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

Magdalini Filippiadou a, b, Dimitrios Kouvelas a, Georgios Garyfallos b, Ioannis Tsakiridis a, Dimitrios Tzachanis a, c, Dimitrios Spachos d, Georgios Papazisis a, *

a Department of Clinical Pharmacology, Faculty of Medicine, Aristotle University of Thessaloniki, Greece
b 2nd University Department of Psychiatry, Psychiatric Hospital of Thessaloniki, Greece
c Department of Medicine, University of California San Diego, La Jolla, CA, USA
d 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.

ARTICLE INFO

Article history:
Received 19 March 2017
Received in revised form
26 May 2017
Accepted 27 May 2017

Keywords:
Drug company
Pharmaceutical industry
Marketing
Medical students
Greece
Gifts

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 ± 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
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 ‘agree’, ‘don’t know/don’t answer’ and ‘disagree’ (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 ± 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).
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 pharmaceutical companies' promotional materials are educational, whereas a vast majority (85.9%) disagreed that lectures sponsored by pharmaceutical companies are educational (p = 0.087), would not ask the company representative's opinion if they had questions about a new medication (p = 0.001). 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 = 0.024) and rarely asked the company's medications? (p = 0.031*). Students who believed that it is unethical to accept 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).

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                                                                 | Preclinical level | Clinical level | p value |
|----------------------------------------------------------------------------------|-------------------|----------------|---------|
| Frequency (n)                      | Percent (%)       | Frequency (n)  | Percent (%)       |         |
| 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 attended 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*|

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 |
|----------------------------------------------------------------------------------|-------------------------|------------------------|---------------------------|---------|
| Frequency (n)                      | Percent (%)             | Frequency (n)          | Percent (%)               |         |
| The most lectures sponsored by companies are educational                          | 12                      | 2.9                     | 169                       | 41      | 231     | 56.1   | 0.113  |
|                                    | 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  |
|                                    | 96                      | 23.3                    | 70                        | 17      | 246     | 59.7   | 0.199  |
| It is ethical for the students to accept gifts or meals from the companies because drug companies have minimal influence on students. | 60                      | 14.6                    | 57                        | 13.8    | 295     | 71.6   | 0.017* |
| Will you ask for the pharmaceutical company representative's opinion if you have any question about a new medication? | 142                     | 34.5                    | 109                       | 26.5    | 161     | 39     | 0.168  |
| Should the Medical School allow the companies representatives to interact with medical students? | 121                     | 29.4                    | 74                        | 18      | 217     | 52.6   | 0.722  |
| Does receiving a gift or meal from a company increase the chance that you would eventually prescribe the company's medications? | 230                     | 55.8                    | 93                        | 22.6    | 89      | 21.6   | 0.684  |
| Does receiving a gift or meal from a company increase the chance that your classmates would eventually prescribe the company's medications? | 354                     | 85.9                    | 39                        | 9.5     | 19      | 4.6    | 0.087  |
| The most lectures sponsored by companies are educational                          | 378                     | 91.7                    | 27                        | 6.6     | 7       | 1.7    | 0.031* |
| Is the main purpose of the pharmaceutical companies their own profit?             | 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 Sieres 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.

Sources of funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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: 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.

Declaration of interest

The authors report no declarations of interest.

Acknowledgments

None.

References

[1] K.E. Austad, J. Avorn, A.S. Kesselheim, Medical students’ exposure to and attitudes about the pharmaceutical industry: a systematic review, PLoS Med. 8 (5) (2011) e1001037.
[2] M.A. Gagnon, J. Lexchin, The cost of pushing pills: a new estimate of pharmaceutical promotion expenditures in the United States, PLoS Med. 5 (1) (2008) e1.
[3] G.K. Spurling, P.R. Mansfield, D.D. Montgomery, J. Lexchin, J. Doust, N. Othman, et al., Information from pharmaceutical companies and the quality, quantity, and cost of physicians’ prescribing: a systematic review, PLoS Med. 7 (10) (2010) e1000352.
[4] S. Chimonas, T.A. Brennan, D.J. Rothman, Physicians and drug representatives: exploring the dynamics of the relationship, J. General Intern. Med. 22 (2) (2007) 184–190.
[5] A. Wazana, Physicians and the pharmaceutical industry: is a gift ever just a gift? Jama 283 (3) (2000) 373–380.
[6] F.S. Seriès, K.H. Kessler, M. Mintz, G. Beck, S. Starr, D.J. Lynn, et al., Changes in medical students’ exposure to and attitudes about drug company interactions from 2003 to 2012: a multi-institutional follow-up survey, Acad. Med. J. Assoc. Am. Med. Coll. 90 (8) (2015) 1137–1146.
[7] F.S. Seriès, A.C. Brockdorff, L.M. Cleary, F.A. McCurdy, M. Mintz, J. Frank, et al., Medical students’ exposure to and attitudes about drug company interactions: a national survey, Jama 294 (9) (2005) 1034–1042.
[8] K.E. Austad, J. Avorn, J.M. Franklin, M.K. Kowal, E.G. Campbell, A.S. Kesselheim, Changing interactions between physician trainees and the pharmaceutical industry: a national survey, J. General Intern. Med. 28 (8) (2013) 1064–1071.
[9] J. Straand, I.J. Christensen, Quality of press rep meetings in general practice, Tidskr. Nor. Laegeforening Tidskr. Prakt. Med. N. Y. Raekke 128 (5) (2008) 555–557.
[10] D. Ball, S. Al-Menea, Exposure and attitudes to pharmaceutical promotion among pharmacy and medical students in Kuwait, Pharm. Educ. 7 (4) (2007) 303–313.
[11] N. Med, F. Friz, D. Homan, S. Reddy, C.H. Griffith 3rd, E. Baker, K.P. Simpson, The hidden curriculum: medical students’ changing opinions toward the pharmaceutical industry, Acad. Med. J. Assoc. Am. Med. Coll. 82 (10 Suppl) (2007) S1–S3.
[12] L. Tardif, B. Bailey, J.F. Russieres, D. Lebel, G. Soucy, Perceived advantages and disadvantages of using drug samples in a university hospital center: a case study, Ann. Pharmacother. 43 (1) (2009) 57–63.
[13] M. Vainiomaki, O. Helve, L. Vuorenkoski, A national survey on the effect of pharmaceutical promotion on medical students, Med. Teach. 26 (7) (2004) 630–634.
[14] L. Vuorenkoski, M. Valta, O. Helve, Effect of legislative changes in drug promotion on medical students: questionnaire survey, Med. Educ. 42 (12) (2008) 1172–1177.
[15] K. Lieb, C. Koch, Medical students’ attitudes to and contact with the pharmaceutical industry: a survey at eight German university hospitals, Dtsch. Arzteblatt Int. 110 (35–36) (2013) 584–590.
[16] E. Fein, M. Verrillius, S. Uijtdehaage, Pre-clinical medical students’ exposure to and attitudes toward pharmaceutical industry marketing, Med. Educ. Online 12 (8) (2007).
[17] M.S. Wilkes, J.R. Hoffman, An innovative approach to educating medical students about pharmaceutical promotion, Acad. Med. J. Assoc. Am. Med. Coll. 76 (12) (2001) 1271–1277.
[18] O. Sarikaya, M. Civaner, K. Varanase, Exposure of medical students to pharmaceutical marketing in primary care settings: frequent and influential, Adv. Health Sci. Educ. Theory Pract. 14 (5) (2009) 713–724.
[19] M. Bellin, S. McCarthy, L. Drevlow, C. Pierach, Medical students’ exposure to pharmaceutical industry marketing: a survey at one U.S. medical school, Acad. Med. J. Assoc. Am. Med. Coll. 79 (11) (2004) 1041–1045.
[20] J.J. Mofford, C.A. Oli, Teaching appropriate interactions with pharmaceutical company representatives: the impact of an innovative workshop on student attitudes, BMC Med. Educ. 5 (1) (2005) 5.
[21] J. Dean, E. Loh, J.J. Coleman, Pharmaceutical industry exposure in our hospitals: the final frontier, Med. J. Aust. 204 (1) (2016) 20–22.
[22] A. Fabbri, M. Ardigo, L. Grandori, C. Reali, C. Bodini, A. Stefanini, Conflicts of interest between physicians and the pharmaceutical industry. A qualitative-quantitative study to assess medical students’ attitudes at the University of Bologna, Ric. Sul Campo 20 (2008) 242–254.
[23] I.A. Giannakakis, J.P. Ioannidis, Arabian nights-1001 tales of how pharma industry: a national survey, WMJ 109 (3) (2010) 142–148.
[24] C. Soyk, B. Pfefferkorn, P. McBride, R. Rieselbach, Medical student exposure to and attitudes about pharmaceutical companies, WMJ 109 (3) (2010) 142–148.
[25] R. Moynihan, Who pays for the pizza? Redefining the relationships between doctors and drug companies. 1: entanglement, BMJ 326 (7400) (2003) 1189–1192.
[26] D.V. Evans, T. Keys, L. Desnick, A.A. Ch, D. Bienz, R. Rosenblatt, Big pharma on the farm: students are exposed to pharmaceutical marketing more often in rural clinics, Fam. Med. 48 (7) (2016) 561–564.
[27] N.E. Beyhun, C.C. Kolayli, G. Can, M. Topbas, Turkish final year medical students’ exposure to and attitudes concerning drug company interactions: a perspective from a minimally regulated environment for medical students, PLoS One 11 (12) (2016) e0168094.
[28] D. Grande, D.L. Frosh, A.W. Perkins, B.E. Kahn, Effect of exposure to small pharmaceutical promotional items on treatment preferences, Arch. Intern. Med. 169 (9) (2009) 887–893.
[29] L. Ganzi, Z. Chen, D. Peters, S. Misra, M. Macht, M. Osborne, et al., Medical student views on interactions with pharmaceutical representatives, Acad. Psychiatry J. Am. Assoc. Dir. Psychiatr. Resid. Train. Assoc. Acad. Psychiatry 36 (3) (2012) 183–187.
[30] B. Lea, O. Spigset, L. Stordal, Norwegian medical students’ attitudes towards
the pharmaceutical industry, Eur. J. Clin. Pharmacol. 66 (7) (2010) 727–733.

[31] J. Dana, C. Loewenstein, A social science perspective on gifts to physicians from industry, JAMA 290 (2) (2003) 252–255.

[32] M.S. Monaghan, P.D. Turner, B.L. Houghton, R.J. Markert, K.A. Galt, B. Bergman-Evans, et al., Pharmacotherapy cost comparison among health professional students, Am. J. Pharm. Educ. 67 (3) (2003).

[33] M.S. Monaghan, K.A. Galt, P.D. Turner, B.L. Houghton, E.C. Rich, R.J. Markert, et al., Student understanding of the relationship between the health professions and the pharmaceutical industry, Teach. Learn Med. 15 (1) (2003) 14–20.

[34] M.A. Steinman, M.G. Shlipak, S.J. McPhee, Of principles and pens: attitudes and practices of medicine housestaff toward pharmaceutical industry promotions, Am. J. Med. 110 (7) (2001) 551–557.

[35] U.T. Siddiqui, A. Shakoor, S. Kiani, F. Ali, M. Sharif, A. Kumar, et al., Attitudes of medical students towards incentives offered by pharmaceutical companies — perspective from a developing nation — a cross-sectional study, BMC Med. Ethics 15 (2014) 36.

[36] K. Jahnke, M.S. Kremer, C.O. Schmidt, M.M. Kochen, J.F. Chenot, German medical students’ exposure and attitudes toward pharmaceutical promotion: a cross-sectional survey, GMS Z. Med. Ausbild. 31 (3) (2014) Doc32.

[37] SFEE, Code of Ethics of the Hellenic Association of Pharmaceutical Companies (SFEE), 2015. Available from: https://www.sfee.gr/kodikas-deontologias-gia-tin-proothisi-ton-sintagografomenon-farmakon/.

[38] EFPIA, The European Federation of Pharmaceutical Industries and Associations (EFPIA) Code of Practice, the Greek SFEE Code, 2015. Available from: http://transparency.efpia.eu/countries/11/30/Greece.