a doctor was not able to fill out the questionnaires because of a heavy workload or were not available, they were visited a second and third time to encourage participation. All the collected sealed questionnaires were not opened until the entire data collection period was completed. The study was conducted between August and October 2010.

The original target sample involved issuing 1,000 questionnaires with a return expectation of more than 50%. The study was approved by the University of South Australia's Human Research Ethics Committee.

Statistical analysis

The data from the survey was entered into Microsoft Excel 2007. All analyses were then performed with the Statistical Package for the Social Sciences (SPSS version 17), and reported *P* values were all two-tailed.

Bivariate analyses were carried out to examine possible associations between subject's or practice characteristics and each of the promotional tools. We performed pairwise comparisons between subgroups for each independent variable.

Non-parametric statistical techniques (Kruskal–Wallis Test, Mann–Whitney test and Gamma test) were employed to further examine the significance of the data.

Logistic regression was also used to assess possible associations between personal and practice characteristics of respondents (age, gender, years of practice, practice setting, location of practice setting and area of practice) and visiting rates and frequency of receiving promotional tools. For the regression analysis of frequency of receiving any promotional tool versus visiting rate, the population was divided into those practitioners who were visited at least once a week versus those doctors who were visited less than once a week. To further assess factors that might influence the receipt of particular promotional tools, the population was divided into those practitioners who never received the promotional tool versus those who did.

Both unadjusted and adjusted odds ratio models were used for logistic regression analysis. The unadjusted effects model examined relationships between each individual predictor variable and the dependent variable without controlling for the other variables in the model, while the adjusted effects analysis examined the impact of a given variable after controlling for the other predictor variables.

Results

General characteristics of the sample

Of the 1,000 questionnaires circulated, 616 questionnaires were returned. Eight questionnaires had incomplete data and were omitted from the final analysis. Six hundred and eight (61%) of the returned questionnaires were therefore included for analysis.

There were more male respondents (371; 61%) than female respondents (237; 39%), with the majority from Tripoli (481; 79%). Of respondents, 399 (66%) were in the younger age group [25–35]. This was also reflected in the number of years of practice analysis where the largest group of respondents had between 1 and 3 years of practice experience (288; 47%). The majority (274; 45%) of respondents were general practitioners and were employed in the public sector (512; 84%) (Table 1).

Visiting rate

Most doctors (574; 94%) reported that they had been visited by PCRs at least 'once' in the last year (Table 1). Of the 574 doctors, 286 (50%) reported at least one visit a month. Approximately one-fifth of respondents (118; 20.5%) reported that they had been visited at least 'once a week', while 14 (2.6%) doctors reported one or more interaction with a PCR each day (Table 1).

Gender

Female doctors were visited less frequently by PCRs ($P < 0.001$) (Table 1). The majority of female respondents (62%) were visited at least once every 3 months compared to at least once a month for the majority of male doctors (52%). Out of 88 respondents who reported they had interactions with PCRs at least 'once a week', only 33 (25%) were female. Male doctors were more than twice as likely as female doctors to see PCRs at least once a week (unadjusted OR = 2.14; $P < 0.01$) (Table 2).

Age

There was a statistically significant difference in visiting rates based on age group ($P < 0.001$) (Table 1). All doctors older than age 45 communicated with PCRs.

Of the 162 (27%) respondents who only reported interacting with PCRs 'once to twice a year', 125 (77%) were in the 25 to 35-year age group. By contrast, respondents in the 56–65 age group were more than three

Table 1. Likelihood of meeting with a PCR vs. specific characteristics of the doctor

	(Number of respondents, %)								Total (study group demographic) N (%)
	Never	1-2 visits a year	1 visit every 3 months	1 visit a month	2 visits a month	1 visit a week	2 visits a week	1 visit a day	
Age, $P < 0.001$ (Gamma test)									
25-35	32 (8)	125 (31)	81 (20)	62 (16)	40 (10)	27 (7)	25 (6)	7 (2)	399 (66)
36-45 ^Ω	3 (2)	22 (18)	27 (22)	20 (16)	21 (17)	8 (7)	18 (15)	4 (3)	123 (20)
46-55 ^Ω	0	10 (16)	17 (27)	8 (13)	8 (13)	4 (6)	15 (23)	2 (3)	64 (11)
56-65 ^Ω	0	5 (23)	2 (9)	1 (5)	6 (27)	2 (9)	5 (23)	1 (5)	22 (3)
Gender									
Female	20 (8)	74 (31)	56 (24)	35 (15)	22 (9)	14 (6)	14 (6)	2 (1)	237 (61)
Male ^Ω	15 (4)	88 (24)	71 (19)	56 (15)	53 (14)	27 (7)	49 (13)	12 (3)	371 (39)
Years of practice, $P < 0.001$ (Gamma test)									
1-3	30 (10)	102 (35)	55 (19)	41 (14)	25 (9)	14 (5)	16 (6)	5 (2)	288 (47)
4-6 ^Ω	2 (2)	16 (20)	24 (29)	14 (17)	11 (13)	10 (12)	3 (4)	2 (2)	82 (14)
7-9 ^Ω	2 (2)	13 (29)	7 (16)	5 (11)	7 (16)	5 (11)	6 (13)	0 (0)	45 (8)
≥10 ^Ω	1 (0.5)	31 (16)	41 (21)	31 (16)	32 (17)	12 (6)	38 (20)	7 (4)	193 (32)
Practice setting, $P < 0.001$ (Kruskal-Wallis)									
Public	35 (7)	150 (29)	119 (23)	80 (16)	55 (11)	26 (5)	40 (8)	7 (1)	512 (84)
Private ^Ω	0 (0)	2 (6)	2 (6)	1 (3)	6 (18)	9 (26)	12 (35)	2 (6)	34 (6)
Both ^Ω	0 (0)	10 (16)	6 (10)	10 (16)	14 (23)	6 (10)	11 (18)	5 (8)	62 (10)
Location of practice setting, $P = 0.002$ (Kruskal-Wallis)									
Sebha	3 (6)	25 (50)	8 (16)	4 (8)	3 (6)	3 (6)	3 (6)	1 (2)	50 (79)
Benghazi	8 (10)	20 (26)	17 (22)	14 (18)	8 (10)	1 (1)	6 (8)	3 (4)	77 (13)
Tripoli ^Ω	24 (5)	117 (24)	102 (21)	73 (15)	64 (13)	37 (8)	54 (11)	10 (2)	481 (8)
Area of practice, $P < 0.001$ (Kruskal-Wallis)									
Resident medical officer	15 (37)	13 (32)	6 (15)	4 (10)	2 (5)	1 (2)	0	0	41 (7)
Anaesthesiologist ^{Ω,#}	2 (3)	32 (52)	12 (20)	8 (13)	3 (5)	1 (2)	2 (3)	1 (2)	61 (10)
GP ^Ω	14 (5)	75 (27)	61 (22)	47 (17)	30 (11)	20 (7)	23 (8)	4 (1)	274 (45)
Surgeon ^Ω	3 (3)	27 (27)	24 (24)	13 (13)	13 (13)	8 (8)	9 (9)	2 (2)	99 (16)
Others ^{Ω,#}	0 (0)	5 (12)	10 (24)	8 (19)	8 (19)	5 (12)	5 (12)	1 (2)	42 (7)
Physician specialist ^{Ω,#}	1 (1)	10 (11)	14 (15)	11 (12)	19 (21)	6 (7)	24 (26)	6 (7)	91 (15)
Total	35	162	127	91	75	41	63	14	608

^ΩMann Whitney test significant for comparison with the first category in the group.

[#]Significant comparison with general practitioners. $P < 0.05$.

Table 2. Likelihood of meeting with a PCR more than once a week vs. specific characteristics of the doctor

	<1/week N (%)	≥1/week N (%)	Unadjusted			Adjusted		
			Sig	OR	95% CI	Sig	OR	95% CI
Age*								
25–35	340 (85)	59 (15)		1			1	
36–45	93 (76)	30 (24)	0.014	1.85	1.1–3.0	0.600	0.76	0.2–2.08
46–55	43 (67)	21 (34)	0.001	2.81	1.5–5.0	0.740	0.818	0.2–2.6
56–65 ^Ω	14 (64)	8 (36)	0.010	3.29	1.3–8.2	0.926	1.069	0.2–4.4
Gender*								
Female	207 (87)	30 (13)		1				
Male	283 (76)	88 (24)	0.001	2.14	1.3–3.3	0.071	1.615	0.9–2.7
Years of practice*								
1–3	253 (88)	35 (12)		1			1	
4–6	67 (82)	15 (18)	0.154	1.61	0.83–3.13	0.690	1.157	0.5–2.3
7–9	34 (76)	11 (24)	0.030	2.33	1.08–5.0	0.150	1.929	0.7–4.7
≥10	136 (70)	57 (30)	<0.001	3.03	1.8–4.8	0.432	1.568	0.5–4.8
Practice setting*^Ω								
Public	439 (86)	73 (14)		1			1	
Private	11 (32)	23 (68)	<0.001**	12.5	5.8–26.8	<0.001	11.175	4.8–25.7
Both	40 (65)	22 (35)	<0.001**	3.30	1.85–5.8	0.003	2.644	1.4–4.9
Location of practice setting								
Sebha	43 (86)	7 (14)		1			1	
Benghazi	67 (87)	10 (13)	0.870	0.917	0.32–2.5	0.490	1.370	0.5–3.3
Tripoli	288 (79)	101 (21)	0.246	1.63	0.71–3.7	0.618	0.749	0.2–2.3
Area of practice*^Ω								
Resident medical officer	40 (98)	1 (2)		1			1	
Anaesthesiologists	57 (93)	4 (7)	0.364	2.8	0.30–26	0.767	1.414	0.1–13.9
GP	227 (83)	47 (17)	0.039	8.2	1.1–61.7	0.087	5.861	0.7–44.4
Surgeons	80 (81)	19 (19)	0.031	9.5	1.2–73.5	0.216	3.832	0.4–31.5
Others	31 (74)	11 (26)	0.013	14.1	1.7–115	0.083	6.832	0.7–59.9
Physician specialists	55 (60)	36 (40)	0.002**	26.1	3.4–199	0.025	11.544	1.3–98.5

*Unadjusted OR significant $P < 0.05$ **Adjusted OR significant $P < 0.05$.

CI: Confidence interval.

times as likely as those aged 25–35 to be visited by PCRs at least ‘once each week’ (unadjusted OR = 3.29; $P < 0.05$) (Table 2).

Years of practice

Doctors who had been practicing for in excess of 10 years were more than three times as likely as those having ‘1–3 years of practice’ to meet a PCR at least once a week (unadjusted OR = 3.03; $P < 0.001$) (Table 2).

The majority (63%) of senior doctors (≥10 years of practice) saw PCRs at least once a month (Table 1). Of the 14 respondents who saw PCRs ‘once a day’, 50% had at least 10 years of practice. The more than 10 years of practice group also reported high results for the two visits a week (60%) or once a week response (30%). Only 1%

of respondents from this group reported that they had not interacted with PCRs in the previous 12 months. By contrast, the majority of junior doctors (64%) were visited less than once every 3 months. Only 35 (13%) doctors with 1–3 years of practice experience were visited by PCRs more than once a week, and 10% of respondents from this age group also reported that they had never interacted with a PCR.

Practice setting

All participants who worked in the private sector either exclusively or in both private and public sectors reported that they had been visited by PCRs at least once during the last 12 months. The majority of respondents (67%) who worked in the private sector interacted with PCRs

at least once a week (Table 1). There was a statistically significant difference in visiting rates according to their practice setting ($P < 0.001$).

Twenty-three (67%) participants who worked in the private sector were visited at least once a week compared with 73 (14%) from the public sector. Doctors who worked in 'the private sector' were more than 12 times as likely as those who worked in 'the public sector' to see PCRs at least 'once a week' (unadjusted OR = 12.5; adjusted OR = 11.837; $P < 0.001$) (Table 2). It was also noticeable that doctors who worked in both sectors received more visits than those who worked in the public sector alone ($P < 0.001$). Doctors who were employed in both private and public practice were more than three times as likely as an exclusively public sector employee to receive at least one visit a week from a PCR (Table 2).

Location of practice setting

There was a significant association between visiting rates and location of practice setting ($P = 0.002$) (Table 1). Respondents working in Tripoli were more likely to receive promotional visits than doctors working in Sebha ($P < 0.01$). Half of the Sebha respondents had been visited less than twice in the last year compared to approximately a quarter of the respondents from the two urban cities (Tripoli and Benghazi). There was no difference in visiting rates between Tripoli and Benghazi ($P = 0.07$). Doctors in Tripoli (49%), however, were more likely than doctors in Benghazi (38%) or Sebha (28%) to meet with PCRs more than once a month. Location of practice did not influence the likelihood of being visited at least once a week by PCRs (Table 3).

Area of practice

There were significant differences between visiting rates according to area of practice ($P < 0.001$) (Table 1). Residents and anaesthesiologists were less likely to interact with PCRs on a weekly basis than other groups. By contrast, the majority of physician specialists (61%) and other specialists (64%) were visited 'at least twice a month' and 'once a month', respectively.

Table 3. Frequency of receiving promotional tools in the previous 12 months

	Number (%)			
	Never	Once	2–5 times	> 5 times
Printed materials	128 (21)	94 (15)	223 (37)	163 (27)
Simple gifts	166 (27)	154 (25)	209 (35)	79 (13)
Drug samples	190 (31)	145 (24)	187 (31)	86 (14)
Textbooks	509 (84)	61 (10)	31 (5)	7 (1)
Sponsored items	407 (67)	10 (17)	82 (13)	18 (3)
Direct inducements	511 (84)	46 (8)	36 (6)	15 (2)

This association also translated to respondents who reported 'at least one visit a week' from a PCR, with physician specialists (36; 40%), more likely than other specialists (11; 26%), surgeons (19; 19%), general practitioners (47; 16%), anaesthesiologists (4; 7%) and residents (1; 2%) to be visited at this high rate.

Logistic regression analysis, using residents as the predictor variable, revealed that physician specialists were more than 26 times more likely (unadjusted OR 26.1; 3.4–199; $P = 0.002$) than a resident to receive promotional visits at least once a week (Table 2). General practitioners and surgeons were more than eight (GP unadjusted OR = 8.2; $P = 0.039$), and nine times (surgeon unadjusted OR = 9.5; $P = 9.5$) as likely as residents to see PCRs once a week or more (Table 2).

Of the 14 (12 males and 2 females) respondents who reported that they had been visited at least once a day, 10 were specialists [specialist physician ($n = 6$), surgeons ($n = 2$), anaesthesiologists ($n = 1$), dermatologist ($n = 1$)] who worked in a hospital setting. The other four doctors were GPs. By contrast, there were no 'junior' resident medical officers that interacted with PCRs more than 'once a day'. The highest response for visiting rates amongst residents was 'never' (15; 37%) (Table 2).

Promotional printed material

Promotional printed material was the most frequent gift/tool (79% of respondents) supplied by PCRs during promotional visits. The majority of respondents (64%) received printed material at least twice during the last year. The frequency of doctors receiving printed materials differed according to their age groups and years of practice ($P < 0.001$) (Table 4). Respondents aged 46–55 years were more than four times as likely as those aged 25–35 to receive printed material ($P = 0.003$). Approximately half (13; 48%) of the junior doctors (1–3 years of practice) compared to over three quarters (43; 78%) of those having 'ten years of practice or more' received printed material at least twice within the last 12 months. Senior doctors with 'at least 10 years of practice' were more than three times as likely as 'junior' doctors to receive printed materials ($P < 0.001$).

There was a significant association between receiving printed materials and the respondent's practice setting ($P < 0.001$). Fourteen (41%) of the respondents who were working in the private sector versus 123 (24%) of those working in the public sector had received printed material at least five times during the last 12 months (Table 4). Doctors employed in both public and private sectors had a similar rate of receiving printed material to those working in the private sector alone. Doctors who worked in the private sector alone were more than four times as likely as those who worked in the public sector (unadjusted OR = 4.8; $P < 0.05$) to receive printed material. Similarly, doctors who worked in both sectors were

Table 4. Frequency of receiving printed material vs. Doctors' characteristics

	Frequency of receiving printed material vs. Doctors' characteristics, N (%)					Regression analysis (never vs. receiving)					
	Never	Once	2–5 times	>5 times	Total	Unadjusted			Adjusted		
						Sig	OR	95% CI	Sig	OR	95% CI
Age (Gamma test, $P < 0.001$)											
25–35	98 (25)	71 (18)	138 (35)	92 (23)	399		1			1	
36–45 ^Ω	24 (20)	15 (12)	48 (39)	36 (29)	123	0.248	1.34	0.8–2.2	0.086	0.415	0.1–1.1
46–55 ^Ω	4 (6)	5 (8)	30 (47)	25 (39)	64	0.003	4.88	1.7–13	0.860	1.146	0.2–5.1
56–65 ^Ω	2 (9)	3 (14)	7 (32)	10 (45)	22	0.116	3.25	0.07–14	0.841	0.829	0.1–5.1
Gender (Mann-Whitney, $P < 0.05$)											
Female	59 (25)	38 (16)	83 (35)	57 (24)	237		1			1	
Male	69 (19)	56 (15)	140 (38)	106 (29)	371	0.064	1.45	0.9–2.1	0.970	1.009	0.6–1.5
Years of practice (Gamma test, $P < 0.001$)											
1–3	83 (29)	54 (19)	86 (30)	65 (23)	288		1			1	
4–6 ^Ω	13 (16)	14 (17)	35 (43)	20 (24)	82	0.020	2.149	1.1–4	0.162	1.634	0.8–3.2
7–9	10 (22)	5 (11)	19 (42)	11 (24)	45	0.361	1.417	0.67–2.9	0.378	1.528	0.5–3.9
≥ 10 ^Ω	22 (11)	21 (11)	83 (43)	67 (35)	193	<0.001	3.147	1.8–5.2	0.020	3.932	1.2–12.4
Practice setting (Kruskal-Wallis, $P < 0.001$)											
Public	120 (23)	82 (16)	187 (37)	123 (24)	512		1			1	
Private ^Ω	2 (6)	4 (12)	14 (41)	14 (41)	34	0.031	4.89	1.1–20	0.104	3.435	0.7–15.2
Both ^Ω	6 (10)	8 (13)	22 (35)	26 (42)	62	0.018	2.85	1.2–6.7	0.083	2.274	0.8–5.7
Location of practice setting (Kruskal-Wallis, $P < 0.01$)											
Sebha	15 (30)	8 (16)	17 (34)	10 (20)	50		1			1	
Benghazi	24 (31)	18 (23.5)	17 (22)	18 (23.5)	77	0.054	1.88	0.9–3.6	0.11	1.76	0.8–3.5
Tripoli ^Ω	89 (19)	68 (14)	189 (39)	135 (28)	481	0.889	.946	0.4–2.0	0.763	0.87	0.3–2.03
Area of practice (Kruskal-Wallis, $P < 0.001$)											
Residents	21 (51)	10 (24)	8 (20)	2 (5)	41	1				1	
Anaesthesiologists ^{Ω,#}	21 (34)	12 (20)	22 (36)	6 (10)	61	.093	2.00	0.8–4.4	0.278	1.636	0.6–3.9
General practitioners ^Ω	54 (20)	38 (14)	104 (38)	78 (28)	274	<0.001	4.27	2.16–8.4	<0.001	3.524	1.7–7.1
Surgeons ^Ω	13 (13)	23 (23)	39 (39)	24 (24)	99	<0.001	6.94	2.98–19	0.004	3.905	1.5–9.8
Others ^Ω	8 (19)	6 (14)	13 (31)	15 (36)	42	0.003	4.46	1.66–11	0.053	2.859	0.9–8.2
Physician specialists ^{Ω,#}	11 (12)	5 (5)	37 (41)	38 (42)	91	<0.001	7.63	3.17–18	0.066	2.811	0.9–8.4
Total	128	94	223	163	608						

^ΩMann Whitney test significant for comparison with the first category in the same group.

[#]Significant comparison with general practitioners.

CI: Confidence interval.

more than twice as likely as those who worked in the public sector alone to receive printed material (unadjusted OR = 2.8; $P < 0.05$) (Table 4). There was a statistically significant difference in the receipt rate of printed materials according to the locations of practice setting ($P < 0.01$). Respondents working in Tripoli were more likely to receive printed material than those working in Benghazi or Sebha ($P < 0.01$ and $P < 0.05$, respectively).

The provision of printed material was also influenced by the doctor's type of practice or specialty ($P < 0.001$). Over half of the resident medical officers ($n = 21$; 51%) and one-third of anaesthesiologists (21; 34%) reported that they had never received any printed materials. By contrast, physician specialists had the highest rate of receiving printed material ($n = 80$; 88%). Surgeons and physician specialists were seven times more likely than their residents to receive printed materials (unadjusted OR = 6.94 and 7.63, respectively; $P < 0.001$). Forty-nine per cent of the residents, compared to 80% ($n = 88$) of physician specialists received printed materials within the last 12 months. More than two-thirds of general practitioners, anaesthesiologists, general practitioners, and surgeons and 'others' reported that they received printed materials within same period. Adjusted logistic regression showed that area of practice ($P < 0.01$) was the only statistically significant independent predictor factor that influenced doctors' receipt of printed materials (Table 4).

Simple gifts

Simple gifts were the second most common tools used by PCRs during their promotional visits. The majority of respondents (442; 73%) received simple gifts from pharmaceutical companies. Nearly half of the total respondents (288; 48%) received simple gifts at least twice during the last year. There was a statistically significant difference in frequency of receiving simple gifts between respondents according to their age groups or years of practice ($P < 0.001$). Approximately one-third (131; 33%) of the respondents aged 25–35 versus only three individuals (14%) aged 56–65 reported they had not received a gift from a PCR (Table 5) in the last 12 months. By contrast, doctors with more than 10 years of practice experience received simple gifts nearly four times as often as junior doctors (unadjusted OR = 3.9; $P < 0.001$). Male doctors (280; 75%) were more likely to receive simple gifts from pharmaceutical companies than female practitioners (162; 68%; $P < 0.05$) (Table 5).

There was a significant difference in the frequency of receiving simple gifts according to practice setting ($P < 0.001$) (Table 4). Participants working solely in private practice or in both private and public sectors were more likely to receive simple gifts from PCRs than those working exclusively in the public sector ($P < 0.05$). Doctors who worked in 'both sectors' were more than six

times as likely as those who worked in the public sector alone to receive simple gifts (unadjusted OR = 6.5; $P < 0.001$; adjusted OR = 4.3; $P < 0.01$) (Table 5).

A doctor's area of practice was significantly associated with the frequency of receiving simple gifts ($P < 0.001$). Physician specialists were more likely to receive simple gifts than residents ($P < 0.001$), anaesthesiologists ($P = 0.001$), general practitioners ($P < 0.001$) or surgeons ($P = 0.018$). However, residents were less likely to receive gifts than anaesthesiologists (unadjusted OR = 6.5; $P = 0.001$), general practitioners (unadjusted OR = 5.41; $P < 0.001$) or surgeons (unadjusted OR = 6.7; $P < 0.001$). Out of 79 respondents who had received simple gifts 'more than five times', most ($n = 47$; 60%) were specialists [physician specialists, 19; surgeons, 15; anaesthesiologists, 5; dermatologists, 3; paediatricians, 3; urologists, 1; and gynecologists, 1]. Of the doctors who did not receive a simple gift in the previous 12 months, the highest proportion were residents ($n = 28$; 68%).

In summary, physician specialists were approximately 14 times as likely to receive simple gifts ($P < 0.001$) (Table 4). Adjusted logistic regression analysis revealed that area of practice ($P = 0.001$), years of practice ($P < 0.05$) and practice setting ($P < 0.01$) were the only independent predictor factors that influenced doctors' receipt of simple gifts.

Drug samples

The majority of respondents (69%) reported that they had been given drug samples. Nearly half of the surveyed respondents (273; 45%) received free samples at least twice during the last 12 months (Table 6). Generally, frequency of receiving drug samples was related to age group or number of years of practice of respondents ($P < 0.001$). Over two-thirds of respondents older than 45 years (58 out of 86; 67%) received drug samples at least twice within the last 12 months. Respondents aged 56–65 were more than 12 times as likely as doctors aged 25–35 to receive drug samples (unadjusted OR = 12.65; $P < 0.05$) (Table 6). Senior doctors with 'at least 10 years of practice' were much more likely to be supplied with drug samples than junior doctors (163; 84% vs. 162; 56%) (adjusted OR = 6.41, unadjusted OR = 3.9, $P < 0.01$).

Male doctors were more likely to receive free samples than female doctors ($P < 0.05$). Almost half the male doctors 180 (49%) had been given drug samples at least twice in the last year compared to female doctors 93 (39%).

There was a significant difference in frequency of receiving free samples according to a doctor's practice setting ($P < 0.001$). Over 90% of doctors working in private or in both the private and public sectors had received drug samples compared with 65% of doctors who worked in the public sector alone (Table 6). Doctors who worked in the private sector alone or both sectors

Table 5. Frequency of receiving simple gifts vs. doctors' characteristics

	Frequency of receiving simple gifts vs. doctors' characteristics, N (%)					Regression analysis (never vs. receiving)					
	Never	Once	2-5 times	>5 times	Total	Unadjusted			Adjusted		
						Sig	OR	95% CI	Sig	OR	95% CI
Labels age (Gamma test, $P < 0.001$)											
25-35	131 (33)	106 (27)	122 (31)	40 (10)	399		1			1	
36-45 ^Ω	25 (20)	26 (21)	50 (41)	22 (18)	123	0.009	1.91	1.1-3.1	0.126	0.466	0.1-1.2
46-55 ^Ω	7 (11)	18 (28)	25 (39)	14 (22)	64	0.001	3.98	1.7-8.9	0.776	0.823	0.2-3.1
56-65 ^Ω	3 (14)	4 (18)	12 (55)	3 (14)	22	0.073	3.09	0.9-10.6	0.712	0.737	0.1-3.7
Gender											
Female	75 (32)	62 (26)	74 (31)	26 (11)	237		1			1	
Male	91 (25)	92 (25)	135 (36)	53 (14)	371	0.055	1.4	0.99-2	0.866	0.964	0.6-1.4
Years of practice (Gamma test, $P < 0.001$)											
1-3	112 (39)	74 (26)	79 (27)	23 (8)	288		1			1	
4-6 ^Ω	16 (20)	24 (29)	31 (38)	11 (13)	82	<0.01	2.62	1.4-4.7	0.44	1.916	1.01-3.6
7-9 ^Ω	11 (24)	6 (13)	17 (38)	11 (24)	45	0.066	1.96	0.9-4.0	0.157	1.895	0.7-4.5
≥10 ^Ω	27 (14)	50 (26)	82 (42)	34 (18)	193	<0.001	3.91	2.4-6.2	0.12	4.188	1.3-12.8
Practice setting (Kruskal-Wallis, $P < 0.001$)											
Public	159 (31)	131 (26)	167 (33)	55 (11)	512		1			1	
Private ^Ω	3 (9)	8 (47)	16 (47)	7 (21)	34	0.012	4.65	1.4-15.4	0.084	2.98	0.8-10.3
Both ^Ω	4 (6)	15 (24)	26 (42)	17 (27)	62	<0.001	6.53	2.3-18.3	0.009	4.169	1.4-12.1
Location of practice setting (Kruskal-Wallis, $P < 0.01$)											
Sebha	18 (36)	11 (22)	13 (26)	8 (16)	50		1			1	
Benghazi	25 (32)	20 (26)	23 (30)	9 (12)	77	0.115	1.63	0.8-3.0	0.239	1.5	0.7-2.9
Tripoli	123 (26)	123 (26)	173 (36)	62 (13)	481	0.681	1.17	0.5-2.4	0.788	0.89	0.3-2.05
Area of practice (Kruskal-Wallis, $P < 0.001$)											
Residents	28 (68)	7 (17)	6 (15)	0	41		1			1	
Anaesthesiologists ^Ω	20 (33)	16 (26)	20 (33)	5 (8)	61	<0.001	6.53	2.3-18.3	0.011	3.261	1.3-8.1
General practitioners ^Ω	78 (28)	78 (28)	87 (32)	31 (11)	274	<0.001	5.41	2.6-10	<0.001	4.189	2.0-8.6
Surgeons ^Ω	24 (27)	27 (27)	33 (33)	15 (15)	99	<0.001	6.73	3.01-15	0.007	3.326	1.37-8.0
Others ^{Ω,#}	4 (17)	7 (17)	22 (52)	9 (21)	42	<0.001	6.53	2.3-18.3	<0.001	11.65	3.2-41.8
Physician specialists ^{Ω,#}	12 (21)	19 (21)	41 (45)	19 (21)	91	<0.001	6.53	2.3-18.3	0.005	4.79	1.6-14.1
Total	166	154	209	79	608						

^ΩMann-Whitney test significant for comparison with the first category in the same group.

[#]Significant comparison with general practitioners.

CI: Confidence interval.

Table 6. Frequency of receiving free drug samples vs. doctors' characteristics

	Frequency of receiving free samples vs. doctors' characteristics, N (%)					Regression analysis (never vs. receiving)					
	Never	Once	2-5 times	> 5 times	Total	Unadjusted			Adjusted		
						Sig	OR	95% CI	Sig	OR	95% CI
Labels age (Gamma test, $P < 0.001$)											
25-35	150 (38)	95 (24)	109 (27)	45 (11)	399		1			1	
36-45 ^Ω	26 (21)	36 (29)	43 (35)	18 (15)	123	<0.01	2.24	1.39-3.6	0.41	0.348	0.1-0.9
46-55 ^Ω	13 (20)	10 (16)	26 (41)	15 (23)	64	0.009	2.36	1.24-4.4	0.011	0.188	0.05-0.6
56-65 ^Ω	1 (5)	4 (18)	9 (41)	8 (36)	22	0.014	12.65	1.68-95	0.861	1.228	0.1-12.1
Gender											
Female	82 (35)	62 (26)	69 (29)	24 (10)	237	0				1	
Male	108 (29)	83 (22)	118 (32)	62 (17)	371	0.155	1.2	0.90-1.82	0.53	0.876	0.5-1.3
Years of practice (Gamma test, $P < 0.001$)											
1-3	126 (44)	64 (22)	70 (24)	28 (10)	288		1			1	
4-6 ^Ω	24 (29)	22 (27)	23 (28)	13 (16)	82	<0.01	2.625	1.10-3.19	0.219	1.439	0.8-2.5
7-9 ^Ω	10 (22)	13 (29)	17 (38)	5 (11)	45	0.066	1.967	1.2-5.7	0.024	2.981	1.1-7.7
≥10 ^Ω	30 (16)	46 (24)	77 (40)	40 (21)	193	<0.001	3.912	2.6-6.6	0.001	6.398	2.04-20
Practice setting (Kruskal-Wallis, $P < 0.001$)											
Public	181 (35)	129 (25)	143 (28)	59 (12)	512		1			1	
Private ^Ω	3 (9)	6 (18)	15 (44)	10 (29)	34	0.005	5.65	1.7-18.7	0.34	3.88	1.1-13.6
Both ^Ω	6 (10)	10 (16)	29 (47)	17 (27)	62	<0.001	5.10	2.1-12	0.01	3.35	1.3-8.4
Location of practice setting (Kruskal-Wallis, $P < 0.01$)											
Sebha	142 (30)	115 (24)	152 (32)	72 (15)	481		1			1	
Benghazi	27 (35)	17 (22)	25 (32)	8 (10)	77	0.071	1.72	0.9-3.1	0.121	1.69	0.8-3.2
Tripoli	21 (42)	13 (26)	10 (20)	6 (12)	50	0.432	1.34	0.6-2.7	0.793	1.117	0.4-2.5
Area of practice (Kruskal-Wallis, $P < 0.001$)											
Residents	30 (73)	6 (15)	3 (7)	2 (5)	41		1			1	
Anaesthesiologists [#]	32 (52)	18 (30)	8 (13)	3 (5)	61	0.038	2.47	1.05-5.8	0.255	1.713	0.6-4.3
General practitioners ^Ω	89 (32)	72 (26)	84 (31)	29 (11)	274	<0.001	5.66	2.7-11.8	<0.001	4.489	2.1-9.5
Surgeons ^{Ω,#}	20 (20)	25 (25)	36 (36)	18 (18)	99	<0.001	10.77	4.6-20	<0.001	6.188	2.4-15.5
Others ^{Ω,#}	9 (21)	10 (24)	14 (33)	9 (21)	42	<0.001	10.00	3.6-27.4	0.002	5.620	1.9-16.5
Physician specialists ^{Ω,#}	10 (11)	14 (15)	42 (46)	25 (27)	91	<0.001	22.09	8.5-57.3	<0.001	10.727	3.4-33.4
Total	190	145	187	86	608						

^ΩMann Whitney test significant for comparison with the first category in the same group.

[#]Significant comparison with general practitioners.

CI: Confidence interval.

were more than five times as likely as those who worked in the public sector alone to receive drug samples (unadjusted OR = 5.6 and 5.10; $P < 0.01$) (Table 5).

There was also a significant association between frequency of receiving free samples and area of practice ($P < 0.001$). Nearly three quarters of residents (30; 73%) and just in excess of 50% of anaesthesiologists (32; 52%) reported that they had never received drug samples (Table 6). By contrast, more than 80% of specialists (physician specialists, surgeons, other specialities) received free samples. Physician specialists were more likely to receive drug samples than residents, general practitioners, anaesthesiologists or surgeons ($P < 0.01$). General practitioners were more than five times as likely as residents to receive simple gifts (unadjusted OR = 5.66; $P < 0.001$). Anaesthesiologists were more than twice as likely as residents to receive free samples (unadjusted OR = 2.4; $P < 0.001$).

Adjusted logistic regression modelling for receiving free samples revealed that doctors' age group, years of practice, practice setting and area of practices were the statistically significant independent predictor factors that influenced doctors' receipt of free samples ($P < 0.05$).

Sponsored items

Approximately one-third of respondents (33%) acknowledged that they had received sponsored items (travel, luggage, assistance with conference attendance or provision of meals) at least once during the last year. Frequency of receiving sponsored items differed between respondents according to their age groups and years of practice ($P < 0.001$). Seventy per cent of doctors older than 45 years received at least one sponsored item compared with 43% of respondents younger than 45 years (Table 7). Male respondents were more likely to receive sponsored items than females ($P < 0.05$).

The frequency of receiving sponsored items was also influenced by their area of practice ($P < 0.001$). There were significant differences between physician specialists and residents, general practitioners and surgeons ($P < 0.001$). The majority of physician specialists (51; 56%) had received at least one sponsored item. There was a lower rate amongst general practitioners (80; 30%), surgeons (30; 29%), anaesthesiologists (22; 36%) and residents (3; 7%). Physician specialists were more than 16 times as likely as residents to receive sponsored items (unadjusted OR = 16.15; adjusted OR = 5.6; $P < 0.001$) (Table 7).

Textbooks

Ninety-nine respondents (16%) received one or more textbooks in the last year (Table 3). Of the 99 respondents who admitted to receiving a textbook, 61 (62%) received one book, 31 received two to five books and 7 doctors received more than five textbooks in the last 12 months.

Direct inducements

Ninety-seven doctors (16%) admitted to receiving direct inducements from PCRs (Table 3). Approximately one-half (46 out of 97) of these respondents received one inducement and 15% (15 of the 97) received inducements more than five times during the last year. There was a significant difference in likelihood of receiving direct inducements according to their practice setting with ($P < 0.01$). Doctors working in both sectors 'private and public' were more likely to receive inducements than those who worked in the public sector alone ($P < 0.001$). Almost one-third (20; 32%) of doctors who worked in both sectors received inducements compared to approximately one-sixth of those who worked solely in public practice (71; 14%).

Discussion

A total of 608 out of the 1000 Libyan doctors surveyed responded to the questionnaire, which exceeded our targeted return of 50%. The majority of doctors (574; 96%) indicated that they had been visited by PCRs in the previous 12 months, and approximately half were visited at least once a month. By comparison, Libyan doctors were visited less frequently than their Turkish and Tunisian counterparts (72% of doctors were visited at least once a month) (29, 32) and considerably less than the four times a month rate commonly reported in Western developed countries (USA/Canada/NZ) (11, 34–37). In Libya, pharmaceutical marketing activities have increased in the last decade but appear less prevalent than in other countries.

This study found almost all medical practitioners (91%) reported that they had received gifts during the previous year. Many kinds of marketing tools were used but printed materials (79%), simple gifts (73%) and drug samples (69%) were the most common promotional gifts supplied. This is concordant with Australian (38), Japanese (39), German (40) and US (41) results, which reported that simple gifts and drug samples were the most common tools used by PCRs. Reimbursements or sponsored items were received by 33% of respondents.

PCRs commonly used printed materials to increase awareness and knowledge about their products and to influence attitudes and behaviour. Printed materials are essential components of all marketing strategies and provide written reinforcement of any verbal message provided by PCRs during their promotional visits. They are relatively inexpensive compared with others tools and are an enduring product that allow medical practitioners to review then re-examine the content at a convenient time.

The common use of printed material in Libya was similar to distribution in another developing country (Nigeria) where postable printed material was the most common promotional item distributed by PCRs (42).

Table 7. Frequency of receiving sponsored items vs. doctors' characteristics

	Frequency of doctors' receiving sponsored items, N (%)					Logistic Regression (never vs. receiving)					
	Never	Once	2-5 times	≥5 times	Total	Unadjusted			Adjusted		
						Sig	OR	95% CI	Sig	OR	95% CI
Age, P < 0.001 (Gamma test)											
25-35	297 (74)	47 (12)	46 (12)	9 (2)	399		1			1	
36-45 ^Ω	74 (60)	25 (20)	18 (15)	6 (5)	123	0.248	1.34	0.8-2.2	0.166	0.545	0.2-1.2
46-55 ^Ω	26 (41)	21 (33)	15 (23)	2 (3)	64	0.003	4.88	1.7-13	0.980	0.987	0.3-2.7
56-65 ^Ω	10 (45)	8 (36)	3 (14)	1 (5)	22	0.116	3.25	0.7-14	0.678	0.768	0.2-2.6
Years of practice, P < 0.001 (Gamma test)											
1-3	225 (78)	28 (10)	30 (10)	5 (2)	288		1			1	
4-6	56 (68)	15 (18)	8 (10)	3 (4)	82	0.068	1.658	0.9-2.8	0.201	1.446	0.8-2.5
7-9	31 (69)	7 (16)	6 (13)	1 (2)	45	0.175	1.613	0.8-3.2	0.186	1.680	0.7-3.6
≥10 ^Ω	95 (49)	51 (26)	38 (20)	9 (5)	193	<0.001	3.684	2.4-5.4	0.003	4.211	1.6-10.8
Area of practice, P < 0.001 (Kruskal-Wallis)											
Residents	38 (93)	1 (2)	2 (5)	0 (0)	41	1					
Anaesthesiologists ^Ω	39 (64)	10 (16)	10 (16)	2 (3)	61	0.003	7.145	1.9-25.8	0.014	5.328	1.4-20.1
General practitioners ^Ω	194 (71)	44 (16)	30 (11)	6 (2)	274	0.007	5.223	1.5-17.4	0.023	4.117	1.2-13.9
Surgeons ^Ω	69 (70)	17 (17)	10 (10)	3 (3)	99	0.008	5.507	1.5-19.2	0.115	2.87	0.7-10.6
Others ^Ω	27 (64)	7 (17)	7 (17)	1 (2)	42	0.004	7.037	1.8-26.7	0.28	4.73	1.1-19.0
Physician specialists ^{Ω,#}	40 (44)	22 (24)	23 (25)	6 (7)	91	<0.001	16.15	4.6-56.1	0.012	5.66	1.4-22.04
Total	407	101	82	18	608						

^ΩMann-Whitney test significant for comparison with the first category in the same group.

[#]Significant comparison with general practitioners.

CI: Confidence interval.

In developing countries, PCRs are frequently the only source of drug information (43), and they provide information to doctors about their company's products in a variety of ways, including verbal presentations and written materials. In Pakistan, 75% of physicians surveyed admitted that they used information from leaflets when prescribing (44). In Libya, journal advertising, direct mail and e-detailing activities are not widely used; therefore, it is not unexpected that provision of written material during visits was common.

The content of printed material is subject to regulation in many countries. The Libyan Health Law Act number 106 of 1973 and its explanatory notes of 1975 prohibit any advertising of pharmaceutical preparation by words or phrases, which may be unethical. Deciding between ethical and unethical advertising is difficult, but written information supplied by PCRs in developing countries can be biased. In a study conducted in Pakistan, Rohra et al. (45) audited 340 pamphlet and brochure advertisements from pharmaceutical companies and observed that 18% of advertisements were adjudged to be misleading and exaggerated, 32% were ambiguous, 21% were false and 21% were adjudged as controversial (45). Similarly, in a Bangladesh study, 34% of the brochures claims were found to be misleading and were categorised as providing; controversial claims (50%), exaggerated claims (22%) or ambiguous statements 16% (46). In India, Roy et al. interviewed 25 doctors and 36 PCRs. The PCRs admitted that the verbal information conveyed about the promoted products was often inconsistent with the written materials. Doctors also indicated that the PCRs provided literature backup only when repeatedly requested (47). In this study, we did not review and assess the quality of the written information provided by the PCRs, but it should be stressed, however, that although content may be biased and the quality of information supplied variable, the availability and ready access to this form of drug information is often more convenient than obtaining information from other sources. In the absence of independent sources of information in Libya, the use of commercial information therefore is a more convenient resource than retrieval of independent evidence based information (48, 49).

The majority of respondents (442; 73%) in our study received simple gifts from pharmaceutical companies. Receiving trivial value gifts from PCRs can introduce an unconscious and unintentional self-serve bias since simple stationery gifts with the names of products exposes physicians to specific company products. Katz et al. indicated that stationery gifts that display the brand name of a specific product can have a subtle influence on a doctor's prescribing decisions (50) and this silent information regarding brand products, is often more influential than verbal reminders (51). The decision-making process can be influenced by retrieval of brand

information from memory, and this knowledge can be acquired from sources in the external environment (52). Accordingly, the more exposed a doctor is to a promoted product; the more likely it is to enter prescribing consideration. These promotional products even influence medical students' attitudes toward product brands (53). Therefore, all prescribers should acknowledge that even simple gifts are part of a complex combined marketing strategy to influence behaviour. In addition, an individual's impulse to reciprocate for even trivial gifts is often underestimated (17).

Providing prescription drug samples is one of the major marketing activities undertaken by pharmaceutical companies (54) and a common reason for PCR visits. In the United States and England, 92 and 78% doctors reported receiving drug samples from PCRs, respectively (38, 41). The result of the current study (69% of respondents received drug samples) is similar but not as high as the level of sample provision in other countries.

Since a drug sample will ultimately be used by a patient, as compared to other pharmaceutical promotional tools (personal gifts), the acceptance of samples may be regarded as more ethically acceptable (55). Doctors who dispense free samples may believe they are helping patients, rather than believing that PCRs are attempting to influence their prescribing behaviour (11, 56). A Turkish study reported that 44% of doctors believed free drug samples were extremely useful and 84% of respondents used drug samples often or always (57). Morgan et al. found that the main reasons doctors provide drug samples were financial (93.5%), ready availability of the samples (89.1%) or patient request (76.1%) (55). Patient request is more prevalent in developed countries where marketing directly or indirectly to consumers can introduce a further complexity to the provision and supply of drug samples. Companies promote their drug to potential prescribers ("push strategy") and also encourage patients to request prescription of their product ("pull strategy"). Direct patient requests have therefore also been reported to influence doctors' prescribing decisions (57–59).

The potential to provide 'free' pharmaceuticals to patients may encourage physicians to accept PCR visits (23). Any benefit, however, must be balanced by the realization that sample provision is a specific marketing and promotional tool designed to influence drug prescription (54). Several studies have shown that the availability of drug samples may increase subsequent prescription of sampled drugs and compromise patient outcomes. Warrier et al. reviewed 40 studies and found that availability of drug samples influenced doctors' prescribing decisions, increased promoted brand products, decreased prescribing of generic and inexpensive medications and decreased adherence to prescribing practice guidelines. Furthermore, they reported that less

than half of practitioners believed that the presence of drug samples could affect their prescribing behaviour and most practitioners stated that accepting drug samples was not unethical (60). Therefore, it should be remembered that although free medication samples may seem to reduce the financial cost initially, they may result in continuing prescription that is more expensive. The provision of free samples is therefore extremely beneficial to pharmaceutical companies. It increases both the exposure of the representative to the prescribing decision-maker and also increases brand awareness.

The variables for this study included, the age of the participants and years of medical practice, which logically should correspond. Out of 608 of participant doctors, 385(63%) of the respondents were in the younger age group (25–35) and subsequently were junior doctors (1–3 years of medical practice). Out of the 385 junior doctors, only ($n=35$; 9%) said they were visited 'at least once a week' (Table 2). By contrast, of the 84 (14%) doctors older than age 45 who also had ≥ 10 years of practice experience, 29 (34.5%) met with PCRs at least once a week. Our study found area of practice was a significant factor even when adjusted for all other variables. Physician specialists interacted commonly with PCRs and the majority of physician specialists (73%) saw PCRs 'at least once a month' compared to 44% of general practitioners and 17% of residents. Physician specialists were also 26 times more likely than resident medical officers to see a representative more than once a week.

Specialists were, therefore, highly targeted by PCR promotional activities. Although simple cheap gifts (stationery and printed materials) were commonly distributed to all doctors, sponsored items and drug samples were more likely to be provided to specialists. The majority of physician specialists (56%) admitted receipt of a sponsored item compared to only 7.3% of residents and 29.2% of general practitioners. In Australia, 52% of medical specialists reported that had received offers of travel to conferences (61).

With the exception of anaesthesiologists, specialists also received more drug samples than non-specialists. Eighty-nine per cent of physician specialists received free samples compared to 68% of general practitioners. PCRs therefore invest considerable effort toward specialist clients. The association between visiting rate and area of practice has been reported in other studies (62).

Identifying, targeting and influencing opinion leaders remains a critical component of promotional activities (63). According to diffusion theory, behavioural change in medical practitioners can be commenced and then diffused among others if enough opinion leaders (specialists) within the medical health services are acknowledged and able to adopt, endorse and support the behaviour (64). Pharmaceutical companies therefore invest considerable resources in maintaining and encouraging positive

relationships with specialists. Opinion leaders are considered to be reliable sources of information and impose influence on consumer decisions (65). Opinion leaders (specialists) can produce multiplier marketing influences (66) and 'reduce' the indecision of other practitioners regarding their prescription choices. Medical practitioners who are sceptical about pharmaceutical industry information may be influenced indirectly by specialist 'opinion leaders' (67, 68). In many developing countries, lack of access to independent sources of drug information can lead to doctors seeking information and advice from their specialist colleagues. Kisa's study in Turkey found that 75% of doctors completely agreed that doctors who worked in hospitals had their prescribing decisions affected by the department head and their colleague's opinions (69, 70). Prescribing of a new drug by peers helps inform physicians about a treatment's effects and has a significant impact on attitude toward the new medicine. Medical specialists therefore have a higher threshold of influence than other prescribers and assist in 'legitimizing' prescribing of new drugs.

Thus the return on investment of detailing to opinion leaders may be much higher than is suggested by just the opinion leader's prescription volume (66).

The 15 largest pharmaceutical companies spend 32% of their total advertising expenses on opinion leaders (66, 69). Steinman et al. observed that during the 1990s, 35 of the 40 opinion-leader doctors who were been targeted by Parke-Davis were involved in at least one promotional activity (71). Pharmaceutical companies employ higher standard detailers to carry out detailing activities to opinion leaders (66). The targeting of physician specialists by PCRs is therefore a key marketing tool to induce or influence attitudes to prescribing and exceeds the mere transfer of product information.

Another reason for increased focus on specialists concerns their role as prescription initialisers. A Dutch study reported that two-thirds of family practitioners' prescriptions for cardiovascular drugs were for regimens initiated by specialists (72).

By contrast, in Australia, some family doctors have higher PCR visiting rates than specialists (38). Since studies have also demonstrated a relationship between high-prescription rates and the number of interactions between doctors and PCRs (73), it can be assumed that high prescription volume general practitioners are also considered critical promotional clients. Doctors who are known as heavy prescribers are therefore more likely to become the targets of PCRs (74, 75). Vancelik et al. found that the rate of PCR visits to general practitioners, who had a burden of more than 60 patients a day, was at a higher rate than the rate of those doctors who examined less than 60 patients a day (29). The influence of heavy prescribers for particular pharmaceutical products leads to an increase in the popularity and loyalty amongst

other medical practitioners. PCRs exploiting social validations have used an individual's peer group to encourage prescribing of their products (76).

The lowest number of PCR interactions was recorded with resident medical officers. This result concurs with other studies performed in developing countries. Previous studies examining the interactions between residents and PCRs in Tatarstan (31) and Libya found that residents in both countries had low visiting rates compared with other practitioners. A large proportion of residents (between 37 and 47% of respondents) indicated that they had never communicated with PCRs. In both studies, no 'junior' resident medical officer interacted with PCRs every day. Forty-four per cent of residents in Tatarstan interacted with PCRs once or twice each week compared with only 2% who interacted 'once a week' in Libya. By contrast, studies in the United States and the United Kingdom revealed that residents were visited anywhere between two to four and five times a month by PCRs, respectively (73).

Doctors who were practicing in the private sector, whether in private practice alone or dual practice, had the opportunity to frequently interact with PCRs. Two-thirds of doctors who worked in the private sector met with PCRs at least once a week and were also more likely to receive printed materials, simple gifts and free samples compared with practitioners who worked only in public practice.

Private sector targeting by PCRs therefore seems more aggressive than with the public sector. Private practice has only recently become a more prevalent component of the Libyan healthcare environment. There is a perception amongst some Libyans that private medical care is associated with improved health care (77). Since the salaries of civil servants and employees of state-owned services have been largely frozen since 1981 (78), more medical practitioners may have also chosen to supplement income by working in the private practice alone or in dual practice (19, 77). In this study, the number of specialists who were private practitioners or who maintained dual practice (private and public) was 68 and 71%, respectively; hence, the increased visits may also be explained in part by the large proportion of specialists working in the private sector.

Male doctors displayed a higher rate of interaction with PCRs compared to their female counterparts. Male doctors displayed a higher rate of receiving simple gifts, drug samples and sponsored items from PCRs compared to their female counterparts. This result is inconsistent with Anderson et al.'s study in the United States which found no significant differences in PCRs' interactions with the doctors surveyed according to their gender (28). This variation could be due to different communication-culture relationships in Libya.

Most of the health facilities and senior specialist medical staff are located in major cities; therefore,

respondents working in Tripoli were more likely to see PCRs and receive printed materials than doctors working in Sebha.

Sixteen per cent of respondents admitted that they had received direct inducements for prescribing promoted drugs. Offering commissions for prescribing a particular drug from a particular company is illegal in most countries. But from an industry perspective, competitive marketing practices are designed to increase sales not to provide unbiased information and professional back up to doctors (79). If there is an absence of legislation or suitable codes of conducts for interactions between PCRs and doctors, PCRs may be tempted to use less ethical marketing practices in return for prescribing a specific drug especially if dictated by strict sales targets (47).

Interactions between representatives and doctors can produce a conflict of interest and may encourage less ethical practice, and doctors should always remember that they are being targeted by companies to increase sales of selected products. What's best for the patient should always dictate the prescription decision. Since the acceptance of small gifts can progress to larger or more expensive gifts, some researchers (80) are of the belief that all gifts whether large or small are not appropriate and should be prohibited (50).

Involvement in pharmaceutical promotion may lead to less rational prescribing choices (11, 81–85), and a positive correlation has been reported between the cost of physicians' prescribing and the frequency of PCR visits (27). In developing countries, such as Libya, there is no mechanism to monitor pharmaceutical company activities. Although advertising of any pharmaceutical preparation by words or phrases that cannot be proven is prohibited, enforcement of this regulation is difficult and there are no other guidelines that dictate pharmaceutical promotional activities. Therefore, governmental and institutional intervention is needed to minimize unethical promotional practices. Legislation, guidelines or agreed codes of conduct would assist both medical practitioners and representatives to conform to an agreed standard of promotional activities. The WHO has established ethical criteria which constitute the general principals of promotion that can be adapted by governments (86). At the time of the survey, we were not aware of any formal written guidelines at any of the institutions involved in the survey. In addition, education regarding the ethics, psychology and promotional techniques used by pharmaceutical companies should be included in the curriculum of medical and pharmacy schools in Libya.

The current study had several limitations. It was a descriptive, self-reporting study that employed a focused, as opposed to a random sampling method. There was a potential for both recall and response bias. We employed a 'convenience sample' with the majority of targeted institutions being teaching hospitals; therefore, generalisation

beyond this sampling framework is not possible. Further studies employing more extensive and inclusive criteria are required.

Conclusions

Libyan doctors were frequently visited by PCR and the provision of commercial information, reminder gifts, free samples and sponsored items were the major inducements tools used by PCRs.

Specialists and medical practitioners in the private sector had the highest rate of interactions with PCRs. Government and national medical agencies should also take practical positions in monitoring pharmaceutical promotion activities to ensure consistent standards. Our study highlighted that there is a need, in Libya, to produce National Guidelines for health professionals' interactions with pharmaceutical companies. This should involve sufficient consultation between medical educators, health organisations and the pharmaceutical industry.

Key messages

- Pharmaceutical company representatives (PCRs) commonly interact with Doctors in Libya.
- Accepting gifts from PCRs can generate potential conflicts of interest between the PCR and a medical practitioner.
- Specialists as opinion leaders are especially targeted for promotional activities.
- The establishment of an approved code of conduct for pharmaceutical promotional activities needs to be established in Libya.

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Appendix

Health service providers used in the study.

Tripoli:

- University Hospitals:
 - Central Tripoli Hospital
 - Tripoli Medical Centre
- Public hospitals:
 - Tajora Central Heart and Cardiac Medical Center
 - Al Jala Women Hospital
 - The Diabetes Hospital
 - Metiga Military Hospital
 - Al Razi Mental Hospital
- Private hospitals:
 - Al-Khadra
 - Al Mokhtar
 - Libya Swiss Medical centre
 - Al Manar
 - Brothers Clinic

Benghazi:

- University hospitals:
 - Benghazi Medical Centre
- Public hospitals:
 - Al Hwari
 - Aljamhoria
- Private hospitals:
 - Al Marwa Hospital

Sebha:

- University Hospitals:
 - Sebha Medical Centre
- Private Hospitals:
 - Al Manar
 - Belkys Maternity Hospital