ORIGINAL ARTICLE
THE ILLUSION OF UNDETECTED PLAGIARISM: AN ETHICAL AND ACADEMIC DILEMMA IN RESEARCH

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Background: Despite knowing about the fact that Plagiarism is an academic fraud as there is a general lack of awareness that plagiarism should be avoided at all levels. Faculty play a crucial role in fostering ethical professionalism, so clear perspectives on plagiarism are essential. The objective was to enhance positive attitudes toward plagiarism among faculty members of Jinnah Medical & Dental College and Sohail University through an academic intervention, measured by an improvement in awareness and ethical perception. **Method:** This Pre and post-academic intervention study was conducted from September to November 2022 for the period of three months at the Sohail University. About 130 faculty members were included through non-probability purposive sampling technique. The intervention was in the form of a series of "Series of Interactive session (LGIS) on Plagiarism: description its types, its consequences, and HEC policy regarding Plagiarism in Research methodology through multimedia". Study participants were called for the intervention in a calm and quiet auditorium, and the same self-administered questionnaire was given Pre and Post the post-intervention on the same participants after taking written consent from the study participants.ERC was taken from the Sohail University Hospital Committee. Data was entered and analyzed by SPSS version 25, Descriptive statistics were calculated and a paired t test was applied to determine the change in attitudes among faculty before and after the intervention. **Results:** it was found that positive attitude towards Plagiarism significantly improved post-intervention (SEM=0.435, 95% CI= 0.371−1.99, p=0.001), similarly for negative attitude there was significant change after the intervention (SEM=0.266, 95% CI= 0.123−1.39, p=0.001) and faculty recognition of norms also improved after intervention (SEM=0.327, 95% CI=0.306−1.70, p=0.001). **Conclusion:** This study concluded that our educational intervention was found to be effective in improving the overall attitudes and norms towards plagiarism. Hence, we should promote regular educational sessions among researchers to overcome the increasing trend of Plagiarism at the institutional level. Furthermore, we suggest including this interventional session in the curriculum of all undergraduate programs to minimize Plagiarism in Scientific writing.

Keywords: Academics; Attitudes; Intervention; Plagiarism; Policy

INTRODUCTION

Despite being universally acknowledged as an academic fraud, plagiarism is still a problem in the academic community. Many academicians still plagiarize because they believe they won't be found, even though they know it's wrong and can have major repercussions.[1] This suggests a pervasive ignorance of the value of academic honesty and the moral ramifications of plagiarism. The fact that many people are ignorant of the precise behaviors that qualify as plagiarism exacerbates the problem even more.[2]

Self-plagiarism is a specific type of plagiarism in which the same work is repeatedly published in multiple publications or under different titles. Often called "salami slicing," this technique divides a single study into several articles.[3]

Additionally, research suggests that those who believe they are more skilled are more likely to access restricted sites and paid content, which results in fewer plagiarism incidents being reported. On the other hand, underprivileged students who depend on communal internet access in classrooms and public areas are more likely to be caught plagiarizing.[4]

Plagiarism can be thought of as a "cat-and-mouse" game in which students try to avoid detection while teachers enforce the rules.[5] Plagiarism charges can be avoided, though, by following appropriate citation guidelines, which include stating original work, referencing all sources, and making a clear distinction between one's own contributions and referenced content. While plagiarism has been made easier by contemporary technology, it has also given

rise to sophisticated techniques for detecting it and safeguards against it.[6] As long as academic institutions do not require the use of plagiarism detection technologies to safeguard their reputation, the researchers think they may easily get away with plagiarism. Since plagiarism has become a recurring issue for the academic and scientific community, training programs should include instruction on how to use plagiarism detection tools properly.[7] The problem of plagiarism has significantly grown, not just in wealthy countries but even in third-world countries like Pakistan.[8]

To raise awareness in Pakistan, numerous studies and suggestions have been made. In the same way that the Higher Education Commission has responded to a number of similar occurrences in our country by removing funding, firing professors, and expelling them. However, there is a noticeable hesitancy to ignore the seriousness of HEC Rules, even though it is acknowledged that plagiarism is immoral.[9] In order to raise awareness, academia must immediately adopt a zero-tolerance stance.[10] The objective of this study is to enhance positive attitudes toward plagiarism among faculty members of Jinnah Medical & Dental College and Sohail University through an academic intervention, measured by a improvement in awareness and ethical perception. This study is done to highlight the fact that strategies should be inculcated so that researchers are bound to avoid plagiarism and promote best practice in scholarly writing. Furthermore, we shouldn't expect our new researchers to avoid such frauds until after we teach them about plagiarism.

MATERIAL AND METHODS

This Academic Interventional study was conducted from September to November 2022 for the period of three months at Jinnah Medical and Dental College, and Sohail University. About 130 faculty members were included through non-probability purposive sampling technique. The intervention was in a form of series of "*Interactive session on Plagiarism description its types, its consequences and HEC policy regarding Plagiarism in Research methodology through multimedia*". Study participants were called for the intervention in a calm and quiet auditorium and adapted questionnaire with Cronbach alpha more than 0.84[11] and pilot testing was done on 15 faculty members other than those included in the study, this same questionnaire was administered before and after the intervention after taking written from the study participants. The Questionnaire comprised of three sections, Positive attitude items, negative attitude items and norms item respectively. Each item was scored on the 5points Likert scale. ERC was taken from the Sohail University Hospital Committee. After getting all the responses from the participants cumulative scores were calculated for all the positive attitudes, negative attitudes and norms. 50% cut off was used to differentiate

for improvement in positive attitude, decrease in Negative attitude and increase recognition of Norms towards Plagiarism. This is how we categorize all the variables into Binomial distribution, then afterwards paired T test was applied on positive, negative and the Norms. Then we applied the logistic regression analysis to determine the association between positive, negative attitudes and Norms with study variables. Data was entered and analyzed by SPSS version 25, Frequencies and Percentages were calculated and paired t test was applied to determine the pre-post statistical difference.

RESULTS

Table 1 shows that 75.6% of the study participants were females, 45.2% were MBBS faculty, 28.9% were BDS faculty and 5.2% were faculty of different biological sciences specialties. Mean age of study participants was 33.47 ± 10.30 SD years. Mean teaching experience was 5.33 ± 6.54 years and mean time spent on the internet per day was 4.65 ± 2.72 hours. Table 2 representing the comparison for positive attitude towards Plagiarism before and after intervention among study participants, it was found that for positive attitude the mean difference for all items was statistically significant Table 3 shows comparison for negative attitude towards Plagiarism before and after intervention. For all 8 items of negative attitude mean difference between pre-post intervention was statistically significant with $p<0.05$. Table 4 represents the comparison of Norms towards Plagiarism before and after intervention. For all the items the significant mean difference was found in the norms among study population. Table 5 showing the overall comparison of Positive attitude, negative attitude and Norms towards plagiarism before and after intervention, For positive attitude there was statistical significant improvement in Positive attitude towards plagiarism (SEM=0.435, 95% CI= 0.371–1.99, $p=<0.001$), for negative attitude there was significant improvement after the intervention (SEM=0.266, 95% CI= 0.123–1.39, $p=0.001$) and statistical significant positive change towards norms after intervention (SEM=0.327, 95%CI=0.306–1.70, $p=<0.001$) respectively. Table 6 in pre-intervention teaching experience of more than 5 years ($p=0.006$, OR=2.78) and more than 4 hours spent on internet ($p=0.001$, OR=11.766) was associated with good positive attitude. Similarly, in post- intervention group teaching experience more than 5 years ($p=0.002$, OR=1.452) and more than 4 hours' time spent on internet ($p=0.003$, OR=1.987) found to be significantly associated with improved positive attitude. In Negative norms, no association was found with any socio-demographic characteristics. In Negative attitude, in post intervention group teaching experience of more than 5 years ($p=0.044$, OR=0.965) and faculty of MBBS program ($p=0.012$, OR=0.715) showed significant improvement in norms towards Plagiarism.

Table-1: Descriptive statistics of study participants N=130

Characteristics	Frequency (%)	Mean (±SD)	
Gender	33 (24.4)		
Male Female	102 (75.6)	-	
ProgramMBBS BDS DPT	61 (45.2)	-	
Others	39 (28.9)		
	12 (8.9)		
	7 (5.2)		
Age in years	-	33.47	(±10.30)
Teaching experience	-	5.33	(±6.54)
Average time spent on the internetin hours per day	-	4.6481 (±2.72)	

Table-2: Comparison of positive attitude towards plagiarism scores before and after the intervention paired t test was performed

Variables	Before intervention N (%)	After intervention N (%)	Difference + (increase after intervention) - (decrease after intervention)	Absolute Mean difference	SEMM	p-value
Sometimes one cannot avoid using other people's words without citing the source, because there are too many ways to describe something						
Strongly Agree	18 (13.3)	22 (16.3)	+04		0.078	0.005
Agree	93 (68.9)	62 (45.9)	-31			*
Disagree	14 (10.4)	34 (25.2)	+20	0.22		
Strongly Disagree	10 (7.4)	17 (12.6)	+7			
It is justified to use previous method, because the method itself remains the same						
Strongly Agree	13 (9.6)	11 (8.1)	-2		0.074	0.001
Agree	77 (57)	54 (40.0)	-23	0.32		*
Disagree	42 (31.1)	51 (37.8)	+9			
Strongly Disagree	3 (2.2)	19 (14.1)	+16			
Self-plagiarism is not punishable because it is not harmful (one cannot steal from oneself)						
Strongly Agree	23 (17)	14 (10.4)	-9		0.084	0.00*
Agree	71 (52.6)	33 (24.4)	-38			1
Disagree	38 (28.1)	61 (45.2)	+23	0.58		
Strongly Disagree	3 (2.2)	26 (19.1)	+23			
Plagiarized parts of a paper may be ignored if the paper is of great scientific value						
Strongly Agree	7 (5.2)	4 (3.0)	-3		0.071	0.031
Agree	27 (20)	15 (11.1)	-12			*
Disagree	76 (56.3)	77 (57)	+1	0.24		
Strongly Disagree	25 (18.5)	39 (28.9)	+14			
Self-plagiarism should not be punishable in the same way as plagiarism						
Strongly Agree	13 (9.6)	17 (12.6)	+4		0.083	0.01*
Agree	76 (56.3)	56 (41.5)	-20	0.18		
Disagree	38 (28.1)	44 (32.6)	+6			
Strongly Disagree	5 (3.7)	18 (13.3)	+13			
Young researchers should receive milder punishment for plagiarism						
Strongly Agree	12 (8.9)	15 (11.1)	+3		0.072	0.008
Agree	58 (43)	50 (37)	-8			
Disagree	53 (39.3)	60 (44.4)	+7	00		
Strongly Disagree	12 (8.9)	9 (6.7)	-3			
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						
Strongly Agree	8 (5.9)	5 (3.7)	-3		0.072	0.493
Agree	29 (21.5)	23 (17)	-6			
Disagree	69 (51.1)	64 (47.4)	-5	0.19		
Strongly Disagree	29 (21.5)	43 (31.9)	+14			
I could not write a scientific paper without plagiarizing						
Strongly Agree	2 (1.5)	4 (3.0)	+2		0.065	0.044
Agree	29 (21.5)	22 (16.3)	-7			*
Disagree	67 (49.6)	69 (51.1)	+2	0.04		
Strongly Disagree	37 (27.4)	40 (29.6)	+3			
Short deadlines give me the right to plagiarize a bit						
Strongly Agree	7 (5.2)	9 (6.7)	+2		0.006	0.001
Agree	38 (28.1)	27 (20)	-11			*
Disagree	62 (45.9)	58 (43)	-4	0.13		
Strongly Disagree	28 (20.7)	40 (29.6)	+12			
When I do not know what to write, I translate a part of a paper from a foreign language						
Strongly Agree	9 (6.7)	7 (5.2)	-2	0.30	0.081	0.005
Agree	46 (34.1)	23 (17)	-23			*
Disagree	59 (43.7)	72 (53.3)	+13			
Strongly Disagree	20 (14.8)	33 (24.4)	+13			

It is justified to use one's own previously published work without providing citation in order to complete the current work						
Strongly Agree	2 (1.5)	4 (3)	+2	0.19	0.066	0.001
Agree	24 (17.8)	14 (10.4)	-10			*
Disagree	86 (63.7)	78 (57.8)	-8			
Strongly Disagree	21 (15.6)	39 (28.9)	+18			
If a colleague of mine allows me to copy from her/his paper, I'm NOT doing anything bad, because I have his/her permission						
Strongly Agree	6 (4.4)	5 (3.7)	-1		0.064	0.001
Agree	41 (30.4)	20 (14.8)	-21			*
Disagree	66 (48.9)	71 (52.6)	+5	0.30		
Strongly Disagree	22 (16.3)	39 (28.9)	+17			
I am aware that Plagiarism will have impact on my reputation						
Strongly disagree	3 (2.2)	4 (3)	+1		0.068	0.512
Disagree	5 (3.7)	7 (5.2)	+2			
Agree	63 (46.7)	50 (37)	-13	0.05		
Strongly agree	64 (47.4)	74 (54.8)	+10			

*p-value <0.05 was considered statistically significant

Table-3: Comparison of negative attitude towards Plagiarism scores before and after intervention

Variables	Before intervention N (%)	After intervention N (%)	Difference + (increase after intervention) - (decrease after intervention)	Mean difference	SEM	p-value
Plagiarists do not belong to the scientific community						
Strongly disagree	15 (11.1)	15 (11.1)	0		0.070	0.002
Disagree	55 (40.7)	41 (30.4)	-14	0.22		*
Agree	49 (36.3)	49 (36.3)	0			
Strongly agree	14 (10.4)	29 (21.50	+15			
The names of the authors who plagiarize should be disclosed to the scientific community						
Strongly disagree	5 (3.7)	2 (1.5)	-3		0.070	0.001
Disagree	35 (25.9)	25 (18.5)	-10			*
Agree	77 (57.0)	68 (50.4)	-9	0.29		
Strongly agree	16 (11.9)	39 (28.9)	+23			
In times of moral and ethical decline, it is important to discuss issues like plagiarism and self-plagiarism						
Strongly disagree	3 (2.2)	6 (4.4)	+3		0.060	0.034
Disagree	72 (53.3)	48 (35.6)	-24			*
Agree	59 (43.7)	80 (59.3)	+21	0.13		
Strongly agree	0 (0)	0 (0)	0			
Plagiarizing is as bad as stealing an exam						
Strongly disagree	2 (1.5	2 (1.5)	0		0.068	0.001
Disagree	13 (9.6	3 (2.2)	-10			*
Agree	71 (52.6)	54 (40.0)	-17	0.27		
Strongly agree	48 (35.6)	75 (55.6)	+27			
Plagiarism impoverishes the investigative spirit						
Strongly disagree	1 (.7)	1 (.7)	0	0.16	0.070	0.022
Disagree	10 (7.4)	12 (8.9)	+2			*
Agree	84 (62.2)	61 (45.2)	-23			
Strongly agree	37 (27.4)	59 (43.7)	+22			
A plagiarized paper does no harm to science						
Strongly Agree	4 (3.0)	4 (3.0)	0	0.21	0.068	0.002
Agree	19 (14.1)	7 (5.2)	-12			*
Disagree	70 (51.9)	65 (48.1)	-5			
Strongly Disagree	40 (29.6)	58 (43.0)	+18			
Since plagiarism is taking other people's words rather than tangible assets; it should NOT be considered as a serious offense						
Strongly Agree	6 (4.4)	8 (5.9)	+2		0.077	0.014
Agree	20 (14.8)	15 (11.1)	-5	0.11		*
Disagree	75 (55.6)	63 (46.7)	-12			
Strongly Disagree	33 (24.4)	48 (35.6)	+15			
I am not aware that Plagiarism policy of HEC is applicable to all the Teachers, researchers, students and staff involved in writing and						
publishing his/her work						
Strongly disagree	17 (12.6)	45 (33.3)	+28			0.001
Disagree	56 (41.5)	54 (40.0)	-2		0.091	*
Agree	45 (33.3)	27 (20.0)	-18	0.45		
Strongly agree	15 (11.1)	8 (5.9)	-7			

Paired t-test was performed-value <0.05 was considered significant

Table-4: Comparison of norms towards Plagiarism scores, before and after intervention

Variables	Before intervention	After intervention	Difference + (increase after intervention) - (decrease after intervention)	Mean difference	SEM	*p*-value
Authors say they do NOT plagiarize, when in fact they do						
Strongly Agree	11 (8.1)	31 (23)	+20			
Agree	108 (80.0)	88 (65.2)	-20			
Disagree	14 (10.4))	14 (10.4)	00	0.15	0.055	0.007
Strongly Disagree	1 (0.7)	1 (0.7)	00			
Those who say they have never plagiarized are lying						
Strongly Agree	17 (12.6)	31 (23)	+14			
Agree	83 (61.5)	72 (53.3)	-11			
Disagree	28 (20.70)	25 (12.5)	-3	0.11	0.061	0.067
Strongly Disagree	5 (3.7)	6 (4.4)	+1			
Sometimes I'm tempted to plagiarize, because everyone else is doing it (students, researchers, physicians)						
Strongly Agree	4 (3.0)	11 (8.1)	+7			
Agree	62 (45.9)	39 (28.9)	-23			
Disagree	59 (43.7)	60 (44.4)	+1	0.17	0.066	0.008
Strongly Disagree	10 (7.4)	25 (18.5)	+15			
I keep plagiarizing because I haven't been caught yet						
Strongly Agree	2 (1.5)	7 (5.2)	+5			
Agree	15 (11.1)	14 (10.4)	-1		0.060	0.801
Disagree	84 (62.2)	70 (51.9)	-14	0.01		
Strongly Disagree	33 (24.4)	42 (31.1)	+9			
I work (study) in a plagiarism-free environment						
Strongly Agree	8 (5.9)	12 (8.9)	+4	0.13	0.077	0.007
Agree	44 (32.6)	36 (26.7)	-8			
Disagree	69 (51.1)	55 (40.7)	-14			
Strongly Disagree	11 (8.1)	30 (22.2)	+19			
Plagiarism is not a big deal						
Strongly Agree	2 (1.5)	3 (2.2)	+1		0.055	0.002
Agree	18 (13.3)	9 (6.7)	-9	0.17		
Disagree	65 (48.1)	55 (40.7)	-10			
Strongly Disagree	50 (37.0)	64 (47.4)	+14			
Sometimes I copy a sentence or two just to become inspired for further writing						
Strongly Agree	5 (3.7)	6 (4.4)	+1			
Agree	59 (43.7)	50 (37.0)	-9			
Disagree	60 (44.4)	54 (40.0)	-6	0.16	0.062	0.012
Strongly Disagree	11 (8.1)	24 (17.8)	+13			
I don't feel guilty for copying verbatim a sentence or two from my Previous papers						
Strongly Agree	6 (4.4)	9 (6.70	+3			
Agree	56 (41.5)	26 (19.3)	-20			
Disagree	55 (40.7)	69 (51.1)	+14	0.29	0.072	0.001
Strongly Disagree	17 (12.6)	31 (23.0)	-14			
Plagiarism is justified if I currently have more important obligations or tasks to do						
Strongly Agree	3 (2.2)	3 (2.2)	0			
Agree	18 (13.3)	17 (12.6)	-1			
Disagree	73 (54.1)	59 (43.7)	-14	0.11	0.063	0.06
Strongly Disagree	41 (30.4)	56 (41.50	+15			
Sometimes, it is necessary to plagiarize						
Strongly Agree	1 (.7)	5 (3.7)	+4			
Agree	37 (27.4)	25 (18.5)	-12			
Disagree	65 (48.1)	54 (40.0)	-11	0.24	0.071	0.001
Strongly Disagree	21 (9.3)	49 (36.3)	+23			
It is the duty of the institution or organization to give information about the plagiarism policy of HEC						
Strongly Agree	67 (49.6)	87 (24.4)	+20			
Agree	64 (47.4)	40 (29.6)	-24			
Disagree	1 (.5)	05 (3.7)	+3	0.10	0.060	0.081
Strongly Disagree	1 (0.7)	03 (2.2)	+2			
I am aware that plagiarism punishment ranging from suspension to termination						
Strongly Agree	33 (24.4)	81 (60)	+48			
Agree	61 (45.2)	47 (34.8)	-14			
Disagree	33 (24.4)	02 (1.5)	-31	0.60	0.087	0.001
Strongly Disagree	6 (4.4)	05 (3.7)	-1			

Paired t-test was performed. *p*-value<0.05 was considered significant

Table-5: Overall mean difference in positive attitude, negative attitude and Normstowards Plagiarism before and after intervention

Characteristics	Standard error ofMean	95% ConfidenceInterval	*p*-value
Positive Attitude	0.44	0.371-1.99	<0.001*
Negative attitude	0.266	0.123-1.39	0.001*
Norms	0.327	0.306-1.70	<0.001*

p-value <0.05 was considered significant

Table-6: Comparison of the categorical variables with Positive, Negative Attitudes and Norms before and after intervention by Logistic Regression analysis

Characteristics	Pre- intervention Good Positive attitude			Post intervention Good Positive attitude		
	t-statistics/ Odds Ratio	*p*-value	95% CI	t-statistics/ Odds Ratio	*p*-value	95% CI
Age	-1.128	0.262	-0.464-0.127	2.245	0.354	0.257-1.354
Teaching experience	2.78	0.006*	0.046-0.292	1.452	0.002*	1.452-1.875
Average time spent on the internet	11.766	0.001*	13.810-19.401	1.987	0.003*	2.475-4.235
Gender Female male	1.142	0.398	0.635-3.141	1.069	0.892	0.241-0.878
Program MBBS Others	2.299	0.006	0.676-1.038	0.800	0.057*	0.635-1.235
Characteristics	Pre-Intervention Negative Attitude			Post- intervention Negative Attitude		
	t statistics/ Odds Ratio	*p*-value	95% CI	t statistics/ Odds Ratio	*p*-value	95% CI
Age	1.560	0.122	0.18-0.954	6.420	0.675	0.178-0.115
Teaching experience	0.259	0.796	0.120-0.156	0.044	0.965	0.318-0.333
Average time spent on the internet	0.167	0.867	0.168-0.199	0.879	0.381	0.134-0.347
Gender Male Female	1.567	0.413	0.534-4.596	1.214	0.823	0.222-6.653
Program MBBS Others	6.997	0.985	0.745-1.334	0.978	0.922	0.625-1.530
Characteristics	Pre- Intervention Norms			Post – intervention Norms		
	t-statistics/ Odds Ratio	*p*value	95% CI	t-statistics/ Odds Ratio	*p*-value	95% CI
Age	1.037	0.302	0.53 -1.693	0.420	0.675	0.178-0.715
Teaching experience	0.379	0.706	0.497-0.291	0.965	0.044*	0.318-0333
Average time spent on the internet	0.298	0.766	0.152-0.206	0.879	0.381	0.134-0.347
Gender Male Female	0.921	0.869	0.349-2932	0.686	0.566	0.189-2.487
Program MBBS Others	0.979	0.871	0.758-1.264	0.715	0.012*	0.551-0.928

DISCUSSION

The result of our study showed a significant increase of knowledge regarding plagiarism after the intervention with *p* value of <0.001. The results of our study were similar to that done in UK, showing significant lack of knowledge that taking someone's ideas, work or words, documenting it or downloading material from the internet without proper referencing is plagiarism.[12]

A study found that medical faculty members were less accurate in answering questions related to negative attitudes toward plagiarism compared to questions about positive attitudes and norms. Similarly, in our study, faculty members who initially struggled with questions like whether plagiarizing is as bad as stealing an exam, whether authors who plagiarize should be exposed, and whether the plagiarism policy of HEC applies to all educators, researchers, students, and staff, showed significant improvement in their knowledge after an intervention. This improvement was statistically significant, with a *p*-value of 0.001. A study found that medical faculty members were less accurate in answering questions

related to negative attitudes toward plagiarism compared to questions about positive attitudes and norms. Similarly, in our study, faculty members who initially struggled with questions like whether plagiarizing is as bad as stealing an exam, whether authors who plagiarize should be exposed, and whether the plagiarism policy of HEC applies to all educators, researchers, students, and staff, showed significant improvement in their knowledge after an intervention. This improvement was statistically significant, with a *p*-value of 0.001.

In the same study, it was reported that medical faculty members answered less correctly to negative attitude towards plagiarism questions in comparison with other two that is positive attitude and Norms.[12] Comparatively, in our study even those who answered less correctly to questions *authors who plagiarize should be disclosed to the scientific community, Plagiarizing is as bad as stealing an exam* and *Plagiarism policy of HEC is applicable to all the Teachers, researchers, students and staff involved in writing and publishing his/her work* improved their knowledge after intervention showing significant *p* value of 0.001.

In one of the studies, Women compared to men reported a negative attitude towards plagiarism highlighting gender difference in the awareness of plagiarism[13] which is in contrast to our study in which there is no significant difference between men and women.

Even knowledge regarding self-plagiarism *Self plagiarism is not punishable because it is not harmful* and *Self-plagiarism should not be punishable in the same way as plagiarism* showed noteworthy *p* value 0.001 which is contrary to a study in which students generally do not see self-plagiarism as comparably serious to plagiarism of other sources. Another significant finding was that value of 0.008 when asked *Young researchers should receive milder punishment for plagiarism* in our research which was in contrast in finding of another research where faculty members were not convinced that young researchers should be given any leverage regarding plagiarism.[1] *Sometimes I'm tempted to plagiarize, because everyone else is doing it (students, researchers, physicians)* was remarkable finding among the academicians in in this study and it can only be controlled by continuous surveillance passing information to the to the academic world that it will not be accepted under any circumstances.[6] Another significant result was shown for *plagiarism-free environment* which was contrary to the result of another study in which only 23% of the students said that they yes to working in plagiarism free environment.[15] In contrast to our noteworthy conclusion that plagiarism is not a significant issue in

Pakistan, the Australian group in the comparison study disagreed with this assertion more than the Chinese group did.

In the same way, 20% of participants in the same study did not think twice about copying a sizable amount of the text, which was comparable to our study where people *did not feel bad about starting to write or copied a few phrases because they did not view it as a severe violation.*[16]

In contrast to our research, which shows a significant result of 0.01 for justifying plagiarism, research found that plagiarism is perceived as a matter of minor importance (63%), harmless (59%), occasionally necessary (35%), and occasionally justifiable (42%). The subscales reflecting subjective norms and positive attitudes received low ratings from students, whereas the subscale measuring negative attitudes received middle levels.

According to research published, plagiarism is perceived by as a matter of minor importance (63%), harmless (59%), at times necessary (35%), and occasionally justifiable (42%)[17] which in comparison to our research shows significant result of 0.01 for *justifying for plagiarism* and in fact *sometimes it becomes necessary to plagiarize.*

Participants gave low ratings on the subscales measuring positive attitudes and subjective norms, and intermediate scores on the subscale measuring negative attitudes. Previous study indicated that being unfamiliar with the principles of plagiarism and having to complete a research project quickly would be the two most significant influencing variables.[18] This is contrary to our finding in which positive attitude towards Plagiarism significantly improved, similarly for negative attitude there was significant improvement after the intervention and norms also improved after intervention.

We found that Senior faculty showed improved attitude towards Plagiarism. Similar results have been reported previously.[19] Another study also reported that senior faculty had better conception of Plagiarism and its consequence.[20] This is justified due to the fact the senior faculty has exposed to publication process and knows the HEC implications of Plagiarism.

It was also found in our study that those faculty members who spent plenty of hours on internet browsing had improved attitudes regarding Plagiarism. Our results are contrary to previous studies which reported that internet usage increase the tendency of Plagiarism and cheating among teaching faculty.[6,21] Our results could be due to the fact that this particular University has always condemn and taken serious action against Plagiarism according to HEC guidelines.

Limitations

There were few limitations of this study. Firstly, sample size was limited and secondly if this would be multicentric study so our results would be more generalizable.

Suggestions & recommendations

We should promote regular educational sessions on Plagiarism among researchers to overcome the increasing trend of Plagiarism at institutional level. This intervention can be applied and should be included in the PMDC curriculum to minimize the Plagiarism in Scientific writing.

CONCLUSION

This study concluded that our educational intervention was found to be effective in improving the overall attitudes and norms towards plagiarism. Senior Faculty and those who were using internet frequently showed significant improvement in their attitudes and norms towards Plagiarism. Universities and authorities should contempt the act of Plagiarism in any way.

Conflict of interest

There is no conflict of interest.

AUTHORS' CONTRIBUTION

ZS: Conceptualization of study design, literature search, data collection, write-up. FN: Data analysis, data interpretation. SSA: Proof reading. UF. Data collection.

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