

Special issue: Responsible writing in science

Attitudes toward plagiarism among pharmacy and medical biochemistry students – cross-sectional survey study

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Abstract

Introduction: Plagiarism is one of the most frequent and serious forms of misconduct in academic environment. The cross-sectional survey study was done with aim to explore the attitudes toward plagiarism.

Materials and methods: First year students of Faculty of Pharmacy and Medical Biochemistry, University of Zagreb, Croatia (N = 146) were anonymously tested using Attitude toward Plagiarism (ATP) questionnaire. The questionnaire is composed of 29 statements on a 5 point Likert scale, (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree and 5 – strongly agree) measuring three attitudinal factors (positive and negative attitude and subjective norms) toward plagiarism. Results were presented as score (mean \pm SD) followed by reference range (divided in three equal parts: low, moderate and high score). Score range extends from 12 to 60 (low: 12-28; moderate: 29-45; high: 46-60) measuring positive attitude toward plagiarism, from 7 to 35 (low: 7-16; moderate: 17-26; high: 27-35) measuring negative attitude toward plagiarism and from 10 to 50 (low: 10-23; moderate: 24-37; high: 38-50) measuring subjective norms. Response rate was 99% (N = 144).

Results: Results revealed moderate positive attitude (36 ± 7) and subjective norms (32 ± 6) toward plagiarism and moderate to high negative attitude (26 ± 4). Plagiarism is perceived as not very important (63% of students), harmless (59%), justified under special circumstances (42%), and sometimes necessary (35%).

Conclusion: Students' attitudes reflect insufficient level of seriousness and awareness with which plagiarism is perceived. They are lacking knowledge on scientific methodology, academic and scientific misconduct. Plan and program to educate students about academic integrity and research methodology is required on all educational level.

Key words: plagiarism; academic misconduct; students; questionnaires

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Introduction

Scientific and professional work in the field of biomedicine requires great responsibility, total commitment and serious and honest lifetime work and learning. Unprofessional behaviour such as scientific misconduct can directly provoke mistakes and seriously damage people's health and even life (1,2). Knowing the importance of scientific work and the possible repercussions it could have on people's lives, one can presume that all researchers have high moral values and strong scientific integrity and that occurrence of scientific misconduct is very rare (3). It would be logical to deduce

that also students who want to undertake this profession also have same integrity and moral values. But is it true? Published papers and reports revealed that it was not always the case; scientists are not more honest than average people and students seem to seek "shortcuts" in their work (4-13). Scientific misconduct is usually recognized as fabrication and falsification of data and plagiarism (1,14,15). Besides that academic misconduct represents various dishonest behaviours that are basically cheating e.g. gaining undeserved benefits. If that behaviour is tolerated that seriously damages

the reputation of academic and scientific community, devaluates learning processes and leads to production of deceitful experts (16,17). Our focus of interest, in the present paper, is plagiarism, as one of the most common forms of academic misconduct and often not considered as serious offence among students (4,7,18,19). Plagiarism can be widely defined as misappropriation of other's people work, words or ideas, claiming to be one's own and giving to perpetuator undeserved benefits (1,5,20). In the last decade plagiarism has become easier to perform and more noticeable with the progress of computer technology. The Internet became an unfailing source for students' seminars and papers, worsening the already alarming situation among students (21). Occurrence of academic plagiarism is, among other elements, affected by students' lack of knowledge on academic integrity and neglecting intellectual property (7,19,22). Previous studies indicate that lack of knowledge about plagiarism, students' propensity toward such behaviour and not understanding the seriousness of such violations increase plagiarism frequency (2,19,22,23) especially when the Internet is the source of plagiarism (21). Recognizing attitudes towards plagiarism is an important basis for educating and deterring students from plagiarizing (19,21,22). Attitudes can be reached using standardized questionnaire, one of which was recently published by our research group (23). The purpose of this cross-sectional survey study is to explore the attitudes of pharmacy and medical biochemistry students toward plagiarism for a better understanding of their point of view and to highlighting importance in further education and formative processes in academic and scientific integrity.

Materials and methods

Questionnaire

The Attitude toward Plagiarism (ATP) questionnaire (23) was used to assess students' attitudes. It consists of two parts: demographic data (gender and age) and the attitude toward plagiarism scale measuring three attitudinal factors: positive attitude, negative attitude and subjective norms. Attitudes were presented with 29 statements on a 5 point Likert scale, graded 1 – strongly disagree, 2 – di-

sagree, 3 – neither agree nor disagree, 4 – agree and 5 – strongly agree for each statement. According to that scale, points were designated to each answer and scores were calculated by summing. Minimal and maximal possible scores were calculated for each factor and ranges were divided in three equal parts representing low, moderate and high score scales (presented in Table 1).

Positive attitude reflects the approval and acceptance of plagiarism. It is measured by 12 statements with score range 12-60. Low score range (12-28) indicates attitude with low tolerance toward plagiarism. Statements measuring positive attitude toward plagiarism are mainly related to procedures that participants do by themselves (23).

Negative attitude towards plagiarism reflects deprecation and condemnation of such act. It is measured by 7 statements with score ranging 7-35. In this attitudinal factor high score range: 27-35, indicates attitude with no tolerance of plagiarism. Statements describing negative attitude are mainly related to procedures done by others or present in society in general (23).

Subjective norms toward plagiarism indicate personal perception of extent and acceptance of plagiarism in society. It is measured by 10 statements with score ranging 10-50. With low subjective norms toward plagiarism, participants will consider such behaviour unacceptable in society and that is why low score (scored 10-23) is favourable (23).

Participants

Participants were the first year students of Faculty of Pharmacy and Medical Biochemistry, University of Zagreb, Croatia, attending mandatory course of Statistics (February 2010, N = 146 students). They filled in the questionnaire anonymously, voluntarily and simultaneously after passing an exam at the first exam period. Response rate was 99% with N = 144 participants. Their median age was 19 (range 18-22 years) with 102 (71%) of women.

Statistical analysis

Student's scores were calculated and presented as mean score \pm SD for each attitudinal factor. Distribution of answers to all questions was also calculated and presented as percentage of students answering particular answer to each question.

Data analyses were performed using MedCalc software version 10.0.1.0. (MedCalc, Mariakerke, Belgium).

Results

The results revealed moderate attitude toward plagiarism among students. Average scores were moderate for all three attitudinal factors (Table 1). The findings of moderate positive attitude (scored 36 ± 7) indicate considerable percentage of students who justify and accept the act of plagiarism. Negative attitude was moderate to high (scored 26 ± 4 , Table 1). Subjective norms were moderate indicating that students do not perceive plagiarism appropriately in the community.

Distributions of answers by questionnaire statements are presented in Table 2, and some data from the table deserve out attention.

Statements describing positive attitude

Results revealed that half of the students would plagiarize to cover up the lack of writing skills (statement 1) but at the same time majority (64%) disagreed that they could not write scientific paper without plagiarizing (statement 12). Mainstream of students (about 50%) considered self-plagiarism harmless and not punishable (statements 3, 5 and 6). There was no clear attitude (neither agrees nor disagrees) in majority of students toward plagiarism when scientific methodology, academic time management and writing student's and scientific papers in general (statements 2, 4, 8, 9, 10 and 11). More than one third of students considered to be entitled to plagiarize to some extent because they were (still) in learning process (statement 7).

Statements describing negative attitude

Almost all students (90%) agreed that plagiarism impoverishes the investigative spirit (statement 13), nearly three quarters considered plagiarism as important issue to discuss (statement 14) with compulsory disclosure of plagiarism perpetrators to public (statement 16). Contradictory to that, two thirds of students felt that plagiarism was not serious offence like appropriation of material goods (statement 15) and does no harm to science (state-

ment 17). There was unclear attitude (neither agree nor disagree) if plagiarists should belong to the scientific community (statement 18) and if plagiarism was as bad as stealing an exam (statement 19).

Statements describing subjective norms

Answers outlined that more than two thirds of students agreed with plagiarism existence in real world with no expectation that plagiarists should admit it (statements 20 and 22). But in contrary, half of them reported that they were studying in plagiarism-free environment (statement 26). Three quarters of students did not have bad conscience for copying text from their previous work (statement 23). Students had unclear attitude about necessity to plagiarize or plagiarizing to gain some time for other tasks (statements 27 and 28) – they agreed, disagreed, and neither agreed or disagreed in equal proportions.

Discussion

Moderate scores obtained in all three categories (Table 1) revealed confusion, lack of clear attitude, and mostly disturbing – lack of knowledge and awareness of academic integrity importance among students. Such attitude might cause behaviours that can obstruct the development of respectable scientific community (2,16,17).

TABLE 1. Scores for three attitudinal factors measuring attitudes toward plagiarism followed by ranges for low, moderate and high attitude for each factor.

Attitudinal factor	Mean \pm SD (N = 144)	Score	
		Reference range	
Positive attitude	36 ± 7	Low *	12-28
		Moderate	29-45
		High	46-60
Negative attitude	26 ± 4	Low	7-16
		Moderate	17-26
		High *	27-35
Subjective norms	32 ± 6	Low *	10-23
		Moderate	24-37
		High	38-50

* Favourable attitude from the academic integrity point of view.

Lack of knowledge of academic integrity is followed by lack of competences on scientific methodology and writing skills. Students feel that using other people's words is unavoidable (statement 1; all statements from Table 2), direct translation from a foreign language is acceptable (statement 2), and copying methodology statements from previously published papers is justified (statement 8). Insufficient competences on scientific methodology can be recognized from students' attitude that it is justified to plagiarize if paper is of great scientific value (statement 11).

Statement 13 claims that plagiarism impoverishes the investigative spirit, and 90% of students agree with that. At the same time 59% of them agree that plagiarized paper does no harm to science (statement 17). This is a clear example how declarative statements (as statement 13) provoke socially desirable answers, but asked differently reveal unclear attitude and insufficient knowledge. It is disturbing that 19% of students agree and 34% are not certain whether it is bad to plagiarize or not (statement 25).

Our results are consistent with similar studies carried out. Ryan *et al.* investigated students' awareness and knowledge about plagiarism in Australia (7). Level of awareness against plagiarism was high but the level of knowledge about plagiarism was low, and both characteristics were constant through all years of education (7). It is hard to expect that students' attitude will change during educational process without strict policy toward plagiarism and proper training on scientific methodology and integrity.

Positive attitude that mainly describes procedures related to own behaviour is less favourable than negative attitude, mainly describing procedures done by other's (Table 1). It might be understood that students will justify plagiarism and self plagiarism when done by themselves, but would be more strict if others do the same. That is consistent with conclusions from Hren *et al.* that revealed noticeable level of *Machiavellianism* among Croatian students (25).

Same study highlights cultural environment as important circumstance in developing attitudes and

moral reasoning (26). Students' and scientists' attitudes and behaviour are strongly influenced by cultural standards in their community (11,26-30). In our study, 67% students agree that names of authors who plagiarize should be disclosed in public. Although there was no question on whistleblowing in the questionnaire, we strongly doubt that majority of those students would report plagiarism if perceived. Study of student attitudes toward plagiarism and plagiarism reporting in Russia, United States of America, Netherlands, and Israel indicated that tolerance toward plagiarism is more pronounced in post communist countries and communities with high rate of corruption (27). Those environments are characterized by high tolerance toward cheating and unfavourable attitudes toward academic and scientific integrity (11,26-30).

Special issue that rose in last decade is self plagiarism in academic and scientific environment (24). Generally, our students do not perceive self plagiarism as being offensive. Nearly half of them agree that self-plagiarism is harmless (statement 3) and justified (statements 5, 6 and 23). These results are consistent with previously published studies revealing that 35% of students in United Kingdom and 47% in Bulgaria committed self-plagiarism at least once (22). In previous Croatian study, 65% of biomedical students find self-plagiarism justifiable and acceptable (22). Their acceptance of self plagiarism resides on attitude that one cannot steal from oneself. Intellectual property needs to be available in public, it is meant to enrich and contribute to general human knowledge and culture (20). Presenting already published material as new and original is deceiving public, it means double publication and is not allowed. It gives illusion of new research and new intellectual effort that has not been done at all. Equally, in academic environment it is also unacceptable to submit the same student's essay twice. Therefore it is nothing more than cheating.

Limitation of the study relies on sample. All participants were first year students from one university, but despite that we considered sample big enough ($N = 144$) with high rate response (99%). Therefore, we presume competent data interpretation. Other limitation is connected to survey studies: possible

TABLE 2. Distributions of answers (in % for N = 144 participants) to the Attitude toward Plagiarism questionnaire (23)*

Statements	Strongly disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
Statements describing positive attitude					
1. Sometimes one cannot avoid using other people's words without citing the source, because there are only so many ways to describe something.	7	14	19	37	22
2. When I do not know what to write, I translate a part of a paper from a foreign language.	24	21	20	27	8
3. Self-plagiarism is not punishable because it is not harmful (one cannot steal from oneself).	4	10	31	35	20
4. Short deadlines give me the right to plagiarize a bit.	11	24	28	33	4
5. Self-plagiarism should not be punishable as plagiarism.	12	12	27	33	16
6. It is justified to use one's own previously published work without providing citation in order to complete the current work.	8	23	26	31	11
7. Young researchers who are just learning the ropes should receive milder punishment for plagiarism.	19	22	22	25	12
8. It is justified to use previous descriptions of a method, because the method itself remains the same.	3	13	47	31	6
9. If one cannot write well in a foreign language (e.g., English), it is justified to copy parts of a similar paper already published in that language.	14	28	35	19	5
10. If a colleague of mine allows me to copy from her/his paper, I am NOT doing anything bad, because I have his/her permission.	14	24	31	18	13
11. Plagiarized parts of a paper may be ignored if the paper is of great scientific value.	13	30	28	20	9
12. could not write a scientific paper without plagiarizing.	38	26	22	12	1
Statements describing negative attitude					
13. Plagiarism impoverishes the investigative spirit.	1	5	3	26	64
14. In times of moral and ethical decline, it is important to discuss issues like plagiarism and self-plagiarism.	1	8	19	40	32
15. Since plagiarism is taking other people's words rather than tangible assets, it should NOT be considered very important.	3	8	24	40	23
16. The names of the authors who plagiarize should be disclosed to the scientific community.	1	7	25	31	36
17. A plagiarized paper does no harm to science.	3	10	28	26	33
18. Plagiarists do not belong to the scientific community.	8	15	33	26	17
19. Plagiarizing is as bad as stealing an exam.	10	21	26	26	15
Statements describing subjective norms					
20. Those who say they have never plagiarized are lying.	5	6	28	28	32
21. Sometimes I copy a sentence or two just to become inspired for further writing.	9	11	12	52	15
22. Authors say they do NOT plagiarize, when in fact they do.	3	3	21	47	26
23. I do NOT have bad conscience for copying verbatim a sentence or two from my previous papers.	3	11	19	38	29
24. Sometimes I am tempted to plagiarize, because everyone else is doing it (students, researchers, physicians).	24	21	18	31	6
25. It is NOT so bad to plagiarize.	1	31	34	13	6
26. I work (study) in a plagiarism-free environment.	1	8	34	28	29
27. Sometimes, it is necessary to plagiarize.	10	23	32	28	7
28. Plagiarism is justified if I currently have more important obligations or tasks to do.	15	28	30	18	8
29. I keep plagiarizing because I haven't been caught yet.	38	24	24	9	5
* Data in statements 1-4, 6, 8, 10, 12, 14, 15, 18-21, 23, and 26-28 do not add up to 100% because of missing values (maximum of two missing values per statement occurred for those listed).					

socially desirable answers, not been concentrated or being annoyed with the questionnaire.

Participating students will become scientists, experts in pharmacy and medical biochemistry, and it is disturbing if their attitude reflects serious neglecting of plagiarism. That is even more worrisome if we know that nearly all participating students were excellent in high school with average mark 4.9 ± 0.3 (mean, SD; on scale from 1, poor, to 5, excellent; data from our previous study (31)) and that they adopted such a low level of academic integrity and knowledge in previous education.

All facts listed rise up questions: Is there a possibility to change attitudes through five years of high education? Is there enough willing, commitment and effort for that in academic society, as well as in general? All models of upgrading knowledge about plagiarism, intellectual rights, authorship, copyrights and integrity in academic and scientific community should be considered, with formal and

non-formal education, debates and forums on topics of academic misconduct that should be stimulated on all educational levels.

If enormous effort is not undertaken through educational process, our society can not expect to have experts and scientists of high quality. Instead, our academic and scientific community might sink at the bottom of scientific periphery, one always avoided by general scientific community, and became isolated closed "greenhouse".

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Stavovi spram plagiranja među studentima farmacije i medicinske biokemije – presječno anketno istraživanje

Sažetak

Uvod: Najučestaliji ozbiljan oblik nepoštenja u znanstvenom i akademskom okruženju je plagiranje. Cilj istraživanja je ispitati stavove studenata spram plagiranja.

Materijali i metode: Anonimnim upitnikom o stavovima spram plagiranja (engl. *Attitude toward Plagiarism (ATP) questionnaire*) ispitani su studenti prve godine Farmaceutsko-biokemijskog fakulteta Sveučilišta u Zagrebu (N = 146). Upitnik se sastoji od 29 izjava s odgovorima na 5-stupanjskoj Likertovoj ljestvici (1 - u potpunosti se ne slažem, 2 - ne slažem se, 3 - niti se slažem niti se ne slažem, 4 - slažem se, 5 - u potpunosti se slažem). Izmjerene su tri sastavnice stava spram plagiranja: pozitivan stav, negativan stav i subjektivne norme. Rezultat je iskazan brojem bodova (srednja vrijednost ± SD) za svaku od tri sastavnice i uspoređen s referentnim rasponom. Raspon bodova kreće se: za pozitivan stav: od 12 do 60 (niski: 12-28; umjereni: 29-45; visoki: 46-60); za negativan stav: od 7 do 35 (niski: 7-16; umjereni: 17-26; visoki: 27-35); i za subjektivne norme: od 10 do 50 (niske: 10-23; umjerene: 24-37; visoke: 38-50). Odziv ispitanika iznosi 99% (N = 144).

Rezultati: Rezultati pokazuju umjereno pozitivni stav (36 ± 7) i umjerene subjektivne norme (32 ± 6) spram plagiranja te umjeren do visok negativni stav (26 ± 4). Veliku važnost plagiranju ne pridodaje 63% studenata, 59% ga ne smatra štetnim, 42% opravdava plagiranje u posebnim okolnostima i 35% ga smatra ponekad potrebnim.

Zaključak: Stavovi studenata odražavaju nizak stupanj svjesnosti i važnosti o problemu plagiranja. Nedostaje im znanja o znanstvenoj metodologiji te akademskom i znanstvenom poštenju. Rezultati upućuju na potrebu dodatne izobrazbe studenata u znanstvenoistraživačkoj metodologiji i akademskoj čestitosti na svim razinama školovanja.

Ključne riječi: plagiranje; akademsko nepoštenje; studenti; upitnik