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Editorial: Ethical Boundaries

Setting boundaries is a theme of the papers in this issue of the journal. In a growing number of countries circuses are no longer using live animals because of ethical concerns that the use of live animals harms them, and this theme is explored by Oana Iftime. Entertainment is a major business, but there are decreasing opportunities for children to see circuses. Many circus operators have found that without live animals fewer people come.

In a related case, SeaWorld in San Diego, California, has found that in the first year after cancellation of the Orca (killer whale) show the number of visitors fell by a quarter. Clearly the bioethical choice was not to keep the orcas in captivity, and to instead encourage people to go whale watching on boats in the ocean (if done sensitively). Many years ago human freak shows were attractions, and even Siamese twins were made famous

(and could generate an income) by being entertainers. Exploitation however is an easy boundary to cross, and setting boundaries and standards lessened the opportunity for blatant exploitation of the vulnerable that used to occur.

Tonmoy Biswas and Macer explore the attitudes of medical students in Bangladesh towards what are acceptable gifts from the representatives of pharmaceutical companies. This issue is of concern all around the world, but the results indicate that it is one which needs to be better discussed in medical ethics education. There are many avenues for education, but interestingly the students whose parents were physicians seemed to be more sensitive to the question, at least in their attitudes expressed in the survey. The paper includes an analysis of correlations with gender, academic year, exposure to pharmaceutical reps, and others factor in a lot of tables. International comparisons are made, and further research on this topic will be useful. It will be particularly interesting to see examples of correlation of attitude with specific teaching materials in the curriculum.

Saeideh Sayari et al. call for a broader examination of religious ethical principles in Muslim countries that impose very restrictive regulations on abortion. A broader concept of health of the mother will be useful for ethical judgment in many moral dilemmas. Abortion is clearly a contentious issue, but we need to consider the broader goals of love of life, and the health of the family.

Carol Rizkalla reviews some of the dilemmas of human germ-line editing. As someone who wrote about these issues in the 1990s, we can see that despite some moratoriums on germ-line genetic interventions, as some medical interventions such as mitochondrial donation have become safe, we have to reconsider the boundaries.

One of the concerns of the therapy-enhancement "divide" is boundaries. Should we simply allow law to determine what is ethical? How much do these boundaries change over time and place? Should we legislate and punish violators of some boundary between the legal and illegal? These are central questions of bioethics that allow us to move closer to promoting a "good-life" for all moral agents. Education is clearly critical for students, legislators, and all citizens to explore the underlying moral values.

- Darryl Macer

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 States 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 $384.16 \approx 384$ ($n = Z^2 pq/d^2$, $Z = 1.96$, $p = 0.5$, $q = 1-p = 0.5$, $d = 10\%$ 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.

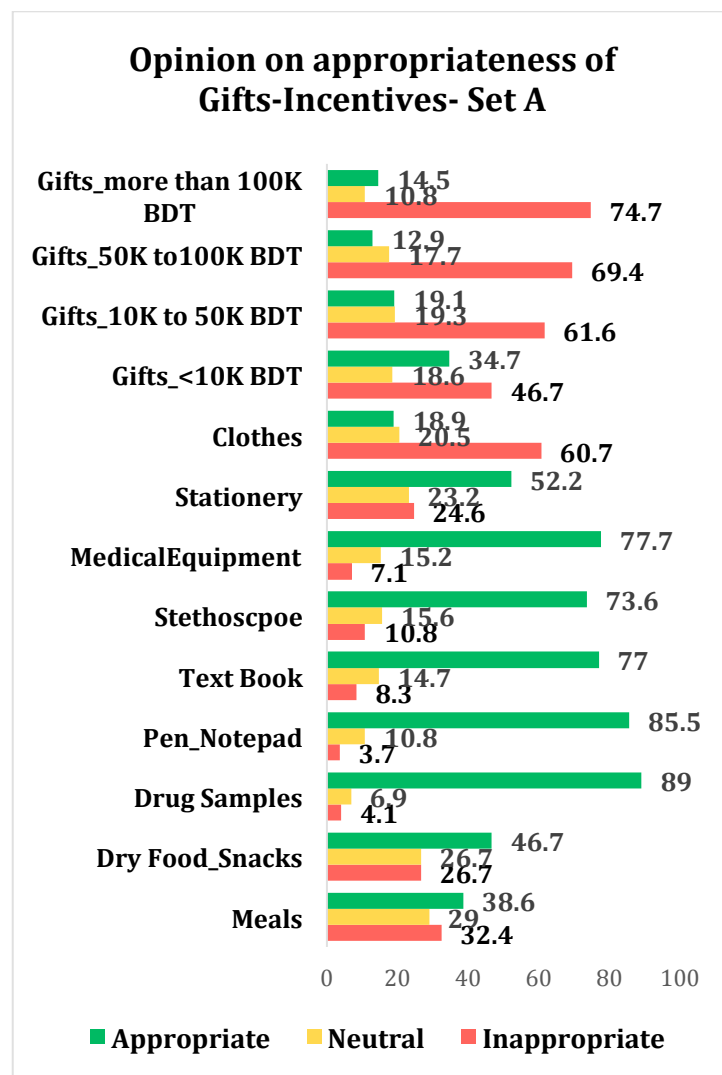


Figure 1: Opinions on Appropriateness of Different Gifts and Incentives (set-A)

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.

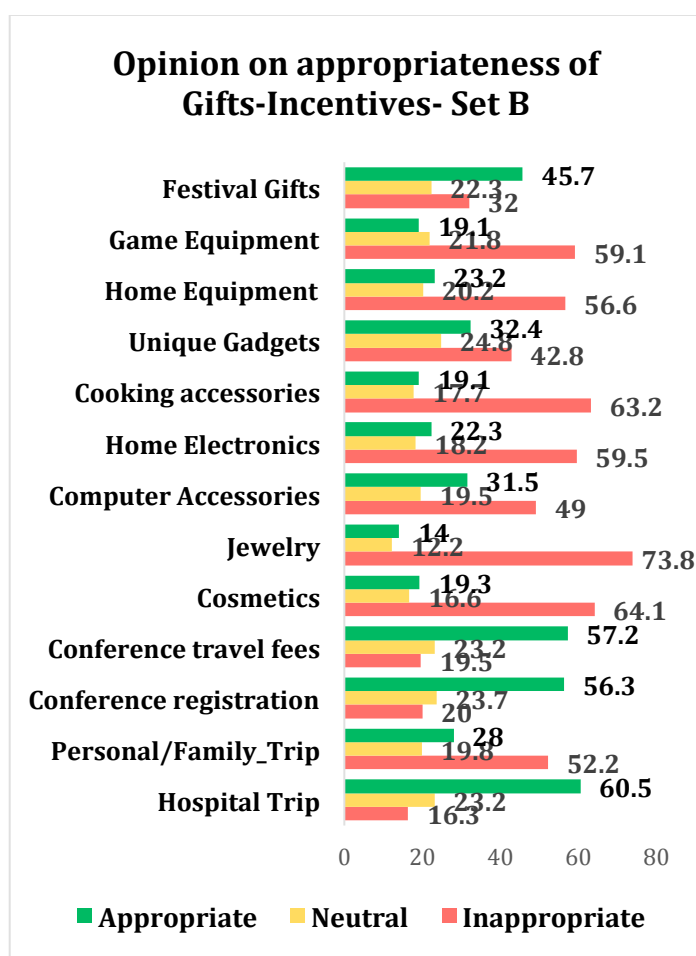


Figure 2: Opinions on Appropriateness of Different Gifts and Incentives (set-B)

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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Opinion about Gifts		
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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Attitude towards drug companies		
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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Opinion about Gifts		
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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Attitude towards drug companies		
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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Opinion about Gifts		
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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Attitude towards drug companies		
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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Opinion about Gifts		
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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Attitude towards drug companies		
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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Opinion about Gifts		
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	Pearson Chi-square Test: P value (2-sided)	Statistical Significance
Attitude towards drug companies		
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 al. 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 United 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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The perception of Muslim motifs and juridical authorities of the concept of health and its function in issuing fatwas on abortion

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Abstract

Muslim jurists and muftis issue fatwas on abortion based on *Ijtihad*. Three fundamental principles of *Ijtihad* indicate that jurisprudence has to consider the changes of the time and place, the public interest, and the least harm in issuing fatwas. However, many ignore these principles since they stick to the traditional concept of health which is their basis to issue fatwas. In this paper, we analyze how Islamic jurisprudence, through using these principles in perception of the concept of health, can help to solve the illegal abortion crisis in Muslim countries.

1. Introduction

Abortion is a global health issue and illegal and unsafe abortions lead to the deaths of an estimated 68,000 women every year. Many of these deaths occur in countries with a large Muslim population, and in some of these countries the laws are based on Islamic law. A summary of the legal provisions is presented later in this paper in Table 1.

Since two main sources of the policies for legislation about abortion are the political policies and religious transitions, in Islamic countries which follow the Islamic law (*shari'a*) the guidance on the act of abortion originates from religious decrees which jurists extract from the sources of religion, *Qur'an* and tradition.

The jurists extract some decrees based on dignity of human life and *hadith* (narrations from the prophet's life and decisions) in which the prophet and other religious leaders made decisions based on the concepts of human life. The key point here is that these decrees normally originated from the jurists' interpretations of the *hadith* and also the main doctrine of the dignity of human life. These interpretations reflect the historical, cultural, social, political, economic, ethical, and scientific realities of the era. In other words, the jurists issue the decree based on their knowledge of their time and concepts which they have, for example, the concept of human life and

human health. According to Muslim juridical attitudes, healthy life is identified as physical health although some of jurists recently also consider mental health in issuing fatwas. Based on this approach, juridical authorities issue fatwas on abortion in the cases in which mother's life is endangered.

According to the holistic concept of health defined by the World Health Organization (WHO), health includes physical, mental, and social well-being and not merely the absence of disease.¹ Therefore, healthy life is considered as a complicated, integrated, intertwined, and multidimensional net which is related to all aspects of human life, such as physical, mental, social, and spiritual aspects. The elimination of any aspects of this multi-faceted phenomenon may lead to making harmful decisions on human life.

In this paper, we argue that the reductionist ideas of some Muslim juridical authorities on the concept of health follows on the traditional concept of health according to which the concept of health was limited to physical health. We will discuss that the adherence to the traditional concept of health causes us to ignore the fundamental principles of *ijtihad* (making effort to extract the rules from the *Qur'an* and *Sunnah*). These principles are:

- 1- Laws change with changes in time and place
- 2- Choosing the lesser of two harms
- 3- Preserving public interest²

The importance of discussing the subject is that not only we can see the effects of the religious ideas and decrees about the concept of the health on reproductive behavior in Muslim countries, even those such as Turkey with a secular parliament, but also they are seen among the Muslim migrants in the secular countries (Arousell & Carlbom, 2016).

2. Methods

This study is qualitative using published data and analyses, and academic papers on a variety of topics about abortion, and uses philosophical and theological analysis. This research looks at the issue through the lens of Islamic jurisprudence.

¹ Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

² Subhi Mahmassani, *Falsafat al-Tashri' fi al-Islam, Dar al-'Ilm lil-Malayin*, Beirut, 1961, pp. 200-207, 408; Azizah Y. al-Hibri, "Islamic constitutionalism and the concept of democracy." *Case western reserve journal of International law*. 24, 1 (1992): 3-10.

3. The traditional vs. the modern concept of health

The traditional notion of health was considered as being in a disease-free state. While this concept is silent about the mental and social aspects, the World Health Organization (WHO) refers to three aspects of health, physical, mental, and social well-being. According to Balgo (1978), health is defined as, “*a state of body and mind functioning well which affords man the ability to strive towards his both functional objectives and culturally desired goals.*”

In the past, healthy life was limited to physical life since human knowledge was limited to simple rules of the physical body. Although Plato, Aristotle and other philosophers dealt with the non-physical part of the human being as the *soul*³, their explanations were connected to moral rules. Therefore, their attitudes refer to the responsibility of the human being to improve her/his soul. However, psychology as a scientific field began around 200 years ago with Fechner’s critique of Kant’s stricture against quantitative study of mind.⁴ Then, many schools and fields developed in psychology. These developments in psychology clarified the effects of the physical body on the mental aspect, and vice versa.

On the other hand, new findings threw light on the dependence of the social and environmental factors on the physical and mental part of human beings. In fact, human life was considered as a system in three dimensions, physical, mental, and socio-environmental. Hence, the healthy life also depends on the three mentioned parts. As a result, in 1946, WHO declared that health includes physical, mental, and social well-being and not only physical health. Therefore, the policy of health in many countries changed. For example, the UK government published a document as a policy for health in 2010. This document states that, “*mental health and well-being are also critical dimensions of health. We know that mental ill health is responsible for a high proportion of the overall burden of ill health and prevalence has been rising. We also know that mental health and well being are important factors for physical health*” (Our Health and Well Being Today, 2010).⁵ Islamic countries, especially the countries mentioned in this research are member countries of WHO. Therefore, since the definitions, rules, and principles of WHO include the members, Islamic countries are also expected to follow its rules.

³ Aristotle's Psychology. *Stanford Encyclopedia of Philosophy*.

⁴ Thomas H. Leahey, *A History of Modern Psychology*, 3rd Edition, Pearson, 2001.

⁵ *Our Health and Well Being Today*, Department of Health, Wellington House, 2010, p. 3. www.dh.gov.uk.

In fact, by adding the social and psychological aspects, WHO (and thus all member states officially) acknowledge that the concept of health and illness are multi-causal, and the focus shifted from a strictly medical perspective in the absence of illness to evaluation of a person’s status (Boruchovitch & Mednick 2002). Over history we can see cycles of over-emphasis on law and over-emphasis on love as the guidance of religions and practice, but the abortion laws need to consider more of the love of life for all moral agents, not just for the fetus (Macer 1998).

4. The traditional concept of health in contrast to the fundamental principles of *ijtihad*

4.1. The first principle: Laws change with changes in time and place

As mentioned above, in the past, healthy life was considered as life without physical illness. Therefore, two other aspects of health, mental and social well-being were generally not considered among the authorities in health and among law makers. Muslim jurists were not exceptional. In issuing the fatwas, they considered the traditional concept of health, as they do today. However, based on the fundamental principle of *ijtihad*, laws change with changes in time and place.

In Islam, God has the supreme legislative power; however, God changed His commands which He sent to people through prophets. God said in Qur’ān, “*None of Our revelations do We abrogate or cause to be forgotten, but We substitute something better or similar: Knowest thou not that Allah Hath power over all things?*”⁶ We can find many examples on the issue.

Changing the divine rules and command (abrogation) does happen within a religion or between religions. For example, the Torah allowed the believers to divorce;⁷ however, Christ rejected it for his followers.⁸ Another example is about the abrogation of a divine law within Islam; God at first commanded to strict punishment for women who committed adultery; then God changed the punishment into the milder law.⁹ The reason behind these changes, in general, is that changes happened in the human cultural, social, historical, political, individual, and even physiological circumstances.

Therefore, the fundamental principle of changing the laws based on the time and place originate from God Himself. In many cases, the

⁶ 2: 106.

⁷ Book of Deuteronomy, chapter 2.

⁸ The New Testament, Gospel Matthew: 19; Gospel Luke: 16.

⁹ Qur’ān, 4: 15 and 16; 24: 2

juridical muftis changed their fatwas. For example, to have more than one wife for men in Islamic realm was accepted; however, in some Islamic countries such as Iran, it has caused many problems for families, children and women. Finally, some jurisprudents reformed their fatwas; in this case, they argue that if a woman considers this Islamic rule as an insulting law to herself as a human being, it should be prohibited in that society.¹⁰

4.2. The second principle: Choosing the lesser of two harms

One of the most important reasons for changing the laws (the first Principle) is to reduce harms in human life. For example, before Islam, marriage to two sisters at the same time for a man was allowed in some Abrahamic traditions¹¹ but Islam forbade it¹² since it was harmful to the sibling relationship. The clearest example of this principle is the prohibition of drinking wine in the Qurʾān. “They ask thee concerning wine and gambling. Say: ‘in them is great sin, and some profit, for men; but the sin is greater than the profit.’”¹³ God explained to people about the advantages and disadvantages of drinking wine, however, since its disadvantages are greater, Muslims were not allowed to drink although it was not forbidden in previous religions (e.g. Judaism and Christianity).

Therefore, the supreme lawmaker, God, enacts based on the less harmful side. Some jurisprudents also followed this principle in social cases; for example, marriage to non-Muslims often was forbidden but recently some Islamic scholars or jurisprudents rejected that and allow all people to marry to people in other religions.¹⁴

4.3. The third principle: Preserving public interest

The third principle highlights the public interest. In Islamic jurisprudence, there are many cases in which muftis issued or changed the fatwas because of public interest. For instance, in 1892, Ayatullah Shirazi, one of the muftis in Iran, issued a fatwa according to which using tobacco was forbidden (*ḥarām*) for Iranian Muslims; then, people broke all hookahs, so the king was forced to cancel the treaty with a tobacco company in UK. In another example, in 1808, Russia attacked Iran and the government needed to ask people to fight. Then, the king asked

the *mofties* to issue a *fatwa* for encouraging people to fight with enemy. They also allowed the government to take religious payments such as *zakāt* to provide the needs of the soldiers.¹⁵ These jurisprudents issued the *fatwa* based on a well-known principle in Islamic tradition; the profit of Muslim community must be kept, therefore, everything which is harmful or has disadvantage for Muslims should be avoided.

5. The concept of health on abortion according to principles of *Ijtihad*

The current *fatwas* on abortion indicate that abortion is generally forbidden except in serious conditions in which mother’s life is endangered. Table 1 shows the abortion laws in various Islamic countries. The base of these laws are *fatwas* which are issued by religious authorities.

The first principle of *Ijtihad* refers to changes in terms of time and place. The concepts of time and place, indicate the social, cultural, economic, and political conditions. Jurisprudents issue *fatwas* according to the need of people for a better life. Also, they issue fatwas in conditions in which society faces a problem. Based on these facts, abortion is a crisis in most of the Islamic countries, such as Iran, Indonesia, Bangladesh, and Pakistan.¹⁶ To solve the problem, lawmakers need new *fatwas* in Islamic countries.

The crisis is not limited to individuals or families, but it affects all the society of a country and even the global society. The high rate of unsafe abortions, of unhealthy children, of maternal mortality, and of economic crises clearly demonstrates a need to revise the rules and fatwas.

According to the second principle of *ijtihad*, the juridical circles must issue a *fatwa* with less harm. We argue that legal abortion has some disadvantages such as physical and mental problems after the abortion; however, illegal abortions and unwanted children impose a huge cost on society. In legal abortion, mother and family will get over the physical and mental problems after a few weeks or a few months, but in the case of unsafe abortion, it may lead to the death of mother or serious infections or disabilities. Beside this, in the case of unwanted children, mother, the unwanted child, the existing children, family, and

¹⁰ <http://fararu.com/fa/news/10568>. 30 April 2008.

¹¹ Such as the marriage of Jacob to Shuaib’s daughters.

¹² Qurʾān, 4: 23.

¹³ Qurʾān, 2: 129.

¹⁴ Ahmad, Ghabel. 2013. jurisprudence, functions and capabilities . SHariate Aqlani publisher, www. Ghabel. Net.

¹⁵ Shykh Jafar Kāshif al-Ghetā, kashf al-ghitā, n.d., Qum, daftar tablghat islami.

¹⁶ “New project to help reduce unsafe abortion death rates in disaster zones “University of Leicester-led research aimed to implement intervention measures for reproductive health issues in disaster-prone countries. <http://www2.le.ac.uk/offices/press/press-releases/2015/november/new-project-to-help-reduce-unsafe-abortion-death-rates>.

Table 1 The number of reasons (1, 2, ...) justifying legal abortions in Muslim-majority countries (2011)

1	2	3	4	5	6	7
Afghanistan L	Comoros L.PH	Algeria L.PH.MH	Burkina Faso L.PH.F.I/R			Albania
Bangladesh L	Iran L.F	Chad L.PH.F	Guinea L.PH.F.I/R			Azerbaijan
Brunei L	Jordan L.PH	Gambia L.PH.MH				Bahrain
Djibouti L	Mali L.I/R	Kuwait L.PH.F				Kazakhstan
Egypt L	Maldives L.PH	Malaysia L.PH.MH				Kyrgyzstan
Guinea-Bissau L	Morocco L.PH	Niger L.PH.F				Tajikistan
Indonesia L	Pakistan L.PH	Qatar L.PH.F				Tunisia
Iraq L	Saudi Arabia L.PH	Sierra Leone L.PH.MH				Turkey
Lebanon L	Sudan L.R					Turkmenistan
Libya L						Uzbekistan
Mauritania L						
Nigeria L						
Oman L						
Senegal L						
Somalia L						
Syria L						
United Arab Emirates L						
Yemen L						
18 (38.30%)	9 (19.15%)	8 (17.02%)	2 (4.26%)	0	0	10 (21.28%)

Grounds: L: Abortion allowed to save the life of the woman; PH: Abortion allowed in cases where the pregnancy threatens a woman's physical health; MH: Abortion allowed in cases where pregnancy threatens the woman's mental health; F: Abortion allowed in cases of fetal impairment; I/R: Abortion is allowed in cases of incest or rape; SER: Abortion allowed on additional enumerated grounds relating to such factors as a woman's age or capacity to care for a child.

Source: Gilla K Shapiro, "Abortion law in Muslim-majority countries: an overview of the Islamic discourse with policy implications," *Health policy and planning*, 2014: 29, 483-494.

the society will be influenced by physical, mental, and social health problems.

Finally, regarding the third fundamental principle of *ijtihad*, juridical authorities should consider the public interest which is not limited to just one society but relates to the whole of human society. For example, according to the Center for Biological Diversity, "A 2009 study of the relationship between population growth and global warming determined that the "carbon legacy" of just one child can produce 20 times more greenhouse gas than a person will save by driving a high-mileage car, recycling, using energy-efficient appliances and light bulbs, etc. Each child born in the United States will add about 9,441 metric tons of carbon dioxide to the carbon legacy of an average parent. The study concludes, "Clearly, the potential savings from reduced reproduction are huge compared to the savings that can be achieved by changes in lifestyle."¹⁷

¹⁷ "Human population growth and climate change". Center for biological diversity. <http://www.biologicaldiversity.org>.

According to the United Nations Population Fund, "human population grew from 1.6 billion to 6.1 billion people during the course of the 20th century. During that time emissions of CO₂, the leading greenhouse gas, grew 12-fold. And with worldwide population expected to surpass nine billion over the next 50 years, environmentalists and others are worried about the ability of the planet to withstand the added load of greenhouse gases entering the atmosphere and wreaking havoc on ecosystems."¹⁸

6. Conclusion

Ijtihad relies on three fundamental principles which indicate the flexibility of shari'a's laws in terms of the changes in the human societies. The concept of health on which jurisprudents issue their fatwas changed in the new world. In the past, this concept referred to merely the absence of illness. However, now, this concept includes physical, mental, and social well-being. Juridical authorities issue fatwas about abortion based on the previous concept of health. This fatwas ignore the fundamental

¹⁸ "Does population growth impact climate change?" Scientific American. <https://www.scientificamerican.com>.

principles of the *ijtihad* from which these fatwas originated.

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The Ethical Dilemma of Human Germline Editing

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1. Introduction

Gene editing provides us with the ability to design and edit genomes of biological entities giving them new properties. A new technology named the CRISPR/Cas9 system allows for fast and inexpensive gene editing (1). A piece of RNA, called guide RNA, contains a set of bases which are complementary to the target sequence on the DNA. The Cas 9 enzyme will follow the guide and will make a cut across both DNA strands. The affected cell then recognizes the DNA damage and tries to repair it; this is the point where scientists can use DNA repair methods to introduce a genetic mutation (2).

Deliberately manipulating the human germline for the avoidance of severe inherited diseases has generally been viewed as acceptable, whereas for 'enhancement' of human capabilities in some cases it has been deemed ethical, but in others not. A disease is any disturbance to the structure or function of the body. There are various types of diseases, ranging from metabolic to inflammatory, from neoplastic to degenerative, and of course,

there are also genetic diseases (3). If there was a way to prevent one of these diseases, should further exploration be encouraged? Assuming a solution is found, would it be acceptable to use the technology for human enhancement? Or are the ethical differences too great to overcome?

Should a temporary or permanent global ban on human germline editing be introduced and, if so, on what basis? Is there an ethical difference between using gene editing for the avoidance of severe inherited diseases or for 'enhancement' of human capabilities? Since the genetic changes made in the DNA of gametes and embryos will impact and will be inherited through the generations, a broad range of discussions on the prospect of enforcing a global ban due to the implications of this technology has begun (4).

2. Offside effects

Regarding the CRISPR/Cas9 technology, one of the concerns that have developed is regarding its accuracy. In theory, it will bind to the target sequence and no other region. However, when working with enzymes that cleave the chains of nucleotides, such as CRISPR/Cas9, there are off-target effects towards other locations in the genome that share similar arrangements with the destination (5). Since the side effects will be an issue, there have been cultural strategies (6) and chemical molecules (7) that have been reported to increase the efficiency of genome editing. Further examination is required to test the possible detrimental effects on cells or embryos exposed to such conditions.

However, in the meantime, bioinformatics has developed a predictive scoring system that identifies determinants that influence Cas9 efficiency towards targets, which should improve outcomes by decreasing the mosaicism rate (when the genetic makeup of some cells varies from others)(8).

3. Human embryos, a requirement for the development of research in the field

The concern regarding the inability to predict the consequences of such a procedure highlights the need for more data on the safety of such interventions, and techniques that could increase the efficiency (9). The preferred solution to discarding affected embryos would be using non-viable embryos. These embryos may result from In Vitro Fertilization, but consent from the donor couple must first be obtained.

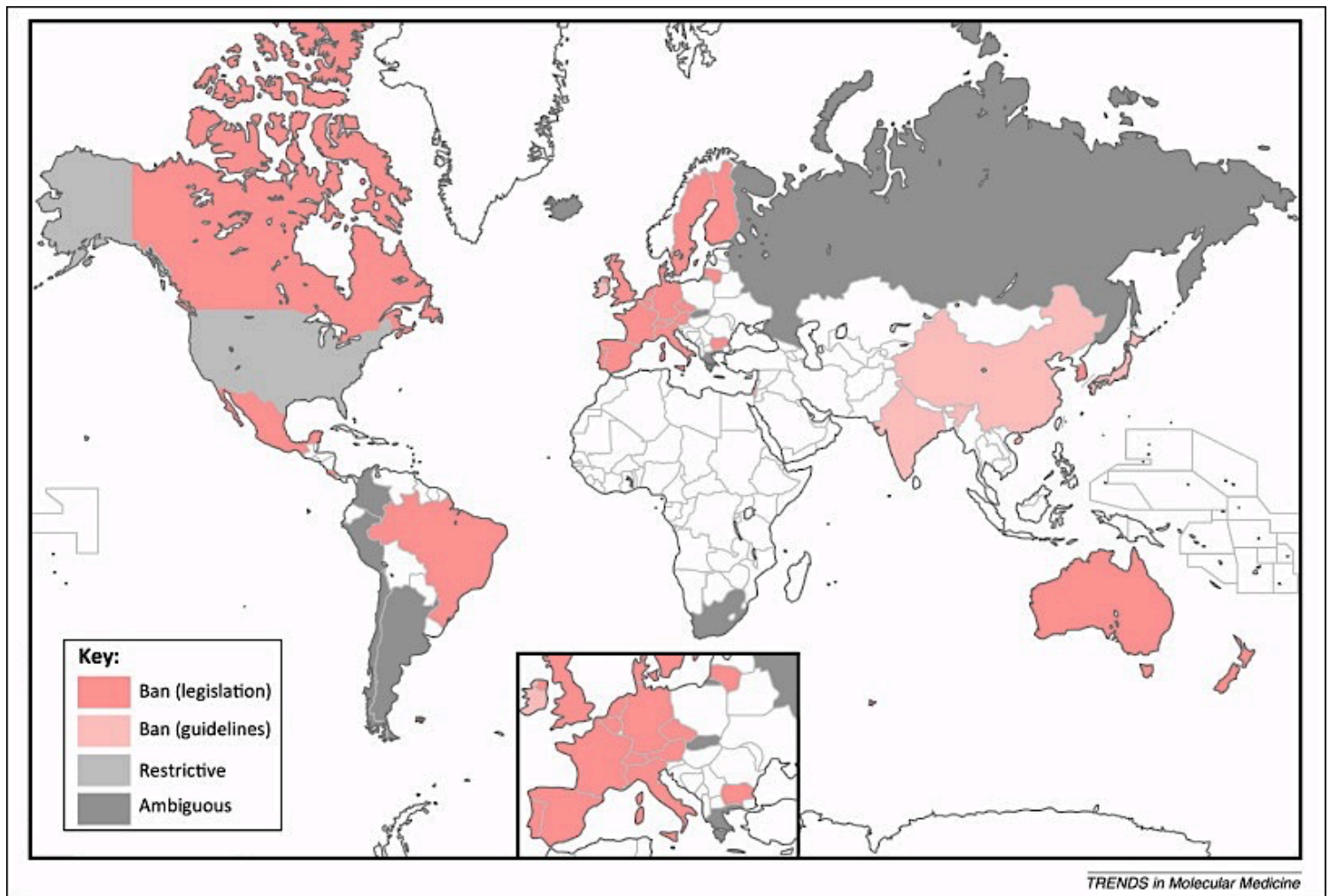


Figure 1: “An international regulatory landscape regarding human germline gene modification. Thirty-nine countries were surveyed and categorized as “Ban based on legislation” (25, pink), “Ban based on guidelines” (4, faint pink), “Ambiguous” (9, gray), and “Restrictive” (1, light gray). Non-colored countries were excluded in this survey.” (14)

Likewise, adult somatic cells give rise to human induced pluripotent stem cells, therefore lessening the ethical concerns. Recent discoveries have reported that human induced pluripotent stem cells can differentiate into male germ cells with the use of bone morphogenetic proteins. There is no record of hiPSCs differentiating into human oocytes, but the scientific community is hopeful in the data to come from current experiments on mice (7). Further research must be conducted on the viability of induced germ cells to determine if they can successfully undergo fertilization and produce viable embryos.

Therefore, a necessary component in the preclinical stage assessment may be using embryos created from human embryonic stem cells as a comparison tool to ensure the reliability of embryos formed using hiPSC's. However, to obtain embryonic stem cells, the destruction of the embryo ensues after cell extraction (10). The moral

dilemma here is whether the duty to prevent future suffering is greater than the obligation to respect the value of a potential human life. There is a broad range of views concerning whether or not the embryo has the status of a person; this has created a barrier to further discovery due to current restrictions in various countries.

4. Varying national laws

Many countries or states have different ethical policies regarding the use or creation of a human embryo for research. In some countries, where there is an overabundance in cryopreserved embryos originally intended for In Vitro Fertilization, researchers are permitted to utilize them with informed consent from the donor parents and by meeting guidelines of institutional review boards (11). Of the countries that allow using embryos for research purposes, there is a restriction to the culture period: 14 days or until the primitive streak forms (7).

In some countries, using germline gene modification is prohibited until gene correction is enhanced (China, India, Ireland, Japan). The US National Academy of Sciences and the National Academy of Medicine have come out with a report (February 2017) outlining several criteria to allow germline editing clinical trials to continue (12). The

rules include that the benefits must outweigh the risks, a risk of damage to the human embryo will prohibit advancement (13), and the objective ought to be the prevention of a severely debilitating disease. In contrast, the UK does not ban the use of human embryos for the sake of reproductive research as long as the HFEA (regulator in the UK responsible for overseeing the handling of embryos and gametes in research and fertility treatments) approves (14).

5. Making a distinction

The Liang Study used non-viable tripronuclear zygotes with a debilitating disease to investigate the use of CRISPR/Cas9 gene editing on human cells to improve data on clinical applications of this technology (15). This study underwent a public outcry; people were calling it the making of 'designer babies'(16).

Some individuals may find it more morally appropriate to administer genetic interventions in one case over another. Interventions for genetically healthy persons are enhancements, whereas in the latter case they are considered therapy. Some may say that enhancement expresses dissatisfaction; conversely, some see it as an opportunity to improve. However, the concept of improvement is not morally contentious as we do many activities in our lives to improve ourselves, some of which being: education, research, and fitness.

Each person is entitled to relief; we see that the distinction solely focuses on the etiology rather than the degree of suffering (17). A physician's professional responsibility to choose the optimal treatment that promotes quality of life, and respecting an individual's reproductive autonomy are valid reasons to move forward with germline interventions (18).

6. Addressing influential factors

There are two aspects to a disability: the medical aspect and the social aspect. Society often categorizes individuals with impairments as disabled, which prevents them from taking part in everyday life (19). Disabilities are more often acquired through an individual's environment rather than inherited; meaning that the social aspect of a disability is a valid concern that ought to be prioritized to encourage people with disabilities to live ordinary lives (20). On the other hand, individuals with medical disabilities, in which their body is impaired in some sort due to a genetic abnormality, can benefit tremendously with this technology. The ethical, legal and social framework that will result from the broad adoption of these technologies must be considered. The ever-occurring question when addressing human germline editing for severe inherited diseases is:

what is seen as a 'severe' genetic disease? Ethical discussions must take place as anticipatory governance; we cannot have a future stall in technological advancement due to a lack of dialogue in our current time (21).

7. Establishing an ethics committee dedicated to human germline editing

Before considering clinical applications, there should be a committee in place for each country that permits the practice of germline modifications. The research group at the Francis Crick Institute obtained approval from the HFEA in regards to conducting experiments involving CRISPR/Cas9 editing of human preimplantation embryos (22).

The UK Health Ministers appoint HFEA members based on guidelines (the 'Nolan' guidelines) that ensure appropriate merit. Also, members of the HFEA have a broad range of expertise to maintain an objective view. Members range from professions in the field of medicine to the field of law and from philosophy to religion (22). Further, the fertility clinics and research centres ought to adhere to the ethical rules and safety protocols established by the UK government. Regular inspection of these locations by the HFEA will ensure compliance. Further, adherence to the ethical rules and safety protocols set by the UK government will be enforced by the HFEA through regular inspection of UK fertility clinics and research centres (22).

Knowing that technical concerns will eventually be resolved by additional scientific research, moral considerations must be the point of focus of public debate (10). Countries should establish an ethics committee to tackle the ethical dilemmas according to the ethical rules placed by the country's government. After careful consideration of the ethical and social implications of such a technology, a country will then be able to establish policies better suited for their values and beliefs.

8. Just distribution scheme

The ethics committee dedicated specifically to the editing of human genomes will need to develop policies that will be the sole source of consolation when it comes to ethical puzzles to avoid misuse by certain individuals or organizations.

To address the concern of 'designer babies,' we should discourage inventions that promote positional advantage and rather posit a just distribution scheme. Neither race nor sexual orientations are conditions that require genetic intervention. If genetic engineering is used to alter an unborn child's skin color, sexual orientation or sex, the parents risk advancing discriminatory

attitudes. Therefore to ensure just distribution, genetic interventions ought not to increase discrimination or racism (23).

Treatment for genetic diseases often requires intervention at a single particular locus, whereas phenotypic traits often result from the interaction between several genes and the environment, making it difficult to influence these complex traits through germline modification without a greater understanding of epigenetics (16). The increased difficulty may result in only a 'select few' being able to afford the intervention, making genetic enhancement morally unacceptable as a factor involved in the ever-increasing gap between the rich and the poor. Genetic alterations ought not to be restricted to a particular sect of society to coincide with the just distribution scheme.

9. Conclusion

Research towards improving the specificity and reducing the off-target effects of the CRISPR-Cas9 system is developing towards a safe level that will eventually permit clinical applications in human patients. In light of the considerable number of countries that are ambiguous, or are awaiting further developments in the technology (14), establishing a temporary global ban is appropriate. This temporary global ban will result in the countries with the ethical policies in place, to lay pressure on the countries undecided on the issue at hand. Due to the global demand, rather than continuing to remain without an opinion, this temporary ban will provide the incentive for countries to focus on the ethical, social and evolutionary implications of this biotechnology, resulting in legislation based on their country's values.

Any discovery that seeks to fulfill medicine's ethical mandate to help the sick will generate pressure to move from the lab, towards the human body (9). Should a country support human germline editing, they ought to establish a plan of conduct to prevent abuses of this technology. When it comes to administering human germline editing to those who are considered to have normal body function and to those of whom are considered impaired, the distinction is in the etiology. Conducting this technology with the aid of a just distribution scheme is recommended to ensure proper allocation of skills. With ongoing reassessment and public participation preceding any heritable germline, the ethical concerns that arise will be acknowledged, and the technology will be able to move towards clinical trials.

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Circus animals - how much is 'unfair'?

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1. Introduction

In early 2017, eleven out of the thirty-two retired circus animals that were kept in a facility near Bucharest, Romania were killed in a fire (Popescu 2017). The public debate moved quickly from the regrettable accidental death of the poor beasts to the general subject of circus animals. A petition entitled "We put an end to the exploitation of wild animals in circuses" (Magor 2017) asking for a ban on the use of wild animals in circuses collected 62,096 signatures by February 7th. On January 29, the General Council of the Bucharest Municipality released a draft decision to ban animal performances in the State Circus. Also, the animals belonging to the State Circus are to be relocated by an NGO (Klodnischki 2017).

The use of animals for organized entertainment goes back to Antiquity. Ancient Greek and Roman territories, Egypt, India, Assyria, Babylon, or China have all known the practice of keeping wild animals for display and games. In the Roman Empire, thousands of local and exotic animals were captured and shipped in poor conditions to the Capital and other large cities. At destination, the animals participated in *venations* (demonstrative hunts taking place in the arena), parades and other types of entertainment. In late antiquity, Roman arena games had to transform, due to diminution of resources. Animals in *venations* were no longer hunted on the spot but preserved for return shows. Also, circus-type performance of tricks by the animals became encouraged (Mackinnon 2006). In modern Europe, arena shows were re-discovered by Philip Astley who started a riding school in 1768, with his

famous performances at Astley's Royal Amphitheatre in London including acrobatic riding (Frost 1881).

2. The underlying reasons

Why do people enjoy animal encounters and performances? More than a few hypotheses were formulated on why we cast a special status upon certain creatures, represented mainly but not exclusively by pets (Serpell 1996). Beyond the endless speculations on the origin of this behavior one element stands: in many cultures, some animals are regarded as special and even personalized and 'befriended'. People give them names, include them in their social world, exchange lots of affection with them and often comment on their human-like attitudes. In contemporary Europe pets can get clothes and accessories and be buried in cemeteries, as humans do. One might also find this fact interesting that from Aesop's fables to contemporary books (animation movies or video games) the public is attracted by and even accepts moral criticism from characters represented by anthropomorphic animals (Dunn 2011). *Why* do people exhibit such attitudes remains unclear, with 'humanization' being identifiable as an aspect rather than the cause of those peculiar interactions between humans, and animals. Yet, it is easy to observe that circus animals are also valued for traits that are alien to their normal behavior in the wild and rather human-like. Circus is a display of the unnatural, but this unnatural is attractive as it is rooted in 'humanization' of the animals. Circus animals are clever unusual beasts that are able to learn and perform. They are trained to react in ways that seem 'human' in terms of determination, coordination and performance, which attracts, amazes and amuses the audience.

Many continue to seek spectacular animal encounters in spite of the efforts of various organizations to educate the public on animal welfare that might have led to some success in terms of concern over the animals in circuses and disapproval of animal performances (Wells & Hepper 1997; The Scottish Government 2015; Zanola 2007). During the last years, a stand has as well been taken by various Western travel brands and tour operators against exploitation of wild animals (such as elephants, tigers, and snakes) in the form of travel attractions such as riding or various types of performance. Still, the demand for animal attractions is increasing and new markets are developing in the world (Baran 2016). Also, animals continue to be present in some circuses.

Are those speaking against animal circus performances merely 'obsessed' by animal rights? The July 2013 newsletter of the World Circus

Federation (Fédération Mondiale du Cirque 2013) seems to promote this perspective, whilst celebrating the legal victory of one renowned circus company against animal rights organizations and calling circus fans to organize some sort of a counter-movement in support of maintaining animal performance in circuses. The Federation quotes a pro-circus student activist: “... taking the circus away would be unfair to the public, the circus performers, and above all, the animals that circuses strive to take great care of and preserve for generations to come”.

As it can be easily observed, the quoted argument is centered on a term pertaining to ethics that can inherently bear a highly variable content, depending on whom do you ask about its significance: *unfair*. In this context, one might want to try and understand *what* is actually *unfair* and *to whom* when it comes about animals in circuses.

3. The unfairness

Violence tends to be generally viewed as *unfair*. It has been argued that violence and cruelty once used in taming and training of circus animals has gradually been replaced with less brutal methods. Yet, the training tools and methods that should be employed for corrective non-violent purposes are still used by some in a harmful way, so that the animals get wounded both physically and psychologically (Humane Review 2012; Kharb 2013; Zoocheck 2016). The case of trainers Roger and Mary Cawley (a. k. a. Mary Chipperfield), fined for cruelty to animals became widely known (BBC 1999). The undercover footage *Elephants in Circuses: Training and Tragedy* (PETA 2007) revealed to the world certain tamers' shockingly brutal perspective. As for the law suit so proudly mentioned in the World Circus Federation's newsletter, a legal analysis published by Beverage (2010) reveals a series of details about how animals were abused and convincingly argues that the 'victory' of the entertainment company was rather technical, due to 'ambiguities and counterproductive provisions' in certain laws and their regulatory schemes. Also, circuses have been recurrently cited by the United States Department of Agriculture for neglect and abuse of animals (Bradshaw 2007).

Furthermore, not only physical violence but also harming a living being by forcing it beyond its natural limits tends to be generally considered *unfair*; failing to provide proper shelter, food and water to an individual, be it human or non-human constitutes a basic example. Again, how far can therefore humans push animals so that we decide that it is *unfair*? Even circus animals that are not subject to brutal treatments remain creatures

deprived of a free natural life, convinced to learn tricks by methods that may be less unpleasant than the old-fashioned ones but are still unpleasant, and obliged to observe a strict schedule for our liking only.

Ecological and behavioral research has established that there is a deep unavoidable contradiction between wild animals' nature and circus life, as none of the wild species employed in circus performance meets the 'ideal' of having low cognitive function, low ecological and social needs, such that it would be proper for living in an artificial environment that bears the characteristics of a circus (Iossa *et al.* 2009). As their feeding, social and reproductive behavior are altered and limited by the specific living conditions, the conclusion that circus animals live an 'inevitably impoverished life' comes natural (Harris *et al.* 2006). Hand-rearing, training and performance, as well as frequent travelling affect them (Bekoff *et al.* 2015). They are exposed to risk factors and develop various health problems and abnormal behaviors related to 'circus life', with all that such existence implies (Rose *et al.* 2006; Animal Defenders International 2009; Hopster & de Jong 2014; Macháčová *et al.* 2015; Dorning *et al.* 2016).

The amount of *unfairness* has been certainly considered sufficient by some professional veterinary organizations so that to express negative opinions on the welfare of animals in circuses and eventually recommend that the use of wild animals for performance be banned (e. g. British Veterinary Association 2012; Federation of Veterinarians of Europe 2015; Veterinary Ireland 2016).

Worldwide, a number of regions, counties, municipalities, and states have banned totally or partially the use of animals in circuses. Such bans are in effect in Argentina, Austria, Australia, Belgium, Bolivia, Brazil, Bosnia and Herzegovina, Bulgaria, Canada, Chile, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Ecuador, El Salvador, Estonia, Finland, France, Greece, Hungary, India, Iran, Ireland, Israel, Latvia, Malta, Mexico, the Netherlands, Norway, Panama, Paraguay, Peru, Poland, Portugal, Republic of Ireland, Singapore, Slovenia, Spain, Taiwan, UK and USA (Robinson *et al.* 2015; Dorning *et al.* 2016; Animal Defenders International *Circus bans*). Steps are now taken for enacting more bans in the UK (Ares & Cromarty 2016).

Public authorities may ban the use of wild species in performances, simultaneously advancing solutions for rehabilitation of the rescued circus animals. A very good example is represented by India, which in 1998 banned the use of lions, tigers, leopards, bears and monkeys and by 2004 the Central Zoo Authority reported rehabilitation of 314 lions and tigers from circuses. Confiscated

animals are sheltered in lifetime-care facilities established in the off-display area of the zoos (Gupta & Chakraborty 2005).

Over time, circus has had to adapt and cope with various challenges and changes in the society and it managed to survive and continue to be numbered among the forms of entertainment valued by many generations (Loring 2007). The contemporary world might also accommodate to viewing the animals in circuses not as some sort of inherited cultural commodity but as valuable living beings belonging to the realm of nature that we now so much struggle to learn to respect and protect, as G. A. Bradshaw (2007) so powerfully put it “animals are not defined by their circumstances but affected by them”. Circus can very well exist and entertain the public without animal performances. In *cirque nouveau*, which combines traditional circus arts with elaborate scenography into a thematic show of human artistry, sound and light, the art of entertainment has shown new performances that keep attracting the public for more than thirty years now.

We have the power to destroy and the power to build, the power to enslave and the power to set free, the power to force other living beings to serve us and the power to force our egoistic wishes to make room for kindness and compassion. What shall we choose, for this world, which is not only ours but also future generations’?

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