Vol 4 (2), July 2013; 20-32

Bioethics Education, Awareness of Ethics and Dissemination of Knowledge among Teachers and Students

Saima Rasool[1], Sumaira Javed[1], Sayyada Ghufrana Nadeem[1], Shazia Tabassum Hakim[1]*

[1]Department of Microbiology, Jinnah University for Women, Karachi-74600, Pakistan.

ABSTRACT

The main goal of this study was to determine the awareness regarding bioethics education, knowledge and dissemination of knowledge among university teachers and students. This study's primary objective was to learn how educators cope with ethical disagreement inside the classroom and to clarify the factors that influence the way they cope. A total of 17 teachers and 26 students were selected for the study. A Questionnaire were designed and circulated among students and teachers of Jinnah University for Women. The data was collected and subjected to SPSS Software for statistical analysis. In total 43 teachers and students were surveyed out of which about 60% were aware of the importance of bioethics and were in opinion to add as a separate course in the syllabus. The results of the present study give us impression about the level of awareness to bioethics education and knowledge among teachers and students. The knowledge should be applied to conduct such study in larger population which will result in facilitation of services in both public and private sectors. The study revealed out the necessity of a comprehensive education programs related to bioethical issues and its awareness for the students as well as teachers.

Key words: Awareness, Bioethics, Education, Statistical analysis.

INTRODUCTION

Bioethics could be defined as the study of ethical issues and decision-making associated with the use of living organisms and medicine. Society is facing many important decisions about the use of science and technology. These decisions affect the environment, human health, society and international policy.

The importance of bioethics education in medicine, nursing, and health care has long been recognized. However, there are also issues that have been neither sufficiently scrutinized nor extensively discussed yet. One of these is the question of how bioethics educators cope with ethical disagreement among students when teaching bioethics (Bharadwaj and Macer, 1999). Bioethics is now regarded as an integral part of contemporary medical education across the World. Well defined strategies have been developed and are in place for undergraduate as well as postgraduate bioethics education. Continuous Professional Development approaches (CPD) have also been devised to keep healthcare professionals abreast with emerging challenges to the multi-disciplinary field of bioethics. It is, however, mainly reliant on contributions made by Western bioethicists, philosophers and theologians that have been responsible for the recent development and popularization of contemporary bioethics (Macer, 1992). The situation in Pakistan is not different from the rest of the Islamic countries. There are 56 medical and dental colleges both in the public and private sector in the country. Although the Pakistan Medical and Dental Council stipulates that bioethics should

*Corresponding author: samira__javed@hotmail.com

be taught as a mandatory course at the undergraduate level, evidence indicated that this is clearly not the case. According to a recent national survey by one of the authors, only a minority (five per cent postgraduate and 39 per cent undergraduate institutions) have some bioethics teaching in their institutions. Eighty two percent of the postgraduate and 65 per cent of undergraduate medical institutions however expressed a desire to incorporate bioethics education in their curriculum. An important reason for the lack of indigenous growth in bioethics has been a lack of capacity to teach bioethics. Human resources in this field were never developed in Pakistan since bioethics was traditionally never a part of curriculum at any level in the country. Of late, some CPD programs have been organized, but they remained confined to the city of Karachi and were based on sporadic personal initiatives rather than on well thought out institutional strategy (Oulton et al., 2004). Although these programs have certainly helped heighten awareness and interest, they cannot be expected to raise capacity in bioethics in any meaningful or sustainable way unless provided with institutional support. Establishment of the Centre of Biomedical Ethics and Culture (CBEC) at the Sind Institute of Urology and Transplantation (SIUT), Karachi, a public sector institute was the first step in beginning to address this deficiency in Pakistan. Inaugurated in October 2004, CBEC has embarked upon a series of educational initiatives aimed at a variety of individuals, including health professionals, pharmaceutical industry professionals, social scientists, philosophers, journalists, lawyers, students, and the lay public. The broad objective of the centre is to raise awareness about bioethics. There is a dire need to develop bioethics leadership in the country that can spearhead education programs in bioethics, establish bioethics committees and enhance bioethics capacity in the country in general.

MATERIALS AND METHODS

Study design: A survey based questionnaire was designed to determine the magnitude of awareness regarding bioethics among students and teachers.

Study participants: A total of 43 teachers and students of Jinnah University for Women, Karachi were included in the present study.

Statistical analysis: Statistical analysis of the collected data was carried out using SPSS v.12.

RESULTS

The present study or this questionnaire survey was conducted in order to discover the current teaching criteria regarding social issues associated with science and technology, especially bioethics, also to investigate the attitudes of university teachers toward these issues, such as the environmental and ethical issues associated with genetic engineering. It is being conducted in Jinnah University for Women, as independent university research. This survey of bioethics will discuss several aspects of the issues of bioethics education, focusing especially on teachers and students education. One of the reasons to focus on university education is to find out the knowledge, education and awareness of bioethics among teachers and students.

In the present study, data is collected from various sources such as research articles, case studies, and theoretical articles from clinical and bioethical literature. Study design is based on questionnaire which was constructed and conducted among teachers and students. From the survey, it was found that there is very widespread support for inclusion of bioethics teaching in curriculum by the teachers as well as by the students.

The summary of the findings of the survey have been presented in Table 4. In total 17 teachers and 26 students were surveyed. Teachers were belonging to the Department of Pharmacy, Chemistry, Zoology, Microbiology and Biochemistry while students were belonging to the Department of Microbiology only. Overall 40% of teachers and 60% students appeared to have awareness of bioethics. 40% teachers and 60% students think that science makes an important contribution to life and most problems can be solved

Table I. Summary of the findings of survey.

Sr.#	Questions to be asked to Respondents (Teachers/Students)	Respondent Type	Frequency (N)	Percent (%)
Q#1	To what extent do you agree or disagree with each of the following statement?	Teacher Student Total	17 26 43	39.5 % 60.5% 100.0%
1A	Science makes an important contribution to the quality of life.	Strongly Agree Agree Total	27 16 43	62.8% 37.2% 100.0%
1B	Most problems can be solved by applying more and better technology.	Strongly Agree Agree Indifferent Total	16 21 6 43	37.2% 48.8% 14.0% 100.0%
1C	The natural environment has a valuable property that humans should not tamper with.	Strongly Agree Agree Indifferent Disagree Total	16 9 13 5 43	21% 37.2% 30.2% 11.6% 100.0%
1D	Genetically modified plants and animals will help agriculture become less dependent on chemical pesticides.	Strongly Agree Agree Indifferent Disagree Total	6 16 17 4 43	14.0% 37.2% 39.5% 9.3% 100.0%
1E	Students should be informed about the social issues associated with science and technology so that they can participate in contemporary debates.	Strongly Agree Agree Indifferent Disagree Total	25 11 4 2 43	58.1% 25.6% 9.3% 4.7% 100.0%
1F	Animals have rights that people should not violate.	Strongly Agree Agree Indifferent Disagree Total	12 17 11 3 43	27.9% 39.5% 25.6% 7.0% 100.0%
1G	Scientists have mostly left it to others to communicate science to the public.	Strongly Agree Agree Indifferent Disagree Total	3 20 10 7 43	7.0% 46.5% 23.3% 16.3% 100.0%
1H	Public understanding and awareness of science is generally very poor.	Strongly Agree Agree Indifferent	14 12 3	32.6% 27.9% 7.0%

		Disagree	10	23.3%
		Total	43	100.0%
1I	Genetic engineering and its applications should be taught as a topic in the school biology syllabus.	Strongly Agree	11	25.6%
		Agree	16	37.2%
		Indifferent	9	20.9%
		Disagree	5	11.6%
		Total	43	100.0%
1J	The school biology syllabus should include discussion of the issues involved in science and technology.	Strongly Agree	16	37.2%
		Agree	18	41.9%
		Indifferent	4	9.3%
		Disagree	5	11.6%
		Total	43	100.0%
Q#2	During the past 12 months have you:			
a)	Bought foods labeled as "pesticide free"?	Ticked	36	83.7%
		Not Ticked	7	16.3%
		Total	43	100.0%
b)	Stopped buying a product because it caused environmental problems?	Ticked	35	81.4%
		Not Ticked	8	18.6%
		Total	43	100.0%
c)	Contributed money or time to an environmental cause?	Ticked	36	83.7%
		Not Ticked	7	16.3%
		Total	43	100.0%
d)	Changed your life style in significant ways to protect the environment?	Ticked	40	93.0%
		Not Ticked	3	7.0%
		Total	43	100.0%
e)	Stopped eating a certain food because of concerns over its safety?	Ticked	39	90.7%
		Not Ticked	4	9.3%
		Total	43	100.0%
f)	Sorted out certain types of household waste (glass, papers etc.) for recycling?	Ticked	40	93.0%
		Not Ticked	3	7.0%
		Total	43	100.0%
g)	Saved energy, for example, by using less hot water or, by closing doors and windows in winter to save heat?	Ticked	37	86.0%
		Not Ticked	6	14.0%
		Total	43	100.0%
Q#3	Which of these statements best describes your interest in science and technology?			
a)	Not at all interested	Not at all interested	4	9.3%
b)	Not very interested	Not very interested	20	46.5%
c)	Interested	Interested	12	27.9%
d)	Very Interested	Very Interested	7	16.3%
e)	Extremely Interested	Extremely Interested	8	17.3%

		Total	43	100.0%
Q#4	Do you think scientific and technological advancements (overall) have done:			
a)	More harm	More harm	9	20.9%
b)	More good	More good	25	58.1%
c)	Did not make much of a difference	Did not make much of a difference	3	7.0%
d)	Don't know	Don't know	6	14.0%
		Total	43	100.0%
Q#5	Have you ever heard or read about any of these terms / subjects (Agricultural Pesticides, In vitro fertilization, Computers, Biotechnology, Nuclear power, AIDS, Human gene therapy)?	Yes	32	74.4%
		No	11	25.6%
		Total	43	100.0%
Q#6	If answer of any of above questions is Yes, could you explain the term to a friend?	Yes	40	93.0%
		No	3	7.0%
		Total	43	100.0%
Q#7	Do you personally believe each of the these discoveries and developments (In vitro fertilization, Computers, Boiotechnology, Nuclear power, Agricultural pesticides, Genetic engineering) is a worthwhile area for scientific research?	Yes	39	90.7%
		No	4	9.3%
		Total	43	100.0%
Q#8	Do you have any worries about the impact of research or its applications of these scientific discoveries and developments (In vitro fertilization, Computers, Boiotechnology, Nuclear power, Agricultural pesticides, Genetic engineering)? How much? Why?	Yes	33	76.7%
		No	10	23.3%
		Total	43	100.0%
Q#9	Genes from most types of organisms are interchangeable. Would potatoes made more nutritious through biotechnology be acceptable or unacceptable to you if genes were added from another type of plant, such as corn?	Acceptable	16	37.2%
		Not acceptable	3	7.0%
		Don't know	24	55.8%
		Total	43	100.0%
Q#10	Would such potatoes be acceptable or unacceptable to you if the new genes came from an animal?	Acceptable	1	2.3%
		Not acceptable	20	46.5%
		Don't know	22	51.3%
		Total	43	100.0%

Q#11	Would chicken made less fatty through biotechnology be acceptable or unacceptable if genes were added to the chicken from another type of animal?	Acceptable Not acceptable Don't know Total	4 16 23 43	9.3% 37.2% 53.5 % 100.0%
Q#12	Such chicken be acceptable or unacceptable if the genes came from a human?	Acceptable Not acceptable Don't know Total	1 21 21 43	2.3% 48.8% 48.8% 100.0%
Q#13	Before today, were you aware that genetically modified organisms, such as bacteria, plants and animals, are being used to produce food and medicines?	Yes No Total	36 7 43	83.7% 63.1% 100.0%
Q#14	If any of the following were to be produced from genetically modified organisms, would you have any concerns about using them? Why?			
a)	Dairy products	Yes No Total	5 38 43	11.6 % 88.45 100.0%
b)	Vegetables	Yes No Total	6 37 43	14.0% 86.0% 100.0%
c)	Medicine	Yes No Total	10 33 43	23.3% 76.7% 100.0%
d)	Meat	Yes No Total	3 40 43	7.0% 93.0% 100.0%
Q#15	Will you please express freely, in sentences the images which come to mind when you hear the word "nature", and/or any ideas you have on "nature".	Gift of God, rainfall, mountains.	-	-
Q#16	Some genetic diseases can be predicted in the fetus during the early stages of pregnancy. Do you think results of such tests should be shared with parents so they can decide to abort the child?	Yes No Total	23 20 43	53.5% 46.5% 100.0%
Q#17	Do you know anyone who has a genetic disease? What disease(s)?	Yes No Total	22 21 43	51% 48% 100.0%
Q#18	If someone is a carrier of a defective gene or has a genetic disease, who else besides that			

	person deserves to know that information?			
b)	Spouse or fiancé	-	12	27%
c)	Other immediate family	-	29	64%
d)	Others (Employer / Insurers etc.)	-	2	4.7%
		Total	43	100.0%
Q#19	Do you agree with the order of preference in above options?	Yes	27	62%
		No	16	37 %
		Total	43	100.0%
Q#20	How do you feel towards people that are HIV-infected or have AIDS?	Sympathy, avoid them.	-	-
Q#21	If someone has HIV (the AIDS virus), who else besides that person deserves to know that information?			
a)	Spouse or fiancé	-	8	18%
b)	Other immediate family	-	29	67%
c)	Others (Employer / Insurers etc.)	-	6	14%
		Total	43	100.0%
Q#22	Do you know anyone who has, or has had, a mental disease? What disease(s)?	Yes	8	18 %
		No	35	81%
		Total	43	100.0%
Q#23	How do you feel towards people with these mental diseases (Mental depression, Schizophrenis, Neurosis)?	Aware	12	27%
		Don't know	31	72%
		Total	43	100.0%
Q#24	If tests showed that you were likely to get a serious or fatal genetic disease later in life, how willing would you be to undergo therapy to have those genes corrected before symptoms appear? Why?			
a)	Very willing	-	20	46%
b)	Somewhat willing	-	2	4%
c)	Very unwilling	-	4	9%
d)	Don't know	-	17	39%
		Total	43	100.0%
Q#25	If you had a child with a usually fatal genetic disease, how willing would you be to have the child undergo therapy to have those genes corrected? Why?			
a)	Very willing	-	20	46%
b)	Somewhat willing	-	2	4%
c)	Very unwilling	-	4	9%
d)	Don't know	-	17	39%
		Total	43	100.0%

Q#26	How do you feel about scientists changing the genetic makeup of human cells to:			
a)	Cure a usually fatal disease, such as cancer	Approve Somewhat	32	74%
		Approve	5	11%
		Strongly Disapprove	2	4%
		Don't know	4	9 %
		Total	43	100.0%
b)	Reduce the risk of developing a fatal disease later in life	Approve Somewhat		
		Approve	29	67%
		Strongly	10	23%
		Disapprove	4	9 %
		Don't know	4	9 %
		Total	43	100%
c)	Prevent children from inheriting a usually fatal disease	Approve Somewhat	24	55%
		Approve Strongly	3	7 %
		Disapprove	12	27%
		Don't know	4	9 %
		Total	43	100%
d)	Prevent children from inheriting a non-fatal disease, such as diabetes	Approve Somewhat	22	51%
		Approve	4	9%
		Strongly Disapprove	13	30%
		Don't know	4	8 %
		Total	43	100.0%
e)	Improve the physical characteristics that children would inherit	Approve Somewhat	18	41%
		Approve	6	14 %
		Strongly Disapprove	16	37%
		Don't know	3	7 %
		Total	43	100%
f)	Improve the intelligence level that children would inherit	Approve	26	60%
		Somewhat Approve	8	19%
		Strongly Disapprove	3	7%
		Don't know	6	14%
		Total	43	100%
g)	Make people more ethical	Approve	23	53%
		Somewhat Approve	2	4 %
		Strongly Disapprove	4	9 %

		Don't know	13	30%
		Total	43	100%
Q#27	Suppose that a number of groups made public statements about the benefits and risks of biotechnology products. Would you have a lot of trust, some trust, or no trust in statements made by?			
a)	Government agencies	A lot of trust	1	2%
		Some trust	11	25%
		No trust	31	72%
		Total	43	100%
b)	Consumer agencies	A lot of trust	4	9 %
		Some trust	27	62 %
		No trust	12	27%
		Total	43	100%
c)	Companies making biotechnology products	A lot of trust	15	34 %
		Some trust	16	37%
		No trust	12	27%
		Total	43	100%
d)	Environmental groups	A lot of trust	9	20 %
		Some trust	24	55%
		No trust	10	23%
		Total	43	100%
e)	University professors	A lot of trust	27	62%
		Some trust	11	25%
		No trust	5	11 %
		Total	43	100%
f)	Medical doctors	A lot of trust	21	48 %
		Some trust	16	37%
		No trust	6	14 %
		Total	43	100%
g)	Farmers or farm groups	A lot of trust	5	11 %
		Some trust	5	11 %
		No trust	33	76 %
			1	2%
		Total	43	100%
h)	Dietitians or nutritionists	A lot of trust	18	41%
		Some trust	12	27%
		No trust	13	30 %
		Total	43	100%
Q#28	People who create something original can obtain financial reward for their efforts through patents and copyright. In your opinion, for which of the following should people be able to obtain patents and copyright?			
a)	New Inventions, such as consumer products	Approve	23	53 %
		Disapprove	13	30 %

		Don't know	7	16 %
		Total	43	100%
b)	Books and other information	Approve	26	60%
		Disapprove	3	7%
		Don't know	14	32%
		Total	43	100%
c)	New plant varieties	Approve	30	69%
		Disapprove	6	14 %
		Don't know	7	16 %
		Total	43	100%
d)	New animal breeds	Approve	27	62 %
		Disapprove	10	23 %
		Don't know	6	14 %
		Total	43	100%
e)	Genetic material extracted from plants and animals	Approve	25	58%
		Disapprove	6	14%
		Don't know	12	27%
		Total	43	100%
f)	Genetic material extracted from humans	Approve	29	67%
		Disapprove	8	18%
		Don't know	6	14%
		Total	43	100%
g)	A medical treatment or drug to cure AIDS	Approve	30	69%
		Disapprove	7	16%
		Don't know	6	14 %
		Total	43	100%
Q#29	If there was no direct risk to humans and only very remote risks to the environment, would you approve or disapprove of the environmental use of genetically engineered organisms designed to produce?			
a)	Tomatoes with better taste	Approve	24	55%
		Disapprove	12	27 %
		Don't know	7	16 %
		Total	43	100%
b)	Healthier meat (e.g. less fat)	Approve	23	53%
		Disapprove	15	34%
		Don't know	5	11%
		Total	43	100%
c)	Larger sport fish	Approve	14	32%
		Disapprove	18	41%
		Don't know	11	25%
		Total	43	100%
d)	Bacteria to clean up oil spills	Approve	32	74%
		Disapprove	4	9%
		Don't know	7	16%
		Total	43	100%
e)	Disease resistant crops	Approve	30	69%

		Disapprove	4	9 %
		Don't know	9	20%
		Total	43	100%
f)	Cows which produce more milk	Approve	29	67%
		Disapprove	12	27%
		Don't know	2	4 %
		Total	43	100%
Q#30	What do you think bioethics is?			
a)	Respect of life	Yes	29	64%
		No	14	32 %
		Total	43	100%
b)	Love of life	Yes	29	64%
		No	14	32 %
		Total	43	100%
Q#31	While teaching, to what extent do you think it is important to discuss in class the Social, Ethical and/or Environmental issues associated with applications of these scientific developments?			
a)	In vitro fertilization	Sufficiently covers	17	39%
		Needs revision	16	37%
		Don't know	10	23 %
		Total	43	100%
b)	Prenatal diagnosis	Sufficiently covers	17	39 %
		Needs revision	14	32 %
		Don't know	12	27 %
		Total	43	100%
c)	Biotechnology	Sufficiently covers	26	60%
		Needs revision	8	18%
		Don't know	9	20 %
		Total	43	100%
d)	Nuclear power	Sufficiently covers	26	60%
		Needs revision	13	30%
		Don't know	4	9 %
		Total	43	100%
e)	Agricultural Pesticides	Sufficiently covers	24	55%
		Needs revision	15	34%
		Don't know	4	9 %
		Total	43	100%

f)	Genetic engineering	Sufficiently covers	27	62%
		Needs revision	12	27 %
		Don't know	4	9 %
		Total	43	100%
Q#32	Do you have sufficient material to teach about these issues? What other teaching aids would you suggest?	Research articles, case studies.	-	-
Q#33	Do you use animals for biological experiments?	Yes	32	74%
		No	10	23%
		Total	43	100%
Q#34	Have you ever had ethical concerns about using animals in biotechnical research?	Yes	24	55%
		No	18	41%
		Total	43	100%
Q#35	Have your students ever mention that they have ethical concerns about using animals?	Yes	20	46 %
		No	22	51%
		Total	43	100%
Q#36	Do think that some animal experiments are necessary to teach biology?	Yes	30	69%
		No	10	23%
		Total	43	100%
Q#37	At your institution are there any guidelines about using animals in class / research lab?	Yes	28	65%
		No	14	32%
		Total	43	100%
Q#38	Do you think, bioethics is needed in education?	Very much	26	60%
		Some	6	14%
		Neither	2	41%
		Not really needed	8	8 %
		Total	43	100%

by applying more and better technologies. 58% students and 25% teachers agreed that students should be informed about the social issues in the classroom. 66% teachers and students support the animal rights while 32% respondents disagree. 62% teachers and students agreed that genetic engineering and its applications should be taught as a topic in the syllabus while 31% disagreed. 78% teachers and students agree that ethical issues should be included in the school biology syllabus while 20% disagreed. 81% respondents agree that they stopped buying a product which caused environmental problems. 20% respondents agree that scientific technological advancements have more harm while 58% respondents think that they are better. 83% respondents agreed to have awareness about genetically modified organisms being used to produce food and medicines while 63% did not. 65% respondents were in favor of following laboratory guidelines in the lab. 39% teachers agreed that ethical issues are sufficiently covered in the classroom and 37% respondents say curriculum needs revision.

DISCUSSION

The results of the present study give us impression about the level of awareness to bioethics education and knowledge among teachers and students. The knowledge should be applied to conduct such study in larger population which will result in facilitation of services in both public and private sectors. As the results have shown that both teachers and students extremely agree to include different bioethical and social issues in the curriculum, they have a very significant profile of knowledge regarding bioethics.

Only few students and teachers say that the modification of food items such as potatoes and chicken can't be acceptable if they were modified within an animal or human gene. A large number of respondents say that if there was no direct and remote risk to the environment, genetically engineered organisms should be designed to produce tomatoes with better taste, healthier meat and bacteria to clean up oil spills. In the present study, most of the teachers used research articles and case studies by using internet to convey different bioethical issues in the classroom. This clearly signifies the importance of social networking media which can be taken as means of communicating ideas and information about health and medicines to a mass of audience. In order to educate masses, multiphase awareness campaigns should be launched as a question and answer brochure that will naturally increase the level of awareness. Finally, we recommend that more television coverage should be given to the bioethical issues. More funds should be allocated to launch such programs through mass media. The syllabus for primary, secondary and university level should be enriched by articles on basic bioethical, social as well as health issues.

CONCLUSION

significant gain of knowledge and attitudes of teachers and students towards bioethics awareness, education and dissemination of ethics was observed. Most of the teachers would like to include different bioethical and social issues in the curriculum as well as students are also extremely interested for the inclusion of bioethics as a subject in the curriculum in their education system. The study revealed out the necessity of a comprehensive education programmes related to bioethical issues and its awareness for the students and teachers. further studies related to bioethics awareness and education should be carried out among other teachers and students communities on such important health issues. Hence the high level of knowledge of respondents (teachers/students) about bioethical issues and its awareness is significant.

REFERENCES

Bhardwaj M & Macer D. 1999. A comparison of bioethics in school textbooks in India and Japan. EJAIB, 9: 56-59.

Macer DRJ. 1992. Public acceptance of human gene therapy and perceptions of human genetic manipulation. Human Gene Therapy, 3: 511-518.

Oulton C, Dillon J and Grace M. 2004. Reconceptualizing the teaching of controversial issues. Int J Sci Educat., 26(4): 411-423.