# Attitudes of Future Doctors of Bangladesh to Pharmaceutical Incentives and Medical Ethics

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## Abstract

**Introduction:** Pharmaceutical companies offer various gifts to physicians to encourage them to prescribe their products. This collaboration has some negative and positive aspects. Different countries have established guidelines to limit the collaboration and reform such relationships. This study aims to determine the attitude of Bangladeshi medical students towards pharmaceutical gifts, physician-pharmacist collaboration, and associated factors.

**Methods:** An online cross-sectional and correlational study was conducted through email and Google-Forms among Bangladeshi medical students. A total of 435 students from different medical colleges completed the questionnaires in May and June, 2016.

**Results:** Monthly parental income was moderate among the majority of medical students. Less than 16% had a physician or pharmacist parent. Most of the students (89%) were taught about medical ethics, but 73% were not taught about the ethics of physician-pharmacist collaboration. About 85% did not have any experience of interaction with marketing representatives. Drug samples and pen-notepads were the most appreciated pharmaceutical gifts. Jewelry and gifts costing more than 100 thousand (Bangladeshi Taka) were said to be the least appreciated pharmaceutical gifts. Attitudes towards drug companies and representatives were assessed by fifteen statements. Medical students had a variety of attitudes regarding its ethical justification. Attitudes were correlated with gender, parental income, physician parents, academic years, and having been taught about pharmaceutical collaboration with physicians.

**Conclusion and Recommendations:** medical students should elaborate on ethical reasoning before accepting pharmaceutical gifts. Medical colleges and curriculums should teach them about the interaction. A national guideline may be needed.

## 1. Introduction

1.1. Background

It is common practice that pharmaceutical companies offer various gifts and incentives to physicians to encourage them to prescribe their drugs. What are the advantages and risks of this collaboration? Are the doctors really influenced? Does this influence affect prescribing proper drugs for patients? Can this interaction lead to a biased decision for therapy? Are these interactions ethical and lawful? Is receiving incentives ethically justified? When does it fall into the criteria of bribe or kickback? What are the doctors' views regarding this issue? Are they aware of the guidelines about this concern? All these questions are knocking the mind of scholars for many years. But the answers change from time to time, person to person and, place to place as discussed in Biswas and Macer (2017).

There is a complex relation between physicians and pharmaceutical companies. Pharmaceutical companies offer various gifts, incentives, sponsor CME (Continuing medical education), and provide notepads, pens, and samples in many countries worldwide. The approach somehow can influence the decision of physicians in the treatment of patients which is based on trust driven by physicians' autonomy. Many countries like the United Sates have restrictions by law upon physician-pharmaceutical interactions (Cicero et al., 2011, Conn and Vernaglia, 2011). American Medical Associations' (AMA) "Ethical Guidelines for Gifts to Physicians from Industry" in 1998 is an example of recommendations that is set to maintain the interaction within ethical limits (Chimonas and Rothman, 2005). However, the dilemma in this field has remained unsolved (Quan, 2007). The guidelines are updated year by year to pace with changing interaction-policies (Austad et al., 2013b). Canada also set up an ethical guideline in 1991 to deal with this complex phenomenon and to preserve the morality of physicians (Woollard, 1991). Japan, Korea, France, and Denmark also have addressed this issue with great concern (Rodwin, 2011; Harris, 2009; Kwon, 2003). Some foreign researchers showed that physicians might have a great role in drug industries directly (being a pharmaceutical physician) and indirectly (Lopes et al., 1993; Hayward, 2011). Physician-pharmacist collaboration is not an unethical matter always. There are many positive outcomes if the incentives are within ethical limits and prescriptions are not biased. A Canadian study found that physicians and pharmacists both agreed in principle over the collaboration, but differed in the areas of collaboration (Kelly et al., 2013).

Medical students are future doctors. A Saudi study researched the attitudes of medical students

towards the incentives from drug companies and found interesting results (Zaki, 2014). If the attitudes of medical students can be evaluated, we can determine their level of ethical perception and investigate how these issues are being taught to them. There was no previous study in Bangladesh in this matter. Therefore, this study aims to answer these questions from a Bangladeshi standpoint. What do medical students think about the gifts and incentives? What are their views about the interaction? Are there any demographic or correlated factors that influence the attitudes?

1.2. Rationale

Pharmaceutical representatives offer incentives to physicians. These kinds of interactions may lead physicians to irrational prescribing, selection bias of drugs, kickback issues, and other ethical dilemmas. There is a greater chance that the doctors may prescribe the drugs of that company from where they have received some gifts, even if the drugs are costly and less effective. Thus, medicinal prices may increase and concerns over the ethical call for beneficence to patients is made more difficult. However, positively, representatives help physicians to learn about new products and provide needed financial assistance..

1.3. Objective

The general objective was to explore the attitude of future doctors regarding incentives offered by pharmaceutical companies. Specific objectives were:

– To determine the demographic data, exposure, and experience about pharmaceuticals.
– To determine the attitude of medical students towards pharmaceutical gifts and incentives.
– To evaluate the attitudes of medical students towards drug companies and representatives.
– To find out the correlated and associated factors of attitude by statistical analysis.
– To compare the results with other countries in the literature.

1.4. Physician-Pharmaceutical Interactions

Physician and pharmaceutical interactions influence physicians' behavior and prescribing patterns (Rubin, 1994). Drug representatives offer gifts, drug details, and samples to physicians (Cicero et al., 2011; Jain, 2010). Especially financial assistance and kickbacks raise ethical dilemmas (Rodwin, 2011; Quan, 2007). Some educational programs, continuing medical education (CME), and academic events are sponsored by drug companies in medical schools (Johnson, 2001). In developed countries, physicians often participate in clinical trials and lectures are facilitated by pharmaceutical companies (Ashar et al., 2004). Meetings between different health professionals take place there (Huang et al., 2005). The interaction is sometimes ethically acceptable and sometimes not (Quan, 2007). Many countries have laws, legislations, and ethical guidelines regarding this issue (Gorlach and Pham-Kanter, 2013; Conn and Vernaglia, 2011; Harris, 2009). the United States and Korea have done pharmaceutical reform (Tobbell, 2008; Kwon, 2003). The attitude of medical students and physicians to the interaction is different country by country (Kelly et al., 2013; Austad et al., 2013a). Public perception of this interaction varies and is not always positive (Arkinson et al., 2010).

## 2. Development and implementation of the Survey

2.1. Ethical Implications

A questionnaire was developed and after pilot testing it was used. This research was approved by the American University of Sovereign Nations (AUSN) IRB. The survey was anonymous and confidential, and gave enough autonomy to the participants.

2.2. Independent Demographic Variables

This is a cross-sectional and observational study. Items include: Gender, current year of study, type of medical college, parental income, doctor parents, pharmacist parents, known medical representatives, being taught about physician-pharmacist collaboration, interaction with pharmaceutical companies.

2.3. Dependent Variables

There are many types of gifts, including: Meals, dry food and snacks, drug samples, pens and notepads, textbooks, stethoscopes, penlight and medical equipment, stationary, clothes, gifts (<10,000 BDT), gifts (10,000 to 50,000 BDT), gifts (50,001 to 1,00,000 BDT), gifts (>1,00,000 BDT), hospital trips, personal or family trips, conference registration fees, travel fees to any conference, cosmetics, jewelry, computer, and its accessories, home electronics, home cooking accessories, unique gadgets, home equipment, game equipment, festival related gifts, and heard of any other.

2.4. Attitudes towards Pharmaceutical Companies

This was assessed by fifteen statements (A to O): A) the information provided by drug representatives about their products can be trusted. B) The information from drug representatives is important for the physicians. C) It is ok for the physicians to accept gifts from drug companies because the drug companies have minimal influence on them. D) Most seminars

sponsored by drug companies are helpful and educational. E) Drug representatives are a useful way to learn about new drugs. F) Drug company sponsored seminars are often biased in favor of their products. G) Gifts from drug companies to doctors lead to increased prices of medicines. H) Receiving gifts or incentives from pharmaceutical representatives increases the chance that I will eventually recommend/prescribe the drug company's products. I) Drug companies act unethically in promoting and advertising their products. J) Students should not have any interaction with drug companies in medical school. K) Pharmacists should be accountable to the patients for the drug they provide. L) If a drug company agreed to pay for the printing costs of all my class notes in the undergraduate medical school, I would not mind the logo of that company appearing in the bottom corner of the first slide of class lectures. M) It is acceptable for drug companies to sponsor events/educational seminars during medical school. N) Five drugs from five different companies are identical in terms of price, and therapeutic efficacy. I would preferentially prescribe a drug from one of the companies that provided me with gifts or incentives. O) There is a need for guidance regarding the relationship between the pharmaceuticals and the physicians in the undergraduate medical curriculum.

Two scenario questions were also included. Attitude towards gifts and incentives were assessed by three levels scale and attitudes towards pharmaceutical companies were assessed by a five-level Likert scale. These variables have been identified from previous studies by extensive literature review and an online focus group discussion. The distribution of the variables is clarified in the questionnaire (Attached in Appendices)

2.5. Study Population and Sampling

This study involved third, fourth, and fifth-year medical students (as they have exposure in clinical wards and hospitals) of different medical colleges in Bangladesh. Simple random sampling was done among the medical students who were invited to participate in the study. Those who gave informed consent were included. Incomplete questionnaires were excluded. According to sampling statistics, a minimum sample size estimation is 384.16 ≈ 384 (n= Z^2 pq/d^2, Z= 1.96, p = 0.5, q= 1-p= 0.5, d= 10% of p= 0.05, in 95% confidence interval). Total sample size was targeted to be more than 400. At last 435 clean responses were gathered from the survey.

2.6. Validity of Google Questionnaire and Focus Group Discussion

The Google Questionnaire was created by considering the questions used in many questionnaires and results of previous studies (Siddiqui et al., 2014) (Sergeant et al., 1996; McCormick et al., 2001; Gibbons et al., 1998; Yeh et al., 2014). The questionnaire was reviewed by established validation criteria and measurement scales (Van Winkle et al., 2011). Some previous studies used Google questionnaires on the same topic had been validated and indexed in PubMed (Zaki, 2014). A Focus Group Discussion (FGD) was carried out in the social media where a question was asked to the members of a medical group, both physicians and students. To include gift-types as much as possible, everyone was asked to share their experience about gifts and incentives from the pharmaceuticals. About two hundred medical students and physicians answered in the discussion forum and twenty six types of gifts were finally added in the questionnaire for the Likert scale of appropriateness.

2.7. Procedures and Methods of Data Collection

Respondents were contacted through social media or personal contacts. The study had taken double informed consent from the participants. At first, verbal informed consent was taken before sending the online link to the consent form. In the link there was a detailed consent form (available upon request). The survey needed only 10 to 15 minutes. Once the questionnaire was filled, respondents were asked to submit. Data obtained from this survey were totally anonymous. No name was taken in the questionnaire. After submission, the responses were unlinked from the respondents and could never be identified. As this was an online survey, retrieved responses were archived automatically in a Google spreadsheet and then further downloaded and saved as Microsoft Excel file.

2.8. Data Analysis

From Excel, data were converted into SPSS software for analysis. After interpretation, the potential correlations among different variables were analyzed using SPSS software version 21.0. Pearson Chi-square test was used to find significant correlations. Two-sided P value less than 0.05 was considered significant in 95% confidence interval. Statistical Significance is indicated by S= Significant; NS= Non-Significant. Cross tabulation was done keeping independent variables in a row (considering 100% in a row) and dependent variables in a column. Bivariate analysis was done to assess the relation of attitude with any other variables.

## 3. Results

3.1. Demographics and Experience

There were more female respondents (53%) than male. Most of the students (59%) were studying in the fifth year (final year) of MBBS, with 23% in the fourth year and 18% in the third year.

Among the respondents, 45% were from Private or non-government institutions or medical colleges, and the rest of them (55%) were from Public or government institutions. Most of the students had parental income between 20,000 BDT to 50,000 BDT ((80 Bangladeshi Taka = 1 USD).

Only 12% of the respondents had physician parents and the rest (88%) of them did not have any parent working as a physician. Similarly, most of the respondents (96%) did not have any pharmacist parent while only 4% of them had. 67% of the respondents did not know any medical representative of any company. But 33% of them knew at least one pharmaceutical representative.

Most of the respondents (89%) claimed that they were taught about medical ethics in their medical college. But most of the students (73%) said that they were not taught about guidelines of physician-pharmacist interaction or collaboration. While asking 'where and when were they taught about physician-pharmacist interaction', 67 respondents gave specific answers.

Most of the respondents (85%) said that they did not have any experience of interaction with a pharmaceutical company. 57 respondents detailed about the place and time of the interaction.

3.2. Attitudes towards Gifts and Incentives

The most positively valued gift was drug samples, where 89% of the respondents agreed (Figure 1). The least valued (only 13%) was Gifts costing 50 thousand to 100 thousand BDT (80 Bangladeshi Taka = 1 USD), because it was not considered appropriate. Specifically "inappropriateness" was perceived most for gifts costing more than 100 thousand BDT where 75% of the respondents said so. Only 4% respondents thought of a pen and notepad as inappropriate gifts. Attitudes and opinion about different gifts and incentives offered by pharmaceuticals are described in Figure 1 and 2

Respondents were asked whether they heard of any more types of gifts and incentives or not. A few respondents reported hearing of Car, Television, Automobiles, Mobile, Commissions, Flats or Apartment, and other Vehicles as gifts by pharmaceutical companies.

3.3. Attitudes towards Drug Company and representatives

Attitudes towards drug companies and representatives were determined by 15 statements and levels of agreement are presented in Table 1.

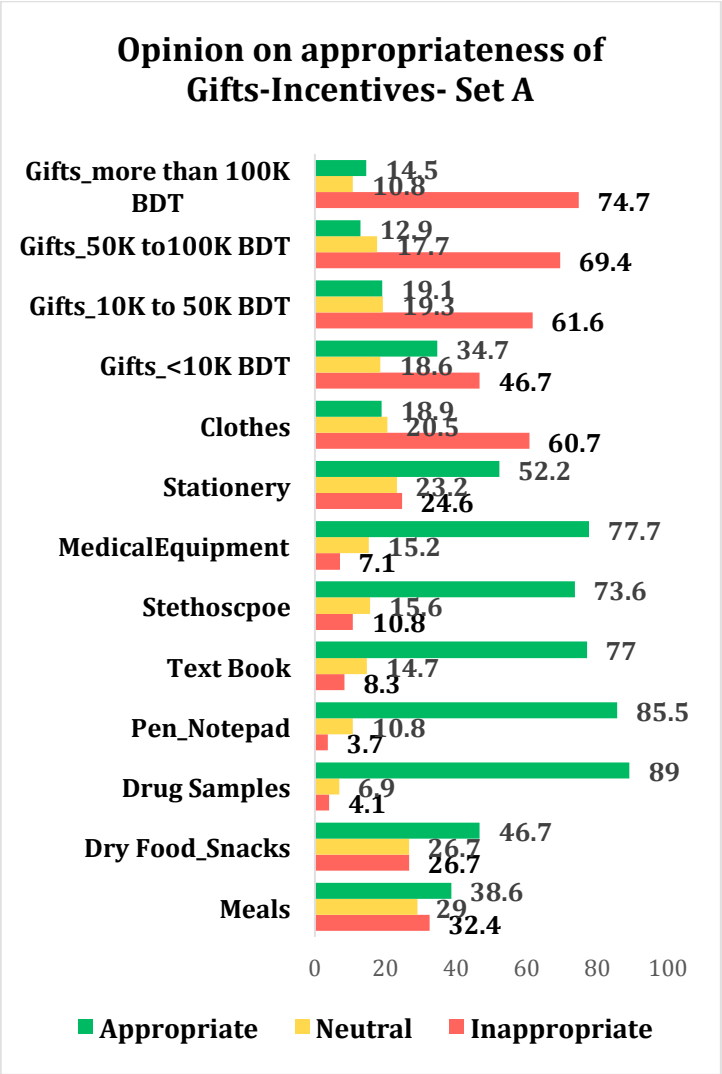


**Figure 1: Opinions on Appropriateness of Different Gifts and Incentives (set-A)**

Horizontal axis presents percentages of respondents opinion on gifts and incentives. Abbreviation: K =thousand, BDT= Bangladeshi Taka (80 Bangladeshi Taka = 1 USD).

## 4. Two More Attitude Questions and Self-judged Biasness

A scenario was given to assess the attitude of future doctors. The scenario was the following: *A drug company wants to increase its visibility to the medical profession and has recently approached the medical school. They would like to provide a one-day seminar regarding their product at the end of the second year. In return, they are willing to pay for a fraction of the second year tuition for each student who attends their seminar. As a medical student faced with increasing tuition costs, I think that it would be fair if the pharmaceutical company pays this percentage of my second-year medical school tuition.*

**Table 1: Attitudes towards Drug Companies and Representatives (%)**

| **Statements:** | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| The information provided by drug representatives about their products can be trusted | 11.0 | 28.7 | 34.3 | 25.1 | 9 |
| The information from drug representatives is important for the physicians | 8.5 | 10.8 | 18.6 | 52.0 | 10.1 |
| It is ok for physicians to accept gifts from drug companies because drug companies have minimal influence on them | 21.6 | 32.2 | 22.5 | 22.1 | 1.6 |
| Most seminars sponsored by drug companies are helpful and educational | 6.9 | 6.0 | 20.2 | 55.6 | 11.3 |
| Drug representatives are a useful way to learn about new drugs | 8.7 | 20.7 | 12.9 | 46.7 | 11.0 |
| Drug company sponsored seminars are often biased in favor of their products | 7.9 | 6.0 | 14.5 | 53.3 | 19.9 |
| Gifts from drug companies to doctors lead to increased prices of medicines | 10.6 | 18.6 | 23.2 | 37.0 | 10.6 |
| Receiving gifts or incentives from pharmaceutical representatives increase the chance that I will eventually recommend/prescribe the drug company's products | 12.2 | 22.8 | 15.2 | 37.7 | 12.2 |
| Drug companies act unethically in promoting and advertising their products | 7.6 | 12.0 | 23.7 | 42.8 | 14.0 |
| Students should not have any interaction with drug companies in medical school | 12.6 | 13.3 | 16.3 | 40.0 | 17.7 |
| Pharmacists should be accountable to the patients for the drug they provide | 9.4 | 6.7 | 19.8 | 42.1 | 22.1 |
| If a drug company agreed to pay for the printing cost of all my class notes in the undergraduate medical school, I would not mind the logo of that company appearing in the bottom corner of the first slide of the lecture. | 28.5 | 15.4 | 16.8 | 32.0 | 7.4 |
| It is acceptable for drug companies sponsor events/educational seminars during medical school. | 11.0 | 7.8 | 17.0 | 50.8 | 13.3 |
| Five drugs from five different companies are identical in terms of price, and therapeutic efficacy. I would preferentially prescribe a drug from one of the companies that provided me with gifts or incentives. | 33.3 | 26.2 | 16.8 | 18.2 | 5.5 |
| There is a need for guidance regarding relationship between the pharmaceuticals and the physicians in the undergraduate medical curriculum | 10.1 | 5.7 | 14.9 | 40.7 | 28.5 |

Based on the above scenario, medical students gave their opinions. Half (54%) declined to accept any percentage of tuition fees. But 7.4% of them wanted 1 to 10% fees support, 9.9% wanted 10 to 20% fees support, 9% wanted 20 to 30% fees support, and 19.6% wanted more than 30% payment of tuition fees by pharmaceutical company.

Another statement examined the attitude of medical students towards profit and interest of drug companies. More (62%) of respondents agreed to a statement that said: "*They are primarily interested in profit: however, they still try to work in the best interest of doctors and patients".* But 21% respondents agreed with the statement, *"They are fundamentally interested in profit and never on the side of either doctors or patients".* 17% agreed with, *"They are fundamentally on the same side as doctors and patients and should be regarded as an important part of the health care system".*

Respondents were asked whether any previous experience or interaction biased their responses or not. Only a few respondents admitted the possibility of biased responses.

## 5. Association and Correlation among Variables

5.1. Gender and Experience about Pharmaceuticals

Gender had a strong correlation (P value= 0.000, chi-square) with personally knowing any medical representative. Only 22% of female respondents knew any medical representative, compared to 46% of male respondents who knew at least one medical representative.

Moreover, 'Gender' and 'Experience of interaction with pharmaceutical representative' had also a strong correlation (P value= 0.015, chi-square). Only 10% of female respondents had experience of interaction with representatives, but 19% of male respondents had experience of that interaction.

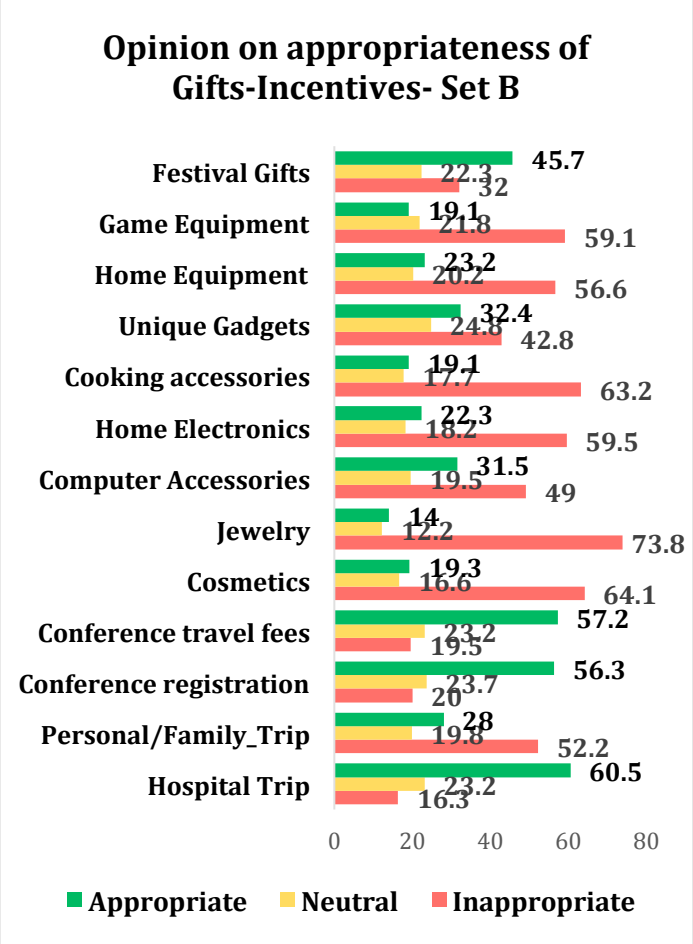


**Figure 2: Opinions on Appropriateness of Different Gifts and Incentives (set-B)**

Horizontal axis presents percentages of respondents opinion on gifts and incentives. Abbreviation: K =thousand, BDT= Bangladeshi Taka (80 Bangladeshi Taka = 1 USD).

5.2. Effect of Gender

Gender was strongly associated with opinions on 12 items (dependent variables) shown as "S" in Table 2. Thirteen out of fifteen statements of attitude were associated significantly with the gender of the respondents as detailed with Pearson chi-square 2-sided P values in Table 3.

**Table 2: Items of Significant Correlation between Gender (Independent Variable) and Opinion on Gifts and Incentives [**

| Dependent variable<br>Opinion about Gifts | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| Meals | 0.007 | S |
| Text Books | 0.025 | S |
| Stationery options | 0.016 | S |
| Clothes | 0.000 | S |
| Gifts less than 10,000 BDT | 0.000 | S |
| Gifts 50,001 to 100,000 BDT | 0.019 | S |
| Gifts more than 100000 BDT | 0.011 | S |
| Personal or Family Trip | 0.003 | S |
| Conference Travel Fees | 0.023 | S |
| Computer Accessories | 0.000 | S |
| Game Equipment | 0.025 | S |
| Festival Gifts | 0.000 | S |

5.3. Effect of Academic Year

A correlation test was run between academic year and personally knowing any medical representative. Data showed percentages of knowing representatives increased with advancement of academic year, but there was no statistically significant correlation (2-sided P value 0.150 in Pearson chi-square test) between those two variables.

Current academic year of study had a significant effect on opinion about different gifts and incentives. Academic year was strongly associated with opinions on meals, text books, stethoscope, stationary items, clothes, gifts less than 10 thousands, personal or family trip, conference registration fees, conference travel fees, computer accessories, unique gadgets, game equipment, and festival gifts. A significant correlation was found between academic year and 13 dependent variables of opinions on gifts and incentives (Table 4).

Seven out of fifteen statements of attitude were associated significantly with academic year of respondents (Table 5).

5.4. Effects of Parental income

Parental income was strongly associated with opinions on drug samples, clothes, gifts less than 10 thousand BDT, personal or family trip, computer accessories, home electronics, cooking accessories, unique gadgets, and home equipment as described in Table 6.

Five out of fifteen statements of attitude were associated significantly with parental income of respondents (Table 7).

**Table 3: Attitudes of Significant Correlation between Gender (Independent Variable) and Attitudes toward Drug Companies and Representatives**

| Dependent variable<br>Attitude towards drug companies | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| The information provided by drug representatives about their products can be trusted | 0.000 | S |
| The information from drug representatives is important for the physicians | 0.012 | S |
| It is ok for physicians to accept gifts from drug companies because drug companies have minimal influence on them | 0.017 | S |
| Drug representatives are a useful way to learn about new drugs | 0.000 | S |
| Gifts from drug companies to doctors lead to increased prices of medicines | 0.000 | S |
| Receiving gifts or incentives from pharmaceutical representatives increase the chance that I will eventually recommend/prescribe the drug company's products | 0.000 | S |
| Drug companies act unethically in promoting and advertising their products | 0.044 | S |
| Students should not have any interaction with drug companies in medical school | 0.002 | S |
| Pharmacists should be accountable to the patients for the drug they provide | 0.014 | S |
| If a drug company agreed to pay for the printing cost of all my class notes in the undergraduate medical school, I would not mind the logo of that company appearing in the bottom corner of the first slide of the lecture. | 0.019 | S |
| It is acceptable for drug companies sponsor events/educational seminars during medical school. | 0.005 | S |
| Five drugs from five different companies are identical in terms of price, and therapeutic efficacy. I would preferentially prescribe a drug from one of the companies that provided me with gifts or incentives. | 0.014 | S |
| There is a need for guidance regarding relationship between the pharmaceuticals and the physicians in the undergraduate medical curriculum | 0.014 | S |

**Table 4: Significant Items of Correlation between Academic Year (Independent Variable) and Opinion on Gifts and Incentives.**

| Dependent variable<br>Opinion about Gifts | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| Meals | 0.001 | S |
| Text Books | 0.016 | S |
| Stethoscope | 0.002 | S |
| Stationery options | 0.010 | S |
| Clothes | 0.030 | S |
| Gifts less than 10,000 BDT | 0.006 | S |
| Personal or Family Trip | 0.028 | S |
| Conference Registration Fees | 0.002 | S |
| Conference Travel Fees | 0.017 | S |
| Computer Accessories | 0.001 | S |
| Unique Gadgets | 0.012 | S |
| Game Equipment | 0.004 | S |
| Festival Gifts | 0.003 | S |

**Table 5: Attitudes of Significant Correlation between Academic Year (Independent Variable) and Attitude toward Drug Companies and Representatives**

| Dependent variable<br>Attitude towards drug companies | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| Most seminars sponsored by drug companies are helpful and educational | 0.048 | S |
| Drug representatives are a useful way to learn about new drugs | 0.041 | S |
| Gifts from drug companies to doctors lead to increased prices of medicines | 0.008 | S |
| Receiving gifts or incentives from pharmaceutical representatives increases the chance that I will eventually recommend/prescribe the drug company's products | 0.014 | S |
| Students should not have any interaction with drug companies in medical school | 0.015 | S |
| Five drugs from five different companies are identical in terms of price, and therapeutic efficacy. I would preferentially prescribe a drug from one of the companies that provided me with gifts or incentives. | 0.016 | S |
| There is a need for guidance regarding relationship between the pharmaceuticals and the physicians in the undergraduate medical curriculum | 0.004 | S |

**Table 6: Correlation between Parental Income (Independent Variable) and Opinion on Gifts and Incentives.**

| Dependent variable<br>Opinion about Gifts | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| Meals | 0.309 | NS |
| Dry Foods and Snacks | 0.308 | NS |
| Drug Samples | 0.028 | S |
| Pen and Notepad | 0.397 | NS |
| Text Books | 0.255 | NS |
| Stethoscope | 0.430 | NS |
| Medical Equipment | 0.050 | NS |
| Stationery options | 0.050 | NS |
| Clothes | 0.021 | S |
| Gifts less than 10,000 BDT | 0.037 | S |
| Gifts 10001 to 50,000 BDT | 0.178 | NS |
| Gifts 50,001 to 100,000 BDT | 0.158 | NS |
| Gifts more than 100000 BDT | 0.341 | NS |
| Hospital Trip | 0.081 | NS |
| Personal or Family Trip | 0.019 | S |
| Conference Registration Fees | 0.393 | NS |
| Conference Travel Fees | 0.062 | NS |
| Cosmetics | 0.052 | NS |
| Jewelry | 0.122 | NS |
| Computer Accessories | 0.004 | S |
| Home Electronics | 0.043 | S |
| Cooking Accessories | 0.000 | S |
| Unique Gadgets | 0.011 | S |
| Home Equipment | 0.001 | S |
| Game Equipment | 0.358 | NS |
| Festival Gifts | 0.211 | NS |

5.5. Effects of Physician or pharmacist parents

The variable 'Physician Parents' is strongly correlated with the opinions about five gifts that are meals, hospital trip, conference registration, cosmetics, and computer accessories (Table 8). As only 16 respondents had pharmacist parents (only 3.7% of total), no correlation statistics was done for the variable 'pharmacist parents'. Respondents having physician parents are named as 'PP Group' and others having no physician parents are named as 'NPP Group'.

Only 25% of PP Group said meals were appropriate gifts while 31% said they were inappropriate and 44% were neutral. Comparing to that, 41% of the NPP Group said a meal was an appropriate gift, while 33% said it was inappropriate and 27% were neutral. 44% of PP Group accepted a hospital trip as appropriate while 63% of NPP group said it was appropriate. In the case of conference registration fees, 59% of NPP group agreed with appropriateness while 40% of PP group agreed.

Appropriateness of cosmetics was agreed by 19% of NPP group and 23% of PP group. It was considered inappropriate in the sense of 67% of NPP group and 46% of PP group. The strongest correlation was found for the opinion about computer accessories. Only 11% of PP group found it appropriate where 34% of NPP group thought so.

Having physician parents and experience about the pharmaceutical issue were not found to have any strong correlation (2 sided P value 0.069).

**Table 7: Significant Correlations between Parental Income (Independent Variable) and Attitude toward Drug Companies and Representatives**

| Dependent variable<br>Attitude towards drug companies | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| The information provided by drug representatives about their products can be trusted | 0.017 | S |
| The information from drug representatives is important for the physicians | 0.000 | S |
| Drug representatives are a useful way to learn about new drugs | 0.030 | S |
| Pharmacists should be accountable to the patients for the drug they provide | 0.033 | S |
| Five drugs from five different companies are identical in terms of price, and therapeutic efficacy. I would preferentially prescribe a drug from one of the companies that provided me with gifts or incentives. | 0.009 | S |

**Table 8: Items of Significant Correlation between Physician Parents (Independent Variable) and Opinion on Different Gifts and Incentives**

| Dependent variable<br>Opinion about Gifts | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| Meals | 0.020 | S |
| Hospital Trip | 0.034 | S |
| Conference Registration Fees | 0.017 | S |
| Cosmetics | 0.005 | S |
| Computer Accessories | 0.000 | S |

Four out of fifteen statements of attitude were associated significantly with physician parents of respondents (Table 9).

**Table 9: Significant Correlations between Physician Parents (Independent Variable) and Attitudes toward Drug Companies and Representatives**

| Dependent variable<br>Attitude towards drug companies | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| Drug representatives are a useful way to learn about new drugs | 0.011 | S |
| Drug company sponsored seminars are often biased in favor of their products | 0.045 | S |
| Gifts from drug companies to doctors lead to increased prices of medicines | 0.015 | S |
| Five drugs from five different companies are identical in terms of price, and therapeutic efficacy. I would preferentially prescribe a drug from one of the companies that provided me with gifts or incentives. | 0.028 | S |

5.6. Effects of Experience about Pharmaceutical Companies and Representatives

Correlation between personally knowing a medical representative were strongly correlated with the opinion about seven gifts - text books, medical equipment, Gifts of 50 thousand to 100 thousand BDT, hospital trip, computer accessories, cooking accessories, and festival gifts (Table 10). Respondents who personally know medical representatives are named as 'E Group' and others who do not know any representative are named as NE group where E stands for Experience.

About 84% of E group accepted a textbook as gifts whereas 74% of the NE groups accept that. And only 5% of E group said it inappropriate whereas 10% of NE group said so. Acceptance of medical equipment as gifts was also strongly correlated with knowing any representatives. With more respondents of E group (85%) agreeing to accept it while 74% of NE group said so. The inappropriateness of medical equipment as gifts was less in E group (2.8% vs 9.3%).

17% of E group found gifts of 50 thousand BDT to 100 thousand BDT (80 BDT= 1USD) as appropriate but only 11% of NE group thought so. The study found that 67% of E group accepted appropriateness of hospital trip, but only 57% of NE group accepted that. Neutrality in case of hospital trip was less in E group (15% vs 28%)

Computer accessories were appreciated as gifts by 36% persons of E group, but only 29% of NE group. More respondents of E group (26%) than NE group (16%) thought cooking accessories were appropriate. Festival gifts are more appreciated by E group than NE (53% vs 42%).

**Table 10: Correlation between Personally Knowing a Medical Representative (Independent Variable) and Opinion on Gifts and Incentives**

| Dependent variable<br>Opinion about Gifts | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| Meals | 0.989 | NS |
| Dry Foods and Snacks | 0.170 | NS |
| Drug Samples | 0.780 | NS |
| Pen and Notepad | 0.166 | NS |
| Text Books | 0.043 | S |
| Stethoscope | 0.254 | NS |
| Medical Equipment | 0.018 | S |
| Stationery options | 0.900 | NS |
| Clothes | 0.312 | NS |
| Gifts less than 10,000 BDT | 0.096 | NS |
| Gifts 10001 to 50,000 BDT | 0.078 | NS |
| Gifts 50,001 to 100,000 BDT | 0.004 | S |
| Gifts more than 100000 BDT | 0.394 | NS |
| Hospital Trip | 0.011 | S |
| Personal or Family Trip | 0.514 | NS |
| Conference Registration Fees | 0.691 | NS |
| Conference Travel Fees | 0.513 | NS |
| Cosmetics | 0.093 | NS |
| Jewelry | 0.476 | NS |
| Computer Accessories | 0.010 | S |
| Home Electronics | 0.128 | NS |
| Cooking Accessories | 0.015 | S |
| Unique Gadgets | 0.574 | NS |
| Home Equipment | 0.186 | NS |
| Game Equipment | 0.165 | NS |
| Festival Gifts | 0.028 | S |

None of fifteen statements of attitude were associated significantly with personally knowing any representative with Pearson chi-square 2-sided test.

5.7. Effect of Being Taught about Physician-pharmacist Collaboration

The variable 'Taught about Physician-Pharmacist Collaboration' is strongly correlated with opinion about computer accessories only. About 40% of respondents who said that they had been taught about it said it inappropriate while 52% of other respondents said so. Among the respondents who was not taught about it, only 27% accepted it as appropriate, but 41% of the respondents who had been taught said it was.

Five out of fifteen statements of attitude were associated significantly with 'Taught about Physician-Pharmacist Collaboration' (Table 11).

**Table 11: Significant Correlation between Being Taught about Physician-Pharmacist Collaboration (Independent Variable) and Attitudes toward Drug Companies and Representatives**

| Dependent variable<br>Attitude towards drug companies | Pearson Chi-square Test: P value (2-sided) | Statistical Significance |
|---|---|---|
| The information from drug representatives is important for the physicians | 0.029 | S |
| It is ok for physicians to accept gifts from drug companies because drug companies have minimal influence on them | 0.033 | S |
| Drug representatives are a useful way to learn about new drugs | 0.000 | S |
| Drug company sponsored seminars are often biased in favor of their products | 0.036 | S |
| Five drugs from five different companies are identical in terms of price, and therapeutic efficacy. I would preferentially prescribe a drug from one of the companies that provided me with gifts or incentives. | 0.001 | S |

## 6. Discussion

6.1. Summary of Results

The most common monthly parental income was between 20,000 to 50,000 BDT for medical students. Less than 16% medical students had a physician or pharmacist parent. More than half of medical students did not know any pharmaceutical representative personally. Almost all the students (89%) said that they were taught about medical ethics in medical colleges. But three quarters (73%) said that they were not taught about ethics of physician-pharmacist collaboration.

Most of the medical students (85%) did not have any experience of interaction with pharmaceutical company representatives though they were in clinical phases of their education (3rd, 4th, and 5th year). Drug samples and pen-notepads were the most appreciated pharmaceutical gifts, whereas jewelry and gifts costing more than 100 thousand BDT (1200 USD) were the least appreciated pharmaceutical gifts.

Attitude towards drug companies and representatives were explored and the majority of students felt that:

- Information provided by drug companies are not always authentic. But the information is important for physicians.
- It is inappropriate to receive pharmaceutical gifts in spite of the minimal influence of pharmaceuticals on physicians.
- Receiving gifts from pharmaceuticals will eventually affect my prescribing behavior in favor of them.
- Most drug company sponsored seminars are educational. Although the programs are biased in favor of company products.
- Drug companies are an important way of learning new drugs.
- Receiving gifts by physician cause increase of drug prices.
- Drug companies act unethically in promoting their products.
- Companies should be accountable to patients for the drugs provided by them.
- Students should not have any interaction with drug companies in medical school. But drug companies can sponsor seminars and educational programs in medical schools.
- If a drug company agrees to pay for the printing cost of all class notes in the undergraduate medical school, the logo of that company appearing in the bottom corner of the first slide of the lecture is acceptable.
- Drug companies should not assist students' tuition fees.
- They will not choose a drug based on given incentives or gifts from a bunch of drugs of same therapeutic efficacy.
- There is a need of guidance about the relationship of pharmaceuticals and physicians in the undergraduate medical curriculum.
- Pharmaceuticals are primarily interested in profit. However, they still try to work in the best interest of doctors and patients.

The above statements were found to be true based on attitudes of medical students of Bangladesh.

6.2. Identified Correlations

The sample was enough to represent the population according to the single proportion formula of sample size calculation. Based on statistical significance, distribution of variables, chi-square test, and P values, the following correlations are proposed in Bangladesh:

Gender of the medical student is associated with experience about pharmaceutical reps. More male medical students know medical representative s and have had interactions than female students.

I. More female students think clothes, gifts costing more than 50 thousand BDT, game equipment, and personal and family trip are inappropriate gifts than do male students. The study found that the majority of male students think it appropriate to receive gifts less than 10 thousand BDT, festival gifts, and computer accessories: whereas the majority of female students think it inappropriate. More male students

accept meals, textbooks, and conference travel fees appropriate than female students. Only stationery items are accepted by more female students than male students.

Change in gender also changes the attitude towards drug companies and representatives as shown in Table 3. Generally male students were more supportive of the interactions still the majority of female students than that of male students support the following statements: Drug representatives are a useful way to learn new drugs; Receiving gifts or incentives from pharmaceuticals increases the chance eventually for me to prescribe that product. The majority of males agree but majority of female disagree with the following statement: "*If a drug company agreed to pay for the printing cost of all my class notes in the undergraduate medical school, I would not mind the logo of that company appearing in the bottom corner of the first slide of the lecture*"

The academic year of study has no association with the experience about pharmaceuticals, but has a strong association with opinions on some specific gifts and incentives. The percentage of students agreeing to the appropriateness of textbooks, stethoscope, stationery items, conference registration fees, and conference travel fees is inversely proportional to the academic year. The more academic year advances, the more the percentage falls. The proportion of medical students perceiving inappropriateness of clothes, meals, personal or family trip, game equipment, unique gadgets, and computer accessories as gifts is proportional to the academic year. The more academic year advance, the more the proportion rises.

Third year students could be a better target for drug companies than later years, but this study did not explore whether that would have a lasting influence on attitudes. Festival gifts are accepted to more third year students than the fourth and fifth year. Current academic year affects the attitude of medical students significantly. More third-year students than other years support the following statements: Drug companies' sponsored educational seminars are helpful; Receiving pharmaceutical gifts by physicians increase drug costs; Students should not have interaction with pharmacists in medical schools; I will not choose a drug from a bunch of drugs of same therapeutic efficacy based on given incentives or gifts. More fourth-year students than other years appreciate drug companies as a useful way to learn about new drugs.

Parental income has a strong association with the opinion of medical students on some gifts and incentives, and has a strong correlation with some statements of attitudes. Comparing to any other groups, a majority of students having parental income more than 150 thousand BDT consider that the information provided by drug companies are useful for physicians. More students having parental income 100 to 150 thousand BDT agree to the following statements than any other parental-income groups: Drug representatives are a useful way to learn about new drugs; Pharmacists should be accountable to the patients for the drug they provide. The majority of medical students having monthly-parental-income less than 20 thousand BDT disagree to choose a drug based on given incentives or gifts from a bunch of drugs of same therapeutic efficacy.

Having physician parents has a strong association with the opinion on some gifts and incentives. Meals, hospital trips, conference registration fees, and computer accessories are appropriate to more students of non-physician parents than students of physician parents. It seems like the students with physician parents were more sensitive to the influence of pharmaceutical companies, and that education at home may have been a positive influence on their ethics.

More students who know any medical representative personally accepts textbooks, hospital trip, gifts costing 50 to 100 thousand BDT, computer accessories, cooking accessories, festival gifts, and medical equipment as appropriate gifts more than that of those who do not know.

Teaching on physician-pharmacist interaction does not affect opinion on gifts and incentives except for computer accessories. Teaching on physician-pharmacist interaction has an effect on the attitude of medical students towards drug companies and representatives. Support for the following statements increases after teaching: Information of drug companies as important for physicians; physicians should not accept gifts from pharmaceuticals in spite of minimal influence on them; I will not choose a drug from a bunch of drugs of same therapeutic efficacy based on given incentives or gifts. Drug companies are accepted as a useful way to learn new drugs to more students who had not been taught compared to those students who said they had been taught.

### 6.3. Limitations of the Study

The study findings should be viewed in the background of certain methodological limitations. The data collection took place via Google forms online, so the students who did not have access to the internet could not participate. Since data were collected on self-administered questionnaires, we could not rule out information bias. There is also some non-response bias. Anonymity and confidentiality of the respondents were ensured in

the study. Hence we did not have the opportunity to identify and re-invite the non-responders on a separate occasion. The statements were insufficient to measure every aspect of attitudes. A longitudinal or cohort study could provide more data.

## 7. International Comparisons

7.1. Comparisons to the United States

Medical students of the United States have more experience of interactions with pharmaceutical industry than Bangladeshi medical students of this study. But less American medical students than Bangladeshi students do not agree that receiving gifts will affect their prescribing behavior (Austad et al., 2013b, Sierles et al., 2005). Austad et al. reported attitude of first and final year students, Sierles et el. Reported third-year students, and Kim et al. reported preclinical students (Sierles et al., 2005, Austad et al., 2013b, Kim et al., 2012). Details of comparison are presented in Table 12.

**Table 12: Comparison of the attitudes of medical students towards pharmaceutical industry in Bangladesh and the United States (% agreeing to the statement)**

| | Bangladesh (this study)- Final year students | The United States (Austad et al.)- final year students (Austad et al., 2013b) | The United States (Sierles et al.)- Third-year students (Sierles et al., 2005) | The United States (Kim et al.)- Preclinical students (Kim et al., 2012) |
|---|---|---|---|---|
| Physician Parents | 12.8 | 24.8 | - | - |
| Personally known pharmacists | 36.6 | 6.7 | - | - |
| Experience of interaction with pharmaceutical representatives | 18.7 | 44.4 | 93.2 | - |
| **Agreement to the following statements:** | | | | |
| It is acceptable for physicians to accept gifts from pharmaceuticals | 23.7 | - | - | 41.1 |
| Receiving gifts from representatives increases the chance that I will eventually prescribe the drug company's products | 52.2 | 36.3 | 31.2 | - |
| Educational programs or rounds by drug companies are educational and helpful | 68.1 | 36.6 | 89 | - |
| Drug companies should sponsor programs in medical school | 64.1 | - | - | 61.5 |
| Drug company sponsored programs are often biased in favor of their product | 71.6 | 76.9 | 67.4 | - |
| Representative of drug companies and their materials are useful way to learn new drugs | 56 | 30.1 | 71.3 | 71 |
| Medical students should not have interaction with pharmaceutical representative in medical schools | 60 | 69.8 | 17.3 | 56.5 |
| I was educated about physician-pharmacist interaction | 33.5 | 69.1 | - | - |

7.2. Comparison to Canada

No Canadian research on medical students regarding this theme is available. But Sergeant et al. studied the attitude of the Canadian family medicine residents towards pharmaceutical industry (Sergeant et al., 1996). Details of comparison are presented in Table 13.

7.3. Comparison to Germany:

German medical students have more experience of interaction with pharmaceutical industry than Bangladeshi medical students. But less German students than Bangladeshi students agree that receiving gifts will change their prescribing behavior. And less German students than Bangladeshi students deny that students should not have interaction with pharmaceuticals in medical school (Lieb and Koch, 2013). Details of comparison are presented in Table 14.

7.4. Comparison to Pakistan

Siddiqui et al (2014) conducted a similar study in Pakistani medical students. In demographics Siddiqui et al. has 31.2%, 44.3%, 24.5% medical students of the third, fourth, and fifth year respectively. But we have 17.9%, 23%,

and 59.1% respectively. More Pakistani students than Bangladeshi students accept drugs companies to sponsor educational events in medical schools. But More Bangladeshi students than Pakistani students consider meals, textbook, pen, stethoscope as appropriate gifts. Other attitudes sound pretty similar (Siddiqui et al., 2014). Details of comparison in presented in Table 15.

**Table 13: Comparison of attitudes towards pharmaceutical industry between medical students of Bangladesh and Residents of Canada.**

| **Agreement to the following statements:** | Bangladeshi Medical Students (this study) | Canadian Family Medicine Residents (Sergeant et al., 1996) |
|---|---|---|
| The information from drug representatives is important for the physicians | 62.1 | 58.5 |
| Receiving gifts or incentives from pharmaceutical representatives increases the chance that I will eventually recommend/prescribe the drug company's products | 49.9 | 43.4 |
| There is a need for guidance regarding relationship between the pharmaceuticals and the physicians in the undergraduate medical curriculum | 69.2 | 45.6 |
| Gifts from drug companies to doctors lead to increased prices of medicines | 47.6 | 35.9 |

**Table 14: Comparison of the attitude towards pharmaceutical industry between medical students of Bangladesh and Germany.**

| | **Bangladeshi Medical Students (this study)** | **German Medical Students (Lieb and Koch, 2013)** |
|---|---|---|
| Experience of pharmaceutical interaction | 14.7 | 87.9 |
| **Agreement to the following statements:** | | |
| Most seminars sponsored by drug companies are helpful and educational | 56.9 | 48 |
| Drug company sponsored seminars are often biased in favor of their products | 73.2 | 89 |
| Drug representatives are a useful way to learn about new drugs | 57.7 | 61 |
| Receiving gifts or incentives from pharmaceutical representatives increases the chance that I will eventually recommend/prescribe the drug company's products | 49.9 | 25 |
| Students should not have any interaction with drug companies in medical school | 57.7 | 22 |

**Table 15: Comparison of attitudes towards pharmaceutical industry between medical students of Bangladesh and Pakistan**

| | **Bangladeshi Medical Students (this study)** | **Pakistani Medical Students (Siddiqui et al., 2014)** |
|---|---|---|
| Physician parents | 12 | 27.1 |
| Pharmacist parents | 3.7 | 3 |
| **Agreement to the following statements:** | | |
| Medical students should not have interaction with pharmaceutical representative in medical schools | 57.7 | 41.3 to 46 |
| Physicians should not receive gifts in any form | 43.8 | 25.4 to 29.1 |
| Acceptable gifts: meals, pen, stethoscope, textbook | 38.6 to 85.5 | 36.3 to 40.4 |
| I will not choose a drug from a bunch of drugs of same therapeutic efficacy based on given incentives or gifts. | 59.5 | 56.1 to 56.5 |
| The information provided by drug representatives about their products can be trusted | 34.1 | 15.8 to 41.8 (significant variation among medical colleges) |
| It is acceptable for drug companies sponsor events/educational seminars during medical school. | 64.1 | 79.8 to 83.2 |
| If a drug company agreed to pay for the printing cost of all my class notes in the undergraduate medical school, I would not mind the logo of that company appearing in the bottom corner of the first slide of the lecture. | 39.4 | 39.1 to 49.1 |
| There is a need for guidance regarding relationship between the pharmaceuticals and the physicians in the undergraduate medical curriculum | 69.2 | 54.9 to 84.2 (significant variation among medical colleges) |

7.5. Comparison to Saudi Arabia

No Saudi study on medical students regarding this theme is available. But the attitude of Saudi physicians has been studied (Zaki, 2014). More Saudi physicians than Bangladeshi medical students find information of drug companies as important. But less of them accept that drug companies are unethically promoting their drugs. More Saudi physicians than Bangladeshi medical students disagree that pharmaceutical incentive to physicians increases drug cost. However, less Saudi physicians than Bangladeshi medical students admitted being affected in prescribing behavior by receiving gifts. Other attitudes are more or less

similar (Zaki, 2014). Details of comparison in presented in Table 16.

**Table 16: Comparison of attitudes towards pharmaceutical industry between medical students of Bangladesh and Physicians of Saudi Arabia.**

| Agreement to the following statements: | Bangladeshi Medical Students (this study) | Saudi Physicians (Zaki, 2014) |
|---|---|---|
| Educated about physician-pharmacist interaction | 27.4 | 22.8 |
| Personally knowing a drug representative | 33.1 | 28 |
| **Agreement to the following statements:** | | |
| The information from drug representatives is important for the physicians | 62.1 | 80 |
| Drug representatives are a useful way to learn about new drugs | 57.7 | 65 |
| Most seminars sponsored by drug companies are helpful and educational | 56.9 | 45 |
| It is ok for physicians to accept gifts from drug companies because drug companies have minimal influence on them | 23.7 | 20 |
| The information provided by drug representatives about their products can be trusted | 34.1 | 42 |
| Drug companies act unethically in promoting and advertising their products | 56.8 | 31 |
| Receiving gifts or incentives from pharmaceutical representatives increases the chance that I will eventually recommend/prescribe the drug company's products | 49.9 | 34 |
| Gifts from drug companies to doctors lead to increased prices of medicines | 47.6 | 27 |
| Drug company sponsored seminars are often biased in favor of their products | 73.2 | 63 |

### 7.6. Further International Comparisons of Attitudes towards Gifts

Various countries reported attitude of medical students and physicians towards pharmaceutical gifts. Some comparisons are presented in Table 17.

### 7.7. Attitudes towards Pharmaceutical Gifts and Associated Factors

Among Bangladeshi medical students in this study, drug samples were found to be a more acceptable gift than other examples. It might be due to the educational purpose. Drug samples help to learn about new drugs and formulary. Drug samples are also appreciated by most students of Saudi Arabia (Zaki, 2014). But it is not that acceptable to German and American medical students (Lieb and Koch, 2013, Sierles et al., 2005). Pen and notepads are also highly appreciated by medical students in this study. Probably it helps them in academic purpose a lot. About half of Saudi Arabian physicians support it, though not that much as Bangladeshi students (Zaki, 2014). Jewelry was most depreciated among the participants in this study, perhaps because it is a luxury product unrelated to medicine or education.

More than one-third of students in this study supported meals as gifts. This proportion is less than Saudi Arabian physicians and German medical students (Zaki, 2014, Lieb and Koch, 2013). On the other hand, a very high acceptance of meals as gifts (more than 70%) is seen among the medical students in Norway and the United States (Lea et al., 2010, Sierles et al., 2005). The probable reason may be the difference in economic condition and social culture.

Among the academic gifts, textbook and stethoscope were highly appreciated by Bangladeshi medical students in this study. It is even higher than Saudi physicians, medical students of Germany, Norway, and the United States (Zaki, 2014). More than half of this study participants accepted conference travel fees as appropriate. The ratio is pretty similar to Germany and Norway (Lieb and Koch, 2013, Lea et al., 2010). Even more than half of Saudi physicians accept it too (Zaki, 2014). But less percentage of the U.S. medical students accept conference travel assistance as appropriate (Sierles et al., 2005).

More than half of Bangladeshi medical students in this study considered stationary items as appropriate gifts. But only 36% Saudi physicians support that (Zaki, 2014). The acceptance rate of personal or family trips as appropriate gifts is 20 to 30% in this study, in Saudi physicians, and the U.S. medical students. But it is only 11.7% among German medical students (Zaki, 2014, Sierles et al., 2005, Lieb and Koch, 2013).

We also investigated attitude towards some more gifts such as dry food, medical equipment, clothes, gifts in the different amount, hospital trip, and cosmetics etc. But no significant data is available in the literature about them. However, this results also showed a significant correlation between opinion on some gifts and students' academic year. This correlation is supported by some studies of the United States too (Bellin et al., 2004, Fitz et al., 2007). This may be due to the change in experience and exposure to pharmaceutical interaction in different years (Bellin et al., 2004).

This results showed that the more the cost of gifts increased, the more inappropriate it became to medical students. Thus, medical students might

**Table 17: International Comparison of Attitude of Medical Students and Physicians towards pharmaceutical gifts (% in Agreement)**

| Agreement to appropriateness of the following gifts: | Bangladeshi Medical Students (this study) | Saudi Physicians (Zaki, 2014) | German Medical Students (Lieb and Koch, 2013) | Norwegian Medical Students (Lea et al., 2010) | The United States Medical students (Sierles et al., 2005) |
|---|---|---|---|---|---|
| Stationery | 52.2 | 36 | - | - | - |
| Textbook | 77 | 55 | 64.2 | 69.1 to 84.4 | 71.1 |
| Stethoscope | 73.6 | 39 | 56.5 | - | - |
| Conference Travel Fees | 57.2 | 63 | 52.2 | 47.7 to 82.2 | 35.4 |
| Conference Registration Fees | 56.3 | 67 | - | - | - |
| Pen-Notepad | 85.5 | 50 | - | - | - |
| Personal or Family trip | 28 | 26 | 11.7 | - | 30.2 |
| Drug samples | 89 | 66 | 33.4 | - | 21.4 |
| Meals | 38.6 | 28 | 46.4 | 75.5 to 90.5 | 77.4 |

emphasize on ethical behavior more than self-beneficence. Female students felt more neutral or inappropriate about most of the gifts than male. Probably they were more concern about ethics or it was a part of the female behavioral difference. However, this issue should be investigated further.

We found that textbook, stethoscope, and conference fees were more popular among the junior students than the seniors. It might be due to a fact that juniors were less exposed to those. The more students expose to them or use them personally, the more acceptability of gifts declines (Bellin et al., 2004). Clothes, gaming and computer equipment and trips are more acceptable to senior students. But the reason behind it is unknown, should be studied.

### 7.8. Attitudes towards Drug Companies and Associated Factors

The reliability of the information provided by drug companies was questioned by almost all students in this study. They might think that information as fabricated for better promotion by drug companies. But despite unreliability, they thought the information as important of physicians. Change in gender and parental income affected their opinion. Literature also suggests that information provided by them have some potential bias (Kalb, 2004). Most Canadian residents and physician trainees consider the information as untrustworthy. Most of them also want to ban this type of pharmaceutical promotion (Hodges, 1995).

Bangladeshi medical students declined the appropriateness of accepting pharmaceutical gifts whether they have minimal influence or not, according to this study. Female gender and formally learned students about the interaction depreciated the gifts most. In contrast, a systemic review shows that more clinical students than preclinical students support to accept gifts (Austad et al., 2011). And most physicians do not perceive any ethical problem in accepting gifts (Brett et al., 2003, Korenstein et al., 2010). Even medical students also appreciate getting gifts or financial support from pharmaceuticals if they have a financial problem (Grande et al., 2009). And when pharmaceutical companies approach students, their main intention is to introduce them repeatedly about the name of drugs and company. In that way, most of the targeted students easily memorize brand names, promotional products, book titles, and company name (Sandberg et al., 1997).

Although most seminars sponsored by drug companies are biased in favor of their products, they are helpful and educational, according to this study participants. The academic year of students affected that attitude of them. Similarly, U.S. study shows that more than half of the U.S. medical students believe those programs as educational. The attitude of students varies from school to school, region to region, and year to year. Variation of opinion is also seen between exposed and unexposed to pharmaceutical interaction (Grande et al., 2009). A systemic review shows that more clinical students than preclinical students support those programs as educational (Austad et al., 2011). About 80% of the U.S. physicians also find the programs helpful (Korenstein et al., 2010). A study among medical students shows that more than two-third of them agree with the biasness of the programs (Grande et al., 2009). About two-third of the U.S. physicians think alike (Korenstein et al., 2010). Even nearly half of pharmacy students also think so (Ashker and Burkiewics, 2007). But pharmacy students are found to be more taught about drug marketing and professional ethics than medical students. They are generally more supportive to pharmaceutical gifts and sponsored seminars (Monaghan et al., 2003).

Future doctors of Bangladesh in this study considered drug representatives as a useful way to learn new drugs. Gender, academic year, parental income, physician parents, and formal education on

physician-pharmacist interaction affected their consideration. Variation of the agreement was found in different years. Similarly, a systemic review shows that more clinical students than preclinical students agree to the efficacy of representatives about educating on new drugs (Austad et al., 2011). About 65% U.S. physicians also think this as a way to learn new drugs (Korenstein et al., 2010).

Pharmaceutical gifts to doctors increase medicinal prices, this students thought so. Gender, academic year, and physician parents affected this attitude. However, Bangladesh has no such data of awareness of physicians about patients' out-of-pocket expenses. In the United States (U.S.), physicians are often unconcerned about that matter. A study shows that 88% of the U.S. physicians agree that patients' drug costs should be within their financial ability. But only 59% prefers less costly drugs to prescribe. While searching for reasons, only 25% of them believe that it is a responsibility of physicians. And 69% of them believe that it is a responsibility of pharmacists (Shrank et al., 2005).

Most of this students agreed that receiving pharmaceutical gifts would change their prescribing behavior in favor of that company. Less females agreed to that act than males. Academic year also affected that opinion. Similarly, a systemic review also supports the variation in different academic years. It shows that more clinical students than preclinical students are afraid of biasness of their future prescribing after receiving gifts (Austad et al., 2011). A study among the U.S. medical students shows that from 29.4% to 63.3% students agree to the influence on prescribing which may vary from school to school, and year to year (Grande et al., 2009). Many faculties of medical schools of the Unite States think that personal relationship affects prescribing more than receiving gifts. They ask for more restrictive regulations on it (Banks 3rd and Mainous 3rd, 1992). Most Canadian residents and interns disagree to have an influence of gifts on their prescribing behavior. And they admit having the same behavior and prescription without any gifts and incentives (Hodges, 1995). Many physicians of Iraq prefer low-cost gifts than high costs. They also switch to generic prescribing occasionally (Mikhael and Alhilali, 2014). But pharmaceutical representatives usually have an impact on the prescribing behavior of physicians, claimed by many studies (Cleary, 1992, Korenstein et al., 2010). Educational assistance, selling and promoting strategies of pharmaceuticals have a significant effect on physicians' prescription (Andaleeb and Tallman, 1995). In the United States, gifts or quasi-gifts by representatives influence the prescribing pattern of physicians (Berger, 2003). Only detailing by a drug representative can cause selection bias by a physician (Datta and Dave, 2016). So, incentives may easily alter a physician's choice of drugs. And if that happens, it will go against physicians' autonomy (Kalb, 2004).

Drug companies act unethically in promoting and advertising their products, that is what most of the Bangladeshi medical students thought. More male students thought it than female students did. However, it can be true. Even sometimes representatives also may feel ethical dilemmas in marketing products. Especially when they describe the benefits of their products and offer incentives, they may sense ethical dilemma but do not express it (Tengilimoglu et al., 2004). Moreover, it is possible to change form and content of a drug after proving its scientific credibility. Sometimes marketing and promotional strategy become different in different time and circumstances (van der Hoogte and Pieters, 2010, Bergman et al., 2016).

Students should not have any interaction with drug companies in medical school, according to the opinions of this study participants. Gender and academic year affected that attitude. Similarly, about 33% of the U.S. physicians also suggest that prohibiting policy (Korenstein et al., 2010). But some students may desire for this interaction which varies in different academic years. A systemic review suggests that preclinical students than clinical students like to have more interaction with companies (Austad et al., 2011).

Most Bangladeshi future doctors think that pharmacists should be accountable to the patients for the drug they provide. Gender and parental income were associated factor of that opinion. More male than female agreed of pharmaceutical accountability to patients. However, it is true that if any drug provided by pharmacists does any harm to patients, physicians and patients can take lawful action against that company (Cacciatore, 1997).

Most participants agreed to have the logo of a drug company on the first lecture slide if the company agrees to pay for the printing cost of all class notes in the medical school. Gender affected that agreement greatly. More female disagreed but more male agreed. This study also found that most medical students accept drug companies to sponsor educational events in medical schools. More male than female significantly supported that matter. Similarly, a systemic review shows that more clinical students than preclinical prefer educational seminars in their medical school (Austad et al., 2011). Moreover, 70% of U.S. physicians also support that matter (Korenstein et al., 2010). Even pharmacy students also support those educational events. A study shows that most of them think the

events helpful to acquire more knowledge (Ashker and Burkiewics, 2007).

Future doctors of Bangladesh in this study would not like to choose a drug from a bunch of drugs of same therapeutic efficacy based on given incentives or gifts. Gender, academic year, parental income, physician parents, and formal education about the interaction affected that attitude significantly in this study. Similarly, a review suggests that more than half of medical students think that gifts will not influence their future prescribing behavior. And more than one-third think that interaction with pharmaceutical will not affect their prescribing pattern (Carmody and Mansfield, 2010).

There is a need for guidance regarding physician-pharmaceutical interaction in the undergraduate medical curriculum of Bangladesh, according to the most opinions in this study. As only a few medical students got a formal education about it. The scenario of other countries also supports the fact. A systemic review shows that mostly less than of half medical students learn about the ethical interaction in their medical school (Austad et al., 2011). Even in the developed countries, the knowledge of faculties or resident doctors about drug marketing, drug cost, pharmacist collaboration can be limited (Watkins and Kimberly, 2004). A study shows that only 40% of the physicians of Washington DC agree to have a structured curriculum. More of those curriculums support the interaction. But most of them want the interaction to be with institutional affiliation. The source of drug information and ethics of physician-pharmacist interaction are the most common subjects among the curriculums (Evans et al., 2016). Education does influence the attitude of medical students and physicians. So, it is highly demanded. There will be a positive change in behavior after learning pros and cons of physician-pharmacist interactions (Vinson et al., 1993) (Hopper et al., 1997).

## 8. Conclusions and Recommendations

### 8.1. Conclusions

The interactions between physicians and pharmaceutical producers has continued for centuries. But sometimes, questions of ethics and conflicts of interests create debates. Pharmaceutical companies offer various gifts to physicians that vary to be low or high cost, rational or irrational, and ethical or unethical. Gifts, on one side, help people to remember the names of new products and companies. On another side, it may cause selection bias in physicians' prescriptions. In Bangladesh, drug samples, textbooks, stethoscope, pen-notepad, hospital trip, and conference travel-registration fees are highly appreciated among medical students. The choices are different in some countries. Meals and festival gifts become more inappropriate as the academic year advances, may be due to an increasing professionalism. Parental income greatly affects the attitudes towards gifts. Students with low parental income appreciate computer accessories and low-cost gifts. The choices can have a link to their financial problem. Because, the more parental income grows, the more inappropriateness of low-cost gifts increases. Having physician parents also affects the attitude towards gifts considerably, making them more neutral. Moreover, personally knowing a representative affects the choice of gifts too. And it is surprising that teaching on pharmaceuticals does not have any association with gift choices. The reasons should be thoroughly investigated.

The information provided by drug representatives is not always fully accurate. Potential biases for drug marketing can be seen there, Bangladeshi students also do support that. There is an ethical question in drug marketing perceived by many medical students, representatives, and pharmacists. Medical students consider pharmaceuticals as a way of learning new drugs. No ethical problem is revealed in learning new drug names. Accepting gifts are depreciated by the most Bangladeshi medical students, because of their ethical concern. They are aware that pharmaceutical gifts may bias their prescription in the future. Most of the medical students do not agree to choose a drug from a group of drugs with same therapeutic efficacy based on company incentives. And it is an obvious unethical matter that many physicians in the world write biased prescriptions in favor of companies who give gifts. The duty of physicians is to recommend the most appropriate drug with high efficacy rate at their knowledge. Pharmaceutical incentives may increase the cost of drugs, many medical students and physicians know that. But they might not consider it during prescribing. Both pharmacists and physicians should be concerned about medicinal prices for greater benefits of patients. Even pharmacists should be accountable to patients for the drugs they provide.

However, pharmaceutical companies often sponsor educational events in medical schools. Most of the students and physicians know those are biased to their products. But they still support the events considering the educational value and financial needs, the support varies among academic years. Many students also have interaction with pharmaceuticals in medical schools. The phenomena are more common in developed countries than in Bangladesh. But, many students and physicians of the world want to prohibit the pharmaceutical interaction in medical schools. However, the attitude of medical students is

affected by gender, academic year, parental income, physician parents, and formal education on pharmaceutical interaction. The attitude may also vary in different settings, medical schools, and countries. But it is really astonishing that personally knowing representatives does not affect the attitude.

Medical schools do not provide enough teaching on pharmaceutical interaction. Formal education on medical ethics and ethics of physician-pharmacist interaction can promote more promising behavior and ethical medical practice. Formal education also may help students to set a better attitude. Collaboration between physicians and pharmacists is definitely necessary for better health care. But it is better if the collaboration occurs in a more ethical way.

8.2 Recommendations

The following recommendations are suggested according to this study findings:

**A. Recommendation for Medical Students:**

1. Medical students should learn themselves about ethical aspects of pharmaceutical gifts.
2. The financial problem should be balanced with the acceptance of pharmaceutical gifts.
3. Drug samples, pen-notepad, textbook, stethoscope, and other educational equipment can be acceptable to certain limits. Medical schools can determine the limits.
4. Students can accept hospital trips, conference registration-travel fees, and financial assistance from pharmaceuticals within a certain limit only they are in financial crisis and if they disagree to write biased prescriptions in the future.
5. Medical schools should form guidelines on pharmaceutical gifts for students with pros and cons listed.
6. They should be introduced by medical schools to sources of drug information other than representatives.
7. Students should evaluate the possible positive and negative aspects of the information provided by pharmaceuticals.
8. Medical schools should train students on how can they avoid the influence of pharmaceuticals in the future practical life.
9. Students should take only the educational part when they attend any seminar or event sponsored by drug companies.
10. Students should interact with more patients in the clinical wards and know more about their financial problems to buy drugs.
11. Students should evaluate themselves about positive-negative and ethical-unethical aspects of the marketing strategy of drug companies.
12. Students should have less interaction with pharmaceuticals in medical schools, they should not interact before learning ethics.
13. Students should avoid financial assistance from drug companies unless they are in extreme financial crisis. Medical schools can increase financial aids to students.
14. Students should learn appropriate prescribing of drugs from a group of drugs of same therapeutic indication and efficacy.

**B. An inclusion of ethics of physician-pharmaceutical interaction should be included in the undergraduate curriculum. The following topics should at least be taught:**

1. Ethics of physician-pharmaceutical interaction, national and international guidelines
2. Ethics of drug prescribing
3. Physician-patient and pharmacist-patient relationship
4. Limits and effects of receiving pharmaceutical gifts
5. History of pharmaceutical reform in different countries
6. Current policies and scenario in different countries
7. Marketing strategy of pharmaceuticals
8. Ethics for pharmacists
9. Difference in ethics for medical students and physicians
10. Effect of prescribing on medicinal prices

**C. Recommendation for physicians:**

1. Physicians should try to minimize the effect of drug representatives while prescribing rationally.
2. Physicians should consider drug prices while prescribing for poor patients.
3. Physicians should rationally evaluate the information provided by drug companies.
4. Physicians ought to be concerned about ethical measures of pharmaceutical marketing.
5. Physicians can move to generic prescribing if they feel ethical dilemma during practice.
6. If some drugs have same therapeutic efficacy and equally indicated for a patient, a physician should choose the cheaper one, not the promoted one by pharmacists.
7. Physicians should decrease their dependence on drug industries
8. Physicians should adhere to all statements of medical ethics and ethics of pharmaceutical practice by all means

**D. Recommendations for pharmaceutical companies:**

1. Pharmaceutical companies should promote their products within the ethical limit.

2. New drugs with same therapeutic efficacy should not be marketed for better business.
3. Pharmaceutical companies should make themselves concerned about medicinal price and patients' affordability.
4. Helping people should be prioritized than gaining profits.
5. Pharmaceutical companies should also receive the idea of 'do no harm' for patients.
6. The companies should be accountable to patients for the drugs they supplied
7. Drug companies should have an ethical board regulating ethical matters of promotion. Representatives should report their activities to that committee
8. Pharmaceuticals should report national ethical council about their annual marketing and business for ethical clearance.

**Recommendations for the Government:**

The government should establish an ethical body to maintain ethics in the health system. The ethical body can maintain all issues in nationally including physician-pharmacist collaboration. Pharmaceuticals should report their annual activities to that ethical board. A national guideline in this issue is needed to be structured soon. Guidelines on ethics of receiving pharmaceutical gifts and interaction should be more clarified. The government can train teachers and faculties of medical schools in this issue so that they can pass it on to medical students. The national ethical body can establish ethical monitoring boards in different hospitals to maintain different aspects of medical ethics.

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**Social Work, Human Security, Ethics and Human Ability**, 1 July 2017, UKM, Kuala Lumpur, Malaysia. *Organizers: UKM; American University of Sovereign Nations (AUSN), USA, Asia-Pacific Forum on Ethics.*

**Intensive courses on research ethics and bioethics in the Philippines:**

**Catanduanes State University, Virac, 6 July 2017**

**Bicol University, Legapzi, 7-8 July 2017**

**University of San Jose-Recoletos, Cebu, 10-12 July**

**Visions of Social and Ethical Change in ASEAN, and Beyond**, 17 July 2017 (9:00-17:00) Chulalongkorn University, Bangkok, Thailand. *Organizers: Center for Ethics of Science and Technology, Chulalongkorn University, Thailand, American University of Sovereign Nations (AUSN), USA, Youth's UNESCO Club, and Eubios Ethics Institute.*

**Joint AUSN-Bangladesh Society of Bioethics Intensive Bioethics Training Course,** 15-16 July 2017 in Dhaka, Bangladesh.

**International Bioethics Roundtable: Bioethics Across and Between Continents and Peoples for the Betterment of All** AUSN, Arizona, USA, 2-5 September 2017

**Eighteenth Asian Bioethics Conference: The Future of Bioethics and Healthcare (ABC18),** 25-28 October 2017 in Seoul, Republic of Korea, followed by a **Joint AUSN-Gangneung-Wonju National University Intensive Bioethics Workshop**(ABA Satellite meeting) 29-30 October 2017 in Gangneung, Korea.

**The Eleventh Kumamoto University International Bioethics Roundtable: Philosophy and practice of bioethics across and between cultures**, ***18-19 November 2017, Kumamoto University, Japan***.
Contact: Kimiko Tashima, ktashima@kumamoto-u.ac.jp

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**Human Genome Research & Society** Eds: Norio Fujiki & Darryl R.J. Macer July 1992 NZ$40
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**Bioethics for the People by the People** by Darryl Macer, ... May 1994 ISBN 0-908897-05-7, 460pp. NZ$50

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**Protection of the Human Genome and Scientific Responsibility** (English and Japanese Bilingual) NZ$40
Editors: Michio Okamoto, Norio Fujiki & D.R.J. Macer, April 1996, ISBN 0-908897-09-X, 210pp.

**Bioethics in India** Eds: Jayapaul Azariah, Hilda Azariah & Darryl R.J. Macer NZ$60
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