



## Exposure to the drug company marketing in Greece: Interactions and attitudes in a non-regulated environment for medical students



Magdalini Filippiadou<sup>a, b</sup>, Dimitrios Kouvelas<sup>a</sup>, Georgios Garyfallos<sup>b</sup>, Ioannis Tsakiridis<sup>a</sup>, Dimitrios Tzachanis<sup>a, c</sup>, Dimitrios Spachos<sup>d</sup>, Georgios Papazisis<sup>a, \*</sup>

<sup>a</sup> Department of Clinical Pharmacology, Faculty of Medicine, Aristotle University of Thessaloniki, Greece

<sup>b</sup> 2nd University Department of Psychiatry, Psychiatric Hospital of Thessaloniki, Greece

<sup>c</sup> Department of Medicine, University of California San Diego, La Jolla, CA, USA

<sup>d</sup> Department of Medical Physics, Faculty of Medicine, Aristotle University of Thessaloniki, Greece

### HIGHLIGHTS

- The marketing strategies used by pharmaceutical companies with physicians are also applied to medical students.
- Mostly the clinical-level students accept meals and gifts of small value.
- Students disagree that accepting gifts would affect their own prescription behaviour.
- Student's conflicting answers demonstrate that they are inadequately prepared for this interaction.
- Institutional and/or national policies should be applied to regulate the interactions.

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### ABSTRACT

**Background:** Medical students are targeted by the pharmaceutical industry and are exposed to their marketing strategies even in the preclinical years of study. The marketing strategies used by pharmaceutical companies with physicians are also applied to students, affecting their future prescribing behaviour, and include low-cost non-educational gifts, travel expenses and conferences registration fees. In Greece, there are no national or institutional regulations and guidelines concerning drug company –medical student interactions. This study is the first time this estimate has been made in Greece and assessed a) the interactions between pharmaceutical companies and medical students, and b) students' attitudes towards pharmaceutical marketing.

**Methods:** A sampling of undergraduate medical students completed an anonymous, self-administered, web-based survey. The first part of the survey investigated the interaction between the students and pharmaceutical companies; the possible answers were the binomial variables 'yes' or 'no'. The second part assessed the students' opinions of pharmaceutical company marketing and the answer options were 'agree', 'don't know/don't answer' and 'disagree'.

**Results:** The survey was completed by 412 undergraduate medical students (mean age  $22 \pm 2.2$  years, 52.7% were women); the overall response rate was 58.9%. Although the majority did not consider accepting gifts and meals from drug companies as ethical, most of them (59%) had accepted meals and low-cost non-educational gifts, especially the clinical-level students. Further, 52.6% of the students did not believe that accepting gifts from pharmaceutical companies would affect their own prescription behaviour, whereas surprisingly they held the opposite opinion of their classmates. The vast majority (85.9%) agreed that sponsored lectures were biased in favour of a company's products; however, 47.6% agreed that promotional material is useful for learning about new medications and 34.5% believed that medical schools should allow drug company representatives to interact with students.

**Conclusion:** Our results suggest that medical students in Greece are notably exposed to pharmaceutical industry marketing and their conflicting answers demonstrate that they are inadequately prepared for

\* Corresponding author.

E-mail address: [papazisg@auth.gr](mailto:papazisg@auth.gr) (G. Papazisis).

this interaction. Interventions are needed so that students are prepared and able to manage these interactions critically.

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## 1. Introduction

The interactions between health professionals and pharmaceutical companies constitute a component of everyday medical practice. Drug company marketing strategies include a multitude of gifts and benefits ranging from low-cost gifts to expensive trips and grants. Although this phenomenon leads to suboptimal prescribing practices and promotes more expensive medical treatments with no evidence of therapeutic benefit over lower-cost options [1–3], many medical doctors deny that such interactions would affect their prescription behaviours, while others tend to rationalise and regard the receipt of gifts as ethical [4,5]. As with medical doctors, medical students are exposed to pharmaceutical company marketing even in the preclinical years of study [1,6–8]. Many studies have reported that medical students accept gifts, mainly low-cost non-educational gifts, and the interactions with industry representatives are augmented throughout the years of medical school [1,9–20]. Interestingly, the pattern, which is also observed in medical doctors, is to deny that receiving gifts would affect their own future prescription behaviours but to believe that of their colleagues would be more affected, and promote the donor company's products [6,21,22].

In Greece, interactions between drug companies and medical students are not regulated by any law or code of ethics. Besides the absence of national regulation, there are no specific institutional regulations or guidelines on interactions between pharmaceutical companies and students in medical schools across the country. Thus, medical students are not adequately prepared for the interaction with companies' representatives and are more vulnerable to their marketing strategies.

With the exception of a very descriptive 'case report' [23], there is no published study either on medical doctors or on medical students assessing their exposure to pharmaceutical industry marketing. This study is the first time this estimate has been made in a Greek university and assessed a) the interactions between pharmaceutical companies and medical students, and b) the students' beliefs and opinions of pharmaceutical marketing.

## 2. Materials & methods

### 2.1. Study design

This cross-sectional study was conducted in 2015 at the Faculty of Medicine of the Aristotle University of Thessaloniki. A simple random sample of 700 students was drawn from the total undergraduate student population (over 3500 students). The students received a pre-notification e-mail, which was sent twice, that described the study and invited them to complete a web-based questionnaire using a given URL. The survey completion rate was 100% (participants had to answer all questions in the survey in order to submit it). No incentives were provided for completing the survey.

### 2.2. Compliance with ethical standards

The study received the approval of the Bioethics Committee of the Faculty of Medicine of the Aristotle University of Thessaloniki.

All participants were informed of the aims and objectives of the study. A comprehensive information leaflet was also uploaded to the webpage for the participants.

### 2.3. Measurements

The data were collected using an anonymised self-administered, web-based questionnaire with the objective of gathering information. The questionnaire was created in accordance with the standards of questionnaires used previously in international studies [24]. The questionnaire consisted of two parts that were not visible to the participants.

The first part of the questionnaire investigated the interaction between the students and pharmaceutical companies. The possible answers were the binomial variables 'yes' or 'no' (Table 1).

The questions in the second part assessed the students' opinions of pharmaceutical company marketing. The possible answers were 'agree', 'don't know/don't answer' and 'disagree' (Table 1).

### 2.4. Statistical analyses

Descriptive statistics are reported as the mean  $\pm$  SD (standard deviation) for continuous variables and as the count (percentage) for categorical variables. The primary outcome variable of interest was each response to the questionnaire. Each answer was used as a categorical variable; univariate analyses (Pearson chi-square test) were carried out between categorical variables. The level of statistical significance was set at 0.05. All statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) v. 22.0.

## 3. Results

The final sample consisted of 412 undergraduate medical students (52.7% were women, 47.3% were men); the overall response rate was 58.9% (412/700). The mean age was 22 years (SD = 2.2, range = 18–28 years). Most respondents (52.2%) were clinical-level students. In Greece, the clinical level starts at the fourth year of studies. Of the respondents, 13.3% (n = 55), 13.1% (n = 54), 21.4% (n = 88), 15.8% (n = 65), 11.7% (n = 48) and 24.8% (n = 102) were in the first, second, third, fourth, fifth and sixth year of studies, respectively.

Most respondents (59.0%) had received a small, low-cost non-educational gift (e.g. pen, coffee mug) from a pharmaceutical company; clinical-level students had received a small gift twice as often as the preclinical students ( $p < 0.001$ ). Almost one-quarter of respondents (24.5%) had received a lunch (15.2% preclinical vs. 33% clinical); clinical-level students tended to receive lunch almost three times more often than the preclinical students ( $p < 0.001$ ). Of the preclinical students, 10.7% reported receiving a book as a gift from a pharmaceutical company, while the same was true for 20% of clinical-level students, meaning that clinical-level students received a book as a gift almost twice as often as preclinical students ( $p = 0.009$ ) (Table 1). Further, clinical-level students had attended a seminar or educational event held by a pharmaceutical company three times more often than preclinical students ( $p < 0.001$ ) (Table 1).

**Table 1**

Positive answers and associations between clinical/preclinical level of the students at the first part of the questionnaire (univariate analysis). \*parameters indicate statistical significance.

Survey questions	Positive answer (Yes)				p value
	Frequency (n)	Percent (%)	Preclinical level (%)	Clinical level (%)	
Have you ever received any book as a gift from any drug industry?	64	15.5	10.7	20	0.009*
Have you ever attended any seminar or educational event provided by a drug industry?	188	45.6	31	59.1	<0.001*
Have you ever participated in research project sponsored by a drug industry?	25	6.1	7.1	5.1	0.398
Have you attended a conference with travel expenses paid by a drug industry?	26	6.3	5	7.4	0.324
Have you attended a conference with the registration fee paid by a drug industry?	60	14.6	11.7	17.2	0.112
Have you obtained a research fellowship or grant sponsored by a drug industry?	3	0.7	1	0.5	0.512
Have you ever approached a drug industry representative to request funding for an event?	13	3.2	4	2.3	0.314
Have you received a lunch from a drug industry?	101	24.5	15.2	33	<0.001*
Have you ever received a small non-educational gift at low cost (e.g., pen, coffee mug) from a drug industry?	243	59	49.7	67.4	<0.001*

Finally, the vast majority of the students had never participated in pharmaceutical company-sponsored research projects (93.9%), had never attended a conference with paid travel expenses (93.7%) and had never approached a pharmaceutical company representative to request funding for an event (95.9%). No differences between preclinical/clinical level were found for these questions.

The analysis of the second part of the survey revealed that most students (56.1%) disagreed that lectures sponsored by pharmaceutical companies are educational, whereas a vast majority (85.9%) agreed that sponsored lectures were biased in favour of a company's products. Further, 71.6% of the participants, mostly the clinical-level students ( $p = 0.017$ ), would not ask the company representative's opinion if they had questions on a new medication. However, 47.6% of the students agreed that promotional material is useful for learning about new medications and 34.5% believed that medical schools should allow pharmaceutical company representatives to interact with students (Table 2).

Most respondents (47.1%) disagreed that receiving gifts or meals

from pharmaceutical companies due to their financial status was ethical, while 32.8% agreed with the statement. Furthermore, 59.7% of respondents believed that receiving gifts and meals was not ethical, considering the impact of pharmaceutical companies on students' prescribing behaviours (Table 2).

Further, although almost all respondents (91.7%) agreed with the statement that the main purpose of pharmaceutical companies is profit; the majority (76.4%) agreed that the more a company provides to a doctor, the more chances the company has for increasing its drug sales regardless of the drug's quality profile.

Additionally, the following significant associations were identified from the correlations between the answers: Students who considered pharmaceutical companies' promotional materials useful educational material on new medications believed that most sponsored lectures are not educational ( $p < 0.001$ ) and rarely asked a pharmaceutical company representative's opinion if they had questions about a new medication ( $p < 0.001$ ).

Students who believed that it is unethical to accept gifts or

**Table 2**

Answers and associations between clinical/preclinical level at the second part of the questionnaire (univariate analysis). \*parameters indicate statistical significance.

Survey questions	Positive answer (Agree)		Don't Know/Don't Answer		Negative answer (Disagree)		p value
	(n)	(%)	(n)	(%)	(n)	(%)	
The most lectures sponsored by companies are educational	12	2.9	169	41	231	56.1	0.113
It is ethical for students to accept gifts or meals from the companies because many of the students have low income	135	32.8	83	20.1	194	47.1	0.199
Is companies' promotional material useful to learn about new medications?	196	47.6	71	17.2	145	35.2	0.164
It is ethical for the students to receive gifts and meals from the companies because drug companies have minimal influence on students.	96	23.3	70	17	246	59.7	0.199
Will you ask for the pharmaceutical company representative's opinion if you have any question about a new medication?	60	14.6	57	13.8	295	71.6	0.017*
Should the Medical School allow the companies representatives to interact with medical students?	142	34.5	109	26.5	161	39	0.168
Does receiving a gift or meal from a company increase the chance that you would eventually prescribe the company's medications?	121	29.4	74	18	217	52.6	0.722
Does receiving a gift or meal from a company increase the chance that your classmates would eventually prescribe the company's medications?	230	55.8	93	22.6	89	21.6	0.684
The most lectures sponsored by companies are educational	354	85.9	39	9.5	19	4.6	0.087
Is the main purpose of the pharmaceutical companies their own profit?	378	91.7	27	6.6	7	1.7	0.031*
The more provisions a company gives to a doctor, the more chances to increase their drug sales regardless of the drug's quality profile	315	76.5	64	15.5	33	8	0.496

meals from drug companies given their low income rarely received a lunch ( $p = 0.03$ ), but often received a non-educational, low-cost gift ( $p = 0.004$ ). Finally, it is noteworthy that students (52.6%) who claimed that receiving a gift or meal did not increase the chances of their prescribing the company's medications declared on the other hand that their classmates would behave differently ( $p < 0.001$ ).

#### 4. Discussion

Pharmaceutical company marketing strategies include a multitude of gifts and benefits such as free books, travel expenses, meals or low-cost, non-educational gifts, e.g. pens or mouse pads. It is well-documented that acceptance of these gifts may increase the possibility of a medical doctor prescribing the donor pharmaceutical company's products, a phenomenon that leads to a non-rational medicine practice that promotes more expensive medical treatments with no evidence of therapeutic benefit over lower-cost options [1–3,24,25]. The majority of students in our sample (76.5%) agreed with this, stating that the more a drug company provides to a doctor, the more chances the company has of increasing its drug sales regardless of the drug's quality profile. In the present study, the most commonly accepted benefits were non-educational, low-cost gifts, books, lunches, as well as attendance at free seminars or educational events held by pharmaceutical companies. Previous international studies have also reported that up to 87% of medical students have accepted low-cost, non-educational gifts [9–15]. A recent study found that medical students in rural settings are exposed more often to pharmaceutical company marketing, where the distribution of free drug samples and meetings with pharmaceutical sales representatives were four and three times higher, respectively, in rural than in urban clinics [26].

Our results suggest that clinical-level students accept gifts from pharmaceutical companies more often. Specifically, they received books, attended seminars and accepted lunch as well as small gifts more often than preclinical students. An abundance of international surveys has drawn similar conclusions, which highlights the fact that the interactions between medical students and pharmaceutical sales representatives are augmented throughout the years of medical school [1,10,16–20,27].

In our study, most students (56.1%) strongly believed that lectures sponsored by pharmaceutical companies are not educational, and only 2.9% of respondents believed in the educational role of such lectures. Further, an overwhelming percentage of students believed that lectures sponsored by pharmaceutical companies were biased in favour of the company's product, where 85.9% of the total participants agreed with this statement. This finding is congruent with the findings of other surveys, where 67–92% of medical students believed that education by pharmaceutical companies is biased [15,20,28]. The majority of respondents (71.6%) in our study would not ask the opinion of a pharmaceutical sales representative if they had questions about a new medication. However, contradicting this, 47.6% of respondents stated that a pharmaceutical company's promotional material is useful for learning about new medications. The literature also contains conflicting evidence, where Ganzini et al. reported that fewer than 1 in 6 students agree that lectures sponsored by pharmaceutical companies provide useful and accurate information about medical products [29]; however, many other studies have reported that students declare that sponsored lectures are educational and an essential component of their education [1,28,30] programme. Clinical-level students held stronger beliefs of pharmaceutical companies as a reliable educational source than their fellow preclinical students [24].

In our study, most students believed that low income was not a sufficient justification for receiving gifts or meals from

pharmaceutical companies; 47.1% agreed that acceptance is unethical. Here, a contradiction should be noted, as despite the abovementioned percentage, 59% of students had accepted non-educational, low-cost gifts, 45.6% had attended a free sponsored seminar or educational event, and 24.5% had received a free lunch. Notably, those who did not believe that accepting gifts would affect their prescribing behaviour were more likely to accept sponsored benefits. It is likely that this paradox is due to the subconscious effect of marketing, which leads to unintentional changes in prescription behaviours [24,31]. Other studies have found that medical students consider it ethical to receive gifts or meals from pharmaceutical companies, where their low financial status was a sufficient justification for such behaviours [7,15,30,32].

In the present study, most students (52.6%) believed that receiving a gift or meal from a pharmaceutical company would not increase their chances of eventually prescribing the company's medications, whereas surprisingly they apparently held the opposite opinion of their classmates, where 55.8% agreed with the statement that receiving a gift or meal from a pharmaceutical company would increase the chances of their classmates eventually prescribing the company's medications. According to Sierles et al., 68.8% of medical students disagreed that receiving gifts would affect their future prescription behaviours [6], whereas two-thirds of the medical student population who participated in other studies held a similar opinion [14,28,32,33]. However, they believed that the future prescription behaviours of their classmates would be affected if they received benefits from a pharmaceutical company [6,22]. The same pattern was also observed in medical doctors. Specifically, although 51% of doctors who participated in a recent survey agreed that interactions with pharmaceutical sales representatives affected their colleagues' prescribing practices, only 1% admitted that this influence affected them as well [21,34].

Finally, there were conflicting answers regarding the prohibition of contact between pharmaceutical company representatives and medical students, as 38.8% of respondents agreed with such interactions and 34.5% were against it. Half of the students in a US university claimed also that presentations by pharmaceutical sales representatives should be prohibited within the campus setting [29], whereas 24–57% of medical students in Finland stated that they needed more educational events sponsored by pharmaceutical companies [13,14].

The present study has certain limitations which need to be considered. First, its design was cross-sectional, so we could not investigate a case and effect relationship. Second, the study is questionnaire-based, so some information bias may have occurred. Finally, the study population is limited among students in a university of Northern Greece, so our results cannot be generalized to all students in the health professions in Greece.

Considering that many of the present survey answers were conflicting, we may conclude that medical students are not adequately prepared to interact with pharmaceutical sales representatives. Especially in countries with a minimally regulated environment, a widespread exposure to drug companies was reported, mostly among final year students [18,27,35]. Similarly, the majority of medical students in other universities declared that they had not discussed the issue with an expert, stating that they did not feel ready for such meetings [19] and raising the issue of guidelines [22,24,27,33,36]. The disclosure code concerning drug company interactions in Greece is the 'Code of Ethics' on the promotion of prescription-only medicinal products and the disclosure of transfers of value by pharmaceutical companies to healthcare professionals and healthcare organisations [37]. This code contains no articles referring to medical students. Further, the directive containing the code of medical ethics in Greece is Regulation No. 3418, published in the State Official Gazette on 28 November, 2005.

No article regulates interactions in universities and relations between students and drug companies. Additionally, there are almost no restrictions on interactions between company representatives and students in the university. Interactions may take place anywhere in a medical school and its clinical areas, from lecture rooms to clinics.

Concluding, our results demonstrate a remarkable interaction between medical students and pharmaceutical marketing, suggesting an increasing need for intervention. Such interventions may include adding a chapter concerning such interaction with students of medicine (and other health sciences) in the Greek code of ethics on the promotion of medicinal products [38] and integrating an informative seminar within the university's curriculum. These targeted educational initiatives could help students develop skills for coping with drug marketing and guide them towards the rational use of medicines.

### Ethical approval

No patients involved. However, the study received the approval of the Bioethics Committee of the Faculty of Medicine of the Aristotle University of Thessaloniki.

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### Author contribution

Conception and design of the study: M.F. and G.P. Drafting the article: G.G. and D.K. Critical revision: D.T. and G.P. Technical support and Acquisition of data: D.S. Data analysis and presentation: D.T. and I.T. All the authors gave the final approval of the version to be submitted.

### Conflicts of interest

The authors report no declarations of interest.

### Guarantor

Papazisis Georgios.

### Consent

No patients or volunteers involved.

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