



Bioethics and adolescents: a comparative analysis of student views and knowledge regarding biomedical ethics

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Abstract

The rapid pace of scientific advancements has given rise to various ethical issues, emphasizing the importance of learning about bioethics at a young age. However, bioethics education often begins at the undergraduate level or beyond. Consequently, current literature assesses the perceptions of bioethical issues among university students. This pilot study assesses perceptions on relevant bioethical issues among high school students from the United States of America and Pakistan. A cross-sectional study design using an online quantitative survey was utilized to collect data using non-probability convenience sampling. The questionnaire collected demographic information, and attitudes of students towards ethical issues surrounding social media use and patient rights on a 7-point Likert scale. Data was analyzed using Statistical Package for Social Sciences (SPSS) through descriptive and inferential statistics. One hundred and seventy-seven respondents returned the survey, with 75 from Pakistan. 80% of the respondents were females. While 85% of respondents believed that bioethics is an important field of study for adolescents, 86% also felt a lack in bioethics outreach and education. 69% reported having a social media account. While there was no statistically significant difference between perceptions of students from the two countries regarding ethical concerns surrounding social media, a statistically significant difference ($p < 0.05$) was observed regarding perceptions of adolescents from these two countries with respect to rights of minors. The survey findings indicate that adolescents demonstrate awareness of bioethical issues and thereby issues relevant to their context require integration into the mainstream curricula at the high school level.

Keywords Bioethics · Adolescents · Bioethics education · United States · Pakistan

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Background

Education in the field of bioethics has largely been developed for medical education or the nursing curricula during undergraduate and postgraduate programs (Stolper et al. 2016). However, bioethical issues are commonly encountered by nearly everyone at some point in their lives whether in areas of biomedicine or biomedical research (Robelen 2021). Moreover, individuals require critical thinking skills to facilitate ethical decision-making in daily life contexts. Bioethics education allows for the development of these crucial skills as well as the inculcation of values such as respect for others. Therefore, the role of bioethics education is central in fields other than medicine and nursing but has real importance even for a younger population.

There is increasing realization that bioethics should be taught to younger students, for instance, those at the high school level. This is because individuals at this age are developing a sense of self-identity and therefore are able to make moral judgments (Chowning et al. 2002). However, very few students at this level get opportunities to engage in formal debate regarding these ethical issues (Robelen 2021). On the other hand, bioethical issues frequently are being discussed in popular media including social media, which means that young students are likely to find it beneficial if bioethics is formally inculcated into the high school curricula.

Adolescents, whether they go into the medical field or not, must be aware of bioethical questions and issues to make informed decisions about their health, define their moral boundaries, and better understand political issues. There have been attempts to introduce education in this multidisciplinary field in some parts of the world. For instance, the National Institutes of Health (NIH) in the United States developed a bioethics curriculum to integrate with biology courses in high school (NIH 2009). However, several challenges were identified, including teachers' unease and unfamiliarity with initiating discussions and structural issues in integrating ethical issues within the scientific curricula. Another example of such an initiation through the Bioethics Teaching in Secondary Education (Project BEST) implemented in 32 schools in Portugal. A survey conducted after the implementation of this project analyzing its utility demonstrated that the project helped foster bioethical education, with participants also noting that bioethics should be promoted in Biology and Philosophy classes in secondary schools (Araujo et al. 2017).

In Pakistan, a quasi-experimental study was conducted with 110 students enrolled in one public and one private secondary school. The student participants were taught several core ideas of bioethics, including informed consent, respect for a person, and organ transplant ethics, to students. The findings demonstrate an increase in knowledge regarding bioethical issues after the intervention, predominantly among females compared to male students (Khan 2014).

A 2021 study documented the opinions of Portuguese medical school students on ethical dilemmas. A questionnaire was delivered to students before and after a bioethics course, with a month interval in between. Before education in bioethics, students had higher levels of indecision and were not sufficiently equipped to make bioethical decisions in a timely manner, a skill required of them as physicians. Post bioethics education, levels of indecision decreased, and the authors concluded that education

in bioethics helps stimulate critical judgement and decision-making skills (Martins et al. 2021).

These interventions emphasize the importance of including bioethics at an early stage more formally, as bioethics education can help equip students to become well-rounded critical thinkers and good citizens. The need is also exacerbated due to student exposure to various ethical issues through television, social media, and the Internet, and the mental vulnerability of adolescents. The period of adolescence is also a crucial stage of development since, in a matter of a few years, these adolescents will become adults who will be in a legal position to make decisions, medical or otherwise on their own. Therefore, the high school period is conducive to formally introducing bioethics to students.

Some institutions have already attempted to do this. New York University's Division of Medical Ethics Education established the High School Bioethics Project in 2001. The project attempts to create simple online educational resources to educate high school students about bioethical issues (New York University 2001). Georgetown University has a similar Bioethics Curriculum Project that provides educators with materials, case studies, and training sessions to equip them to teach bioethics at the high school level (Kennedy Institute of Ethics 2001). However, bioethics education models and their quality can vary, and bioethical concepts are often difficult to deliver to younger students in an engaging manner (Bishop 2015). Considering these difficulties, additional foundational knowledge is needed to form bioethics education frameworks at the precollegiate level.

Considering the existing gap in bioethics education for adolescents, it is crucial to first assess viewpoints and knowledge of bioethics among this population. This will allow for the development of educational frameworks that may facilitate the integration of this field into mainstream education. This study assesses the perspectives of adolescents towards bioethics and bioethical issues using an online survey. Recognizing that sociocultural factors may lead to differences in how individuals perceive ethical issues, the study provides a comparative analysis of these viewpoints from students in the United States and Pakistan.

Methodology

Study design

This pilot study employed a cross-sectional study design using an online survey circulated to high school students in two countries, the United States and Pakistan. Ethical approval was obtained from an Ethical Review Committee (ERC) at the authors' institution.

Study locations

Two countries were chosen in order to provide enough data to conduct a comparative analysis of adolescents in the respective study locations. Pakistan is a South Asian low-income nation with a collectivistic socio-cultural orientation, whereas the United

States, a high-income nation, is predominantly regarded as an individualistic society. There are crucial socio-cultural and economic distinctions between the two countries leading to differences in perspectives guided by a set of distinct value systems in the two countries.

Participant recruitment

Since this was a pilot study, non-probability convenience sampling was used to collect responses from participants, which were initially decided 100 from each country. Participants were eligible if they were 14–18 years of age and belonging to grades 9 to 13. In Pakistan, the questionnaire was distributed online using various social media platforms including WhatsApp, Facebook, and Twitter. In addition, schools were also personally contacted to get administrative approval for data collection, whereupon the school was also requested to circulate the questionnaire to the students via email. In the United States, data was collected by contacting individual students from various youth groups and schools via social media platforms such as Facebook, Instagram, and Snapchat, and via email.

Data collection tool and methods

Data was collected from July 2021 to February 2022 using an online survey in English language circulated through Google Forms. The survey contained a sociodemographic section obtaining information such as age, gender, political affiliation, and ethnicity. The next section asked questions regarding perceptions of bioethics, whereas the following two sections were devoted to statements about students' opinions on the rights and freedoms of minor patients and ethical issues associated with social media, based on a 7-point Likert scale, indicating their level of agreement.

While the initial sample size was targeted to be 200, data collection was stopped at 177 responses due to difficulties in recruiting more participants into the study.

Data analysis

Data was transferred to an Excel file and was imported to IBM's Statistical Package for Social Sciences (SPSS) software. Sociodemographic information was analyzed using frequencies and percentages. To determine whether there were any differences in perception and/or opinion between students with different countries of origin, ethnicities, or genders, inferential statistics tests were performed (chi-square tests, independent samples T-tests, and one-way ANOVA tests) where applicable. A resulting p-value of 0.05 was considered statistically significant.

Table 1 Summary of sociodemographic characteristics

Sociodemographic Characteristics	Frequency		Percentage	
	Pakistan (n=75)	United States (n=102)	Pakistan	United States
Gender	24	51	13.5	29
Male	8	90	4.5	51
Female	0	4	0	2.2
Others				
Grade	8	15	4.5	8.5
9th grade	5	13	3	7.3
10th grade	4	51	2.2	29
11th grade	20	23	11	13
12th grade	38	0	21.5	0
13th grade				
Political Views	2	1	1.5	0.5
Conservative	9	7	5	4
Moderately Conservative	13	20	7	11
Neutral	34	37	19	21
Moderately Liberal	17	37	10	21
Liberal				
Race/Ethnicity	1	2	0.5	1.5
African American	1	18	0.5	10
East Asian	0	3	0	2
Hispanic	72	20	41	11
South Asian	1	59	0.5	33
White				

Results

Respondent characteristics

One hundred and seventy-seven students participated in the study. Basic demographic characteristics are summarized in Table 1.

Perceptions on bioethics

64% of the respondents (n=114) had heard the term bioethics before participating in the study. There was no statistically significant difference ($p=0.646$) between responses from Pakistan and the United States.

85% of respondents (n=161) provided some level of agreement with the statement that bioethics is an important field of study for young people. 47% of respondents (n=83) had previously learned about bioethical issues in some capacity. 86% of respondents (n=152) felt that there was a general lack of bioethics education and outreach towards younger students, and 41% disagreed with the statement that young people were not interested in making themselves aware of bioethical issues. 37% agreed with the statement, and 23% expressed a neutral opinion on it.

The independent samples T-test results demonstrated that there was a statistically significant difference ($p<0.05$) between Pakistani and US-based students' perceptions of bioethics. The one-way ANOVA test also revealed a statistically significant

Table 2 Ethical concerns surrounding social media. (1-Strongly Disagree, 2- Mostly Disagree, 3- Somewhat Disagree, 4- Neutral, 5- Somewhat Agree, 6- Mostly Agree, 7- Strongly Agree)

Statement	Country	1	2	3	4	5	6	7
I feel that it is ethical for social media companies to have the ability to track their users' locations because it improves the user experience.	Pak	20	19	16	12	4	3	1
	US	29	26	25	9	9	4	0
I feel that it is ethical for social media companies to collect the data of their users without permission.	Pak	53	11	2	2	1	2	4
	US	73	19	2	4	2	0	2
Data use by social media companies should be subject to stringent legal regulations.	Pak	6	4	1	7	9	25	23
	US	2	2	3	18	17	31	29
A big ethical issue with social media is its lack of privacy.	Pak	2	5	6	1	9	24	28
	US	0	3	4	8	25	32	30
A big ethical issue with social media is its exposure of inappropriate material to young audiences.	Pak	2	1	6	4	9	17	36
	US	0	7	6	9	24	31	25
A big ethical issue with social media is the negative impact it has on mental health.	Pak	3	5	2	7	6	16	36
	US	1	0	3	15	9	28	46

difference ($p < 0.05$) across genders. There was no difference between the views expressed based on political affiliation ($p = 0.992$), or race ($p = 0.053$).

Opinions regarding ethical concerns surrounding social media

69% of respondents ($n = 122$) reported having a social media account. Table 2 illustrates the data collected from the survey regarding students' opinions (%) about the ethical issues surrounding social media.

Results from the independent samples T-test indicated that there was no statistically significant difference ($p = 0.672$) between perceptions of Pakistani and American students in this area. There were no significant differences ($p = 0.090$) between students of different genders, political affiliations, ($p = 0.227$) and racial groups/ethnicities ($p = 0.053$) as demonstrated by the one-way ANOVA test.

Opinions regarding patient rights and freedom for minors

Table 3 includes data regarding the study participants' responses, in percentages, to statements regarding patient rights and freedom for minors on a Likert scale.

There was a statistically significant difference between opinions of Pakistani and American students in this aspect ($p < 0.05$). As previously observed, there were no significant differences ($p = 0.058$) between students of different genders, political affiliations ($p = 0.839$) and racial groups/ethnicities (0.445) as demonstrated by one-way ANOVA test.

Opinions on bioethical issues

Students were asked to rank certain bioethical issues from most important to least important. They were presented with two different lists, with one of general bioethical issues and another of bioethical issues related to healthcare. The issues prioritized most often from the list of healthcare list were abortion, with 38% ($n = 67$) of respondents ranking it as the most or second most important issue, followed by

Table 3 Patient rights and freedom for minors. (1-Strongly Disagree, 2- Mostly Disagree, 3- Somewhat Disagree, 4- Neutral, 5- Somewhat Agree, 6- Mostly Agree, 7- Strongly Agree)

Statement	Country	1	2	3	4	5	6	7
Adult patients have a right to know the full extent of their medical diagnosis and treatment plan.	Pak	5	0	1	0	4	6	59
	US	0	2	1	2	1	11	85
Adolescent patients between the ages of 12–18 have a right to know the full extent of their medical diagnosis and treatment plan.	Pak	4	1	2	6	14	16	32
	US	1	1	2	4	9	20	65
Physicians need to obtain permission from patients between the ages of 12–18 before performing an operation/ procedure.	Pak	2	2	4	10	15	16	26
	US	1	0	4	10	30	23	34
Patients who are between the ages of 12–18 have a right to confidentiality; physicians cannot tell their parents about their healthcare matters if they want to keep them private.	Pak	10	9	6	13	9	14	14
	US	2	9	12	6	18	21	34
Patients who are 12–18 years old should have the right to full freedom of medical decision making, unconstrained by their parents or other adults.	Pak	9	9	15	13	11	10	8
	US	8	11	22	20	21	14	6

organ donation and transplantation, with 34% (n=60) of respondents ranking it as the most or second most important issue. Technology in healthcare and war was also ranked relatively highly, with 27% (n=48) of respondents ranking it within their top two most important issues. Artificial intelligence and genetic engineering were the lowest-priority issues. 47% (n=83) of students ranked artificial intelligence as a low-priority issue, and the data was similar for genetic engineering.

For the second list (general bioethical issues), freedom of treatment choice/autonomy for patients was by far the highest priority issue for students, with 56% (n=99) of students listing it as their highest priority. On-screen violence and video games were ranked as the lowest or second lowest priority issues by 78% (n=138).

Discussion

This pilot study provides a snapshot of perceptions regarding bioethical issues among adolescents from two different sociocultural contexts. Although adolescence is characterized by emerging notions of identity and autonomy (Pfeifer and Berkman 2018), according to the best of the authors' knowledge, hardly any studies that assess the perceptions of bioethics and bioethical issues among this group have been conducted. This study, therefore, represents an attempt to capture adolescent viewpoints that may lend themselves to educational frameworks and the development of pertinent policies within bioethics education.

While the online survey was distributed to a wide range of students with different backgrounds, most respondents identified as liberal and South Asian, and were between the ages of 16 and 18 years old. Caucasians were the second most represented racial or ethnic group in the study. There was, comparatively, a far lower level of representation of other minority groups from within the United States; this could be explained by the fact that South Asian students felt more of a personal connection to the aims of the survey, as all respondents were informed that the survey aimed to

better understand differences in perception between Pakistani and American students to better inform bioethical education frameworks.

58% of respondents were from the United States, where data collection proved to be far easier due to the existence of youth groups and clubs and increased access to social media platforms. Collecting data from Pakistani students was more challenging due to a lack of readily available and widespread outreach platforms. Rather than connecting with young people directly, in Pakistan, the survey was primarily distributed through schools, which made data collection more difficult. Due to this, data collection was stopped at 177 respondents despite the initial target sample size of 200. Moreover, Pakistani respondents attended private schools. Private schools were targeted to increase the chance of including students with access to technology and the internet, and with a comprehensive background in English.

Survey results indicated that one-third of respondents had not heard the term bioethics, regardless of the country of origin. Keeping in perspective that education in ethics is generally introduced at the undergraduate level, this is hardly surprising. The introduction of bioethics as a formal field within high school education is quite limited (Costandi 2010). Data indicated that only 47% of respondents had formally learned about bioethics. Where there have been attempts to introduce this subject, students have found it very useful, particularly when the topics they learn about are relevant to them, such as the bioethical issues surrounding new technologies (Araujo 2017).

The lack of inclusion of this subject however does not negate its importance, as also made evident through our study; adolescents are constantly exposed to topics and debates within bioethics through social media. In a rapidly changing world full of ethical issues, students must be able to cope with them at a young age. In addition, there was also a general willingness among our respondents to make themselves aware of bioethical issues. Current literature regarding adolescent opinions on bioethical and global issues has been consistent with these findings, suggesting that recent global events, such as the COVID-19 pandemic, have made young people more aware of society and morality (Larcher et al. 2020).

The survey contained a list of crucial bioethical issues in healthcare in which the majority of respondents felt strongly about organ transplantation and deceased organ donation, perhaps due to the media's emphasis on these issues. Abortion was another high-priority issue, likely because it is a widely debated topic in the United States and around the world (Council on Foreign Relations 2022). Young people are often exposed to issues on social media, and this exposure translates into actions taken in their daily lives (Tufts Circle 2018). It is likely that while the students surveyed may not have much direct experience with these issues but had heard of them often on social and general media, these topics received higher ranking.

Students did not prioritize violent video games as a significant ethical issue in the same way that they prioritized technology in healthcare and war. Since students have high levels of direct exposure to and experience with violent video games and often use them as an outlet for entertainment, creativity, and socialization (Bowen 2014), many of them likely see violence in video games as unproblematic and ethically permissible, despite the concerns of some scientists (Kimmig et al. 2018). This is a

consistent pattern; when children and adolescents are exposed to something, their concerns surrounding it are reduced.

Social media, perhaps the most relevant ethical issue in the survey for students, garnered strong opinions and reactions. It appeared as though respondents were aware of the ethical issues surrounding social media, in terms of privacy violations, its impact on mental health, and the ability of social media to track users as well as collect data without permission. Previous studies have also illustrated perspectives of adolescents with respect to the impact of social media use on mental health (Popat & Tarrant, 2022). In the current study, perceptions towards social media did not vary based upon socio-demographic characteristics. However, it is interesting to note that despite the recognition that social media comes with a variety of ethical concerns, 68% of respondents reported having a public social media account on any platform. Other studies have yielded similar results; often, teenagers feel overwhelmed by social media despite maintaining active accounts on various platforms (Anderson and Jiang 2018).

On the flip side, 31% respondents in this age group reported not having a social media account, which was quite unexpected. A possible explanation for this could be that particular social media sites and apps were not specified within the questionnaire. If they had been, the number of students reporting social media accounts could have been higher, as there is a likelihood that platforms such as WhatsApp, for instance, were not considered to be social media. However, the general trend observed has been that teenagers represent the largest group of active social media users (Barrett-Maitland and Lynch, 2020) Individuals without a social media accounts did not have stronger views regarding the need to regulate social media companies. Thus, most students were aware of the ethical issues surrounding social media companies and were in favor of increased regulation, but ethical issues did not deter them from using social media platforms.

Another component of the survey involved healthcare autonomy for minors. While the majority agreed that adolescent patients have a right to know about their treatment plan and that physicians should take permission from minors before proceeding with treatments, this trend almost reversed when students were asked about adolescents' right to full medical decision-making, unconstrained by adults or their parents. This opinion is consistent with several legal rulings in the United States and United Kingdom that emphasize the importance of taking minor patients' opinions into account while heavily involving their parents in the decision-making process (Ford 2017). The number of respondents who supported the right to confidentiality for adolescents also decreased compared to the number of respondents who supported the right of adolescents to know their treatment plan.

For questions about medical decision-making and autonomy for minors, differences were observed between respondents based in the United States and Pakistan. The differences in the viewpoints between respondents from these two countries can be explained by their socio-cultural orientations. Pakistan is largely a collectivist culture with an age-based hierarchy, based on norms of filial piety and respect for elders (Moazam 2000). Undertaking any decisions, particularly significant healthcare decisions without parental consent and involving parents would be inconceivable. Thus, Pakistani students were more likely than American students to emphasize the

involvement of factors other than their own opinions in their healthcare decision-making processes. On the other hand, the United States is largely regarded as an individualistic culture. This discrepancy is consistent with the difference in opinion regarding healthcare autonomy for minors among adults from different sociocultural backgrounds. A 2020 study on participants in the United Kingdom found that adults who grew up in individualistic societies were more likely than other adults to allow their children to make their own healthcare decisions at an earlier age (Dura-Vila & Hodes 2020). Such opinions of parents and other adults may influence the opinions of students in more individualistic cultures by creating an environment in which they feel they should be given increased healthcare autonomy because their peers have it (Daddis 2011).

This survey was an attempt to provide a comparative analysis of perceptions between adolescents based in the United States and Pakistan. Very few studies have formally assessed the viewpoints of adolescents regarding ethical issues, and the current study represents one such effort. However, there are limitations to this study. Since the sample size is quite small and obtained through non-probability convenience sampling, there are limits to the generalizability of the study findings. In addition, while very few differences were observed between patterns of behavior as well as viewpoints expressed by respondents in the United States and Pakistan, this could be because the sample in Pakistan consisted largely of students belonging to private schools and upper socioeconomic strata. Greater differences may have been observed if the study was conducted with students from Pakistani public schools.

Nevertheless, this pilot study paves way for interesting areas for research in the future with adolescents, particularly since it appears as if this age group is interested in learning about bioethical issues and demonstrates familiarity with concerns regarding common bioethical problems.

Conclusion

This pilot study can serve as a baseline for future work with adolescents and bioethics. Adolescents require education in bioethics due to their high exposure to social media, which presents various ethical issues such as limited privacy, oversharing, cyberbullying, and abuse. Future bioethical education frameworks must prioritize issues that young people find important. According to our survey, students prioritized abortion, technology in healthcare and war, and organ transplantation. However, these priorities varied by location. Therefore, for any program in bioethics to be successful, it needs to be local and contextual to facilitate better ethical decision-making and moral learning.

This study can be expanded in the future to include Pakistani respondents belonging to public sector schools along with non-English speaking respondents since their responses may be more representative of trends in Pakistan. In addition, the strategy for sampling can be revised to probability sampling in order to reduce risk of bias while also increasing the sampling size. Attempts can also be made to include more male respondents in the study so a better comparison could be made across genders.

Questions related to termination of pregnancy, a topic relevant to both countries, can also be included to the data collection instrument.

Author's contribution Both authors were involved in study conception and design, along with data collection and analysis. Both authors read and approved the final manuscript.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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