Plagiarism: Concepts, Factors and Solutions
Bahadori M.1 PhD, Izadi M1 MD, Hoseinpourfard M1* PhD

1Health Management Research Center, Baqiyatallah University of Medical Science, Tehran, Iran

Abstract
The goal of knowledge production is the discovery of facts and improving the human situation, and as such, plagiarism and using other unethical means are not compatible with this goal. Most academic scholars agree that plagiarism is a serious violation of publishing ethics. In recent decades, the scientific community has become really concerned about the fast growth of plagiarism. Although plagiarism is widespread, it isn’t consistent with the principles of science. Nowadays some media publish worrying news of plagiarism in scientific publications, including data manipulation by well-known scientists. The prevalence rate of plagiarism has been reported in different studies turns out to be different in various fields, countries, educational levels and times. The goal of this study is to review the scientific concepts related to plagiarism, its factors and roots, its prevalence in the world and methods of detecting it in order to improve the awareness of instructors and students of plagiarism.

Keywords: Plagiarism, Solutions, Concepts, Causes

Introduction
The goal of research is to produce knowledge, and the aim of producing knowledge is to improve human situation while doing research using unethical or inappropriate means leads to scientific corruption, which is against scientific knowledge production [1]. No doubt, there is plagiarism in the scientific community although it is against basic scientific principles. Plagiarism is useless, meaningless, unethical and thus forbidden [2]. One of the pathological components in the relationships between people is the legal culture in society [3]. Unethical issues are quickly increasing in the realm of science. In the future, such issues in gathering data, cooperation between scientists and in publications will most probably get more complicated and more difficult to deal with. More than ever before, postgraduate medical students should know about methods, technologies and concepts of science. The global competition among the scientists of developing countries, especially Asian ones, is a new reality for the western researchers who want to be the best in all areas of research. Researchers in developing countries are increasingly enjoying more research budgets, and this development has been accompanied by governmental and institutional demand for better results and more publications in scientifically accredited journals [4]. Plagiarism is a controversial issue in higher education, and it is increasingly widespread among students. Some challenges in academic activities are due to the increase in the number of students [5]. Today, open access publications are not only reasonable but also very vital to scientific innovations. Unlimited access to scientific ideas, methods, findings and results is not compatible with the restricting regulations of copyright, and this has made for more plagiarism [6].

“If plagiarism turns into an ordinary and usual activity, it will affect the security of scientific knowledge and destroy all social realms. In such a situation, nobody will bother doing research; rather, everybody will make use of ready-made knowledge produced by the past researchers and will destroy all knowledge. Such unreasonable behavior will devastate the foundations of scientific progress and everything else. And if a country loses its firm scientific foundations, it will remain in past achievements and will not experience progress” [7]. Plagiarism is one of the important issues of universities in recent years. In the last two decades, the
progress in computer technology, that is, running websites to provide university services, the copy-paste tool, and loads of pre-fabricated papers, has made for an increase in plagiarism [8]. Nowadays some media publish worrying news of plagiarism in scientific publications, including data manipulation by well-known scientists. The ethics of scientific publication is in direct connection to the concepts of copyright in writing scientific papers and of plagiarism. Sometimes, journal editors take the writers’ cunningness for their lack of familiarity with journal regulations or their lack of attention to a certain paper. As Kosovsky notes, “the road to hell is paved with good intentions” and after that, the writers make very serious ethical mistakes to the end [9].

The author of a book, paper, poem or a scientific passage, after hours of thinking and writing about a subject, puts to paper the fruit of years of his or her continuous efforts. As such, the plagiarist not only steals the fruit of such efforts but also registers all that painstaking work to his or her own name [7].

Plagiarism is hundreds of years old, but, due to the progress in information technology, it has acquired new and different methods compared to the past. Plagiarism was almost a rare phenomenon until 1990, but it has spread across the world in recent years and has worried the academic community [10]. In the past, there were a few scientists who produced knowledge and some of them would produce no more than a couple of papers in their lifetime. In those times, strict reviewing principles were at work, there just a few journals and scientists had a hard time convincing the scientific community to accept their ideas. In the 19th century, the problem was stealing ideas, and that was why many discoveries and inventions were disputed. Today, however, the number of scientists, students, journals and papers has really increased. While there is no problem with the increase in the number of papers, peer-reviewing of the papers is the main problem. It is certainly expected of a reviewer to have a good command of the subject of a paper. But, given the large number of papers to be reviewed, are there enough specialists to review the papers? No scientist can claim that he or she has studied all specialist papers in his or her area of knowledge, and this paves the way for some plagiarists to take advantage of the situation [11].

Ben Jonson was the first one to sue the term plagiarism in the early 17th century. It was hard for authors to protect their writings before devising copyright laws. But as plagiarism increased in the 18th century and copyright laws were consequently clearly defined and devised by the middle of the century, plagiarists faced a change in the public opinion and strong ethical viewpoints towards plagiarism [12].

In view of the prevalence of plagiarism in the scientific community and its devastating effects on scientific progress, this study aims at surveying the concepts, causes and solutions to the issue of plagiarism.

**Terminology, Definitions and Idioms**

According to the Persian dictionary of Dehkhoda, the word “steal” means “taking away somebody’s possession with deception and tricks” or “to take hold of something without the right to do so” [13]. Wilson Mizner states that “when we steal an idea from one author, it will be called plagiarism, but when we do it from a few authors, it is called research” [14]. The word plagiarism comes from the word “plagarius”, meaning kidnapper, robber, misleader, and literary thief” [15]. Plagiarism usually refers to stealing ideas or words that are higher than the level of public knowledge [16].

In Webster’s Dictionary, a plagiarist is defined as “One who plagiarizes, or purloins the words, writings, or ideas of another, and passes them off as his own; a literary thief” [17], and plagiarism as “taking someone’s words or ideas as if they were your own”[18]. The University of Liverpool defines plagiarism as the “use of materials from unacknowledged sources or direct quotation of materials from documented references without acknowledging that the words have been taken verbatim from those references” [19]. Payer sees plagiarism as “taking others’ ideas, words or wok as if they were your own” [20]. Or as Stebel man puts it, plagiarism consists of “claiming as your own the writings and research papers that originally belong to others [21]. Vessal and Habibzadeh take plagiarism to be “ascribing others’ ideas, processes, results and words to oneself without due acknowledgement” [22]. Using sentences from published medical literature with little change in the words without acknowledging the source is also an in-
Plagiarism: Concepts, Factors and Solutions

Plagiarism is an unethical activity in scientific writing. For something to be called plagiarism, it needs to be a serious deviation from normally accepted behavior of the relevant scientific community which is done consciously and deliberately and must be proved with solid evidence. Plagiarism may occur in different forms: stealing ideas and stealing parts of texts. Self-plagiarism happens when an author uses his or her own previously published work without acknowledging it [25]. Self-plagiarism is defined in three ways in the relevant literature: 1) publishing a paper which basically overlaps another paper without due acknowledgement; 2) breaking a large paper into a few smaller papers and publishing them separately, called salami slicing and 3) republishing the same work. Copyright, on the other hand, means enhancing knowledge and useful arts by providing limited-time security for authors and inventions through exclusive rights regarding their writings and inventions. Authors of technical papers are usually asked to transfer the copyright of their work to the journal or the publisher [26]. Scientific integrity depends on honesty and transparency of the methods of producing and transferring knowledge [26]. Republishing results is announcing the same results in two or more papers, multiple recalculations of the same results in meta-analyses and as a result in serious errors in research [27].

Duplicate or redundant publication occurs when there is an overlap, without acknowledging it, between two papers in terms of their hypotheses, data, arguments or results. This could include an overlap with other authors, their results or their samples. The most important cases involve lack of acknowledging the sources. The following are example cases of republishing: publishing data which has been published before, reusing tables and figures in later publications, publishing larger papers using previous smaller papers, publishing the same data in two papers (on with a clinical focus and one with a theoretical focus), and publishing the same paper under two names, one being the real author in his or her own country and the other being a foreign author.

Republishing, which is done in a deceptive way, is certainly unacceptable. If editors, reviewers and end readers of data notice the overlap between papers, they can make the right decision about it. Duplicate publication is, nevertheless, deceptive and involves three problems: it is unethical, it wastes resources and it has adverse impacts upon future clinical and research decisions. Editors and readers of a published report want to make sure that they are dealing with new and important data, and may wrongly be persuaded to think so, while this is not the case. Duplicate or redundant publication misleads the readers and reduces the credibility of the journal as well as its ability to attract good papers. Duplicate publication makes for wasting resources by wasting the time which should be allocated to other papers [28].

“Most academic researchers agree that plagiarism is a serious problem in the ethics of publication. Plagiarism appears in different forms: stealing ideas and stealing texts (verbatim plagiarism). Plagiarism is no doubt an instance of misconduct. Stealing part of text and rephrasing it is a severe problem in the humanities and literature where innovation in phrasing and eloquence are essential. But in the realm of science, it is the scientific content itself, not its eloquence, that matters” [29].

The purpose of scientific journals is to some extent different from that of non-scientific ones. For instance, medical journals are published in order to improve the science of medicine and public health by publishing the results of scientific research. In many areas such as literature and humanities, however, different authors have different views. They try to reflect their own understanding and feelings of texts by means of a selection of good and suitable words. Thus, each and every word, along with its immediate context, has a role in conveying the meaning to the reader. But in a scientific writing, the writer’s audience consists of scholars who are looking for facts based on solid evidence. Therefore, the writer is supposed to observe and report correctly. Unlike literary researchers, a scientific paper author should follow a certain and well-es-
hristiani M. et al

established scientific method and make sure that he or she will not be become biased in his or judgments since this can endanger the truth or reliability of the judgments. Thus, whether or not he or she is eloquent, as far as an author is a just observer who works based on accepted scientific methods, evidence and facts, he or she can publish his or her findings and could be said to have followed a universally accepted method [29].

Plagiarism, in general, includes attributing somebody else’s work to yourself without giving credit to the author, copying other’s ideas or words without giving credit to the source, not putting quotations in quotation marks, giving the wrong information about a reference, changing the words while keeping the structure of a sentence from another source without acknowledging it, and copying a large number of words or ideas from other sources with or without due acknowledgement [30].

Another definition of plagiarism numerates the ways of plagiarizing in the following way: “‘copy-past’ which means verbatim copying of words, plagiarizing ideas, which consists of using a concept or idea which is not commonly known to others, rephrasing, which means changing the grammatical structure, using synonyms, reordering the original sentences, or rewriting the same content in different words, artistic plagiarism, which denotes presenting others’ works using a different medium such as text, voice, or image, plagiarizing codes, that is, using other programs’ codes, algorithms and functions without the right permission or referencing, using expired or neglected links, adding quotation marks or other referencing signs without providing the right referencing information or updating links to sources, inappropriate use of quotation marks, failure to recognize the quoted parts of a text, incorrect referencing, i.e., adding incorrect referencing information or references which do not exist and plagiarism in translation, which consists of translating a text without giving reference to the original text” [30].

The following are some instance of student plagiarism: stealing material from a source and passing it for as their own, for instance, by buying a preordered paper, copying an entire paper without acknowledging it, presenting another student’s work without their knowledge, presenting somebody else’s paper and passing it as your own, copying materials of one or more texts and providing the right citations without using quotation marks to make the readers believe that they have paraphrased the materials not quoted them, and rephrasing sentences from other sources without giving credit to them [31].

Recognizing plagiarism faces a number of problems. One problem is recognizing the amount of plagiarism because it can cover a wide scope. The second problem is the question as to how much change in the original material can make for plagiarism [31]. Roig argues that many students struggle between rewording and summarizing because they cannot distinguish between them. The third issue is that most authors believe that there is no need to reference common knowledge, but we may ask what common knowledge is and who defines it? [32]

Plagiarism can be divided into two types with regard to intentions. The first type is intentional plagiarism where the author is fully aware of the plagiarism and is willing to do it. The second type of is unintentional plagiarism where a person plagiarizes due to his or her unawareness and lack of skill in writing. The latter type could be prevented [33].

In another classification, plagiarism is divided into four categories: 1) “casual plagiarism, which occurs because of lack of awareness of plagiarism, or insufficient understanding of referencing or citation;” 2) unintentional plagiarism, where, due to the wide amount of knowledge in the scientific area, a person may unknowingly present ideas similar to those of others;” 3) intentional plagiarism, where a person deliberately and knowingly copies part or all of somebody else’s work without giving credit to them; and 4) self-plagiarism, which consists of reusing one’s own published work in a different form with acknowledging it” [30].

The Prevalence of Plagiarism

Researches show that plagiarism is an increasingly widespread practice in educational and research institutes. The rate of plagiarism is different in various areas of research. As reported, the rates of prevalence of plagiarism are 78% in the students of Organizational Studies and 63% in the students of humanities. Also, there is a meaningful difference between the behavior of American students and that of Hungary in terms of plagiarism [31].
Similarly, studies carried out by Park in the United States, South Africa and Finland reveal that the rates of plagiarism are different for different areas of study [31]. According to some research, the number of plagiarizing students in an institute increased from 11% in 1963 to 49% in 1993. These results include all forms of plagiarism, including copying material from encyclopedias, journals, papers and the like [34]. Jude Carroll argues that unacknowledged copying of materials from books and journals are more common than from web sites [35].

According to some research, 12% of the papers suspected of plagiarism belong to the students of Politics. According to another researcher, in an American university, 16.5% students report to have plagiarized, and 50% of the students believed that their classmates often copy-pasted material from the Internet without acknowledging it [36]. Satterthwaite argues that the rate of plagiarism in America is 30% [37]. One study shows that 94% of students had misconducted in their research for at least once, and another study shows this rate to be 91% [38]. Dordoy, who has studied plagiarism in the students of an English university, claims that the rate of copying a paragraph from a book or a web site was 73.9% [39].

A study focusing on plagiarism reveals that 48% of the students were not aware of the methods and requirements of referencing [40]. The results of some research on academic misconduct tell us that 76% of students had responded positively to cheating in high school or college [40]. Carroll holds that because most students do not know what makes for plagiarism, they do not commit it with the intention of deceiving others [41]. A study in 2009 indicates that 212 papers showed some potential signs of plagiarism. In these papers, the similarity between the original paper and the republished one was 86.2% while the average of shared sources was 73.1%. Of the 212 papers, only 47 (22%) cited the original paper. Also, there were miscalculations, contradictory data and manipulation of figures in 47% of the papers [42].

Bloemenkamp et al. report that 20% of the papers published in Holland’s Journal of General Medicine had already been published elsewhere. Similarly, Schein and Paladugu reported that one sixth of the papers appearing in three journals of operation showed some signs of duplicate publication. According to Tramer et al, 17% of the reports and 28% of patient data were duplicated and the inclusion of redundant data in a meta-analysis led to a 23% overestimation of the treatment effectiveness of an antiemetic agent. Redundant publication can undermine the results of studies which are based on reliable evidence. It can exaggerate the significance of the results and mislead the reader [28].

According to a meta-analysis by Fanelli, medical scholars report more cases of scientific misconduct than those of fields of study [23]. The University of Sao Paolo has appeared in the media on the suspicion of plagiarism in scientific publication and research. Journals are concerned about fabrication or making up of data in published papers or duplication production of data or text by other authors without proper citation or referencing or even duplication of the published research or texts in other papers [43].

**Factors of Plagiarism**

According to Ashworth, the concept of plagiarism is not clear enough so much so that some students are afraid of unwitting plagiarism while putting to paper what they take to be their own ideas [44]. Researches show that students and teachers have different understandings of plagiarism. For some teachers, some definitions are influenced by higher education values such as the copyright, personal effort and unity in the university [45]. The multiplication of databases, with all its benefits, has also caused a rapid growth in plagiarism. Some factors affecting student attitudes toward plagiarism are ignorance, lack of personal investment in their education, situational ethics, and lack of consistent styles among and within various disciplines [46].

According to Dordoy, the most important factors influencing plagiarism include promotion, laziness or mismanagement of time, easy access to materials on the Internet, unawareness of rules and regulations and unwitting plagiarizing [39].

Some other factors causing plagiarism are low commitment to the learning process and focusing on getting an academic degree, the student life style, family pressures, etc. make students try to achieve the best results with the least efforts and in the least time [47]. In the past, students had to go to libraries, retrieve information and retype it while today and with the rapid progress of the Internet,
this process has changed and most teachers believe that computers have made it easier to cheat and plagiarize [48]. Angellil-Carter claims that there is no transparency about factors influencing plagiarism all over a university [49]. Dickert claims that not only are Hong Kong university students not familiar with plagiarism but also it is very hard to detect plagiarism in this university [50]. Information is easily accessible through electronic media and word processing applications can easily copy-paste material [51].

In some countries, there is a lot of pressure on researchers to publish so that if they do not publish in journals with high impact factors or other internationally indexed journals, they will not get promoted even if they have high instructional skills. This situation represents the familiar saying “Publish or perish.” Therefore, some scholars may make ethical mistakes under the pressure to make progress and to hurry up with publishing [9].

Cultural issues are specially considered in the problem of plagiarism. Cheating and plagiarism is an acceptable practice among the teachers and students of countries where there is little awareness of copyright [52]. A study reveals that students with a stronger belief in detecting plagiarism commit this less than others and turn out to have better writing skills, self-confidence and creativity [53]. Robert Harris takes students’ looking for short cuts, their low interest in the research subject, their low planning skills, mismanagement of time, lack of skills in scientific writing and their interest in ignoring regulations as some of the reasons why students take to plagiarism [54].

Another study shows that the following are among the most important reasons why students plagiarize:

1. Genuine lack of understanding. Some students plagiarize unintentionally, when they are not familiar with proper ways of quoting, paraphrasing, citing and referencing and/or when they are unclear about the meaning of ‘common knowledge’ and the expression ‘in their own words’.

2. Efficiency gain. Students plagiarize to get a better grade and to save time. Some cheat because of what Straw (2002) calls ‘the GPA thing, so that cheating becomes ‘the price of an A’ (Whiteman & Gordon, 2001). Auer & Krupar (2001) identify a strong consumer mentality amongst students, who seem to believe that ‘they should get grades based on effort rather than on achievement’.

3. Time management. There are many calls on student’s time, including peer pressure for an active social life, commitment to college sports and performance activities, family responsibilities and pressure to complete multiple work assignments in short amounts of time. Little wonder that Silverman (2002) concludes that ‘students’ overtaxed lives leave them so vulnerable to the temptations of cheating’.

4. Personal values/attitudes. Some students see no reason why they should not plagiarize or do it because of social pressure, because it makes them feel good or because they regard short cuts as clever and acceptable.

5. Defiance. To some students plagiarism is a tangible way of showing dissent and expressing a lack of respect for authority. They may also regard the task set as neither important nor challenging.

6. Students’ attitudes towards teachers and class. Some students cheat because they have negative student attitudes towards assignments and tasks that teachers think have meaning but they don’t (Howard, 2002). Burnett (2002) emphasizes the importance of a relationship of trust between student and teacher, because ‘the classes in which [students] are more likely to cheat … are those where students believe their professor doesn’t bother to read their papers or closely review their work’.

7. Denial or neutralization. Some students deny to themselves that they are cheating or find ways of legitimizing it by passing the blame on to others.

8. Temptation and opportunity. It is both easier and more tempting for students to plagiarize as information becomes more accessible on the Internet and web search tools make it easier and quicker to find and copy.

9. Lack of deterrence. To some students the benefits of plagiarizing outweigh the risks, particularly if they think there is little or no chance of getting caught and there is little or no punishment if they are caught [31].

Some of the perceived obstacles to changing the management of plagiarism are:

- A reluctance by staff to process a case of suspected plagiarism due to the time and workload involved in proving the plagiarism;
- A reluctance by staff to process a case of suspect plagiarism due to the time and workload involved in proving;
to become the one who dares to differ where it has been somewhat common practice to “turn a blind eye” to some relatively minor cases of plagiarism; a perception that the University is reluctant to act on suspected plagiarism and that therefore the effort expended by individual staff is likely to be fruitless in terms of dissuading or punishing plagiarism; a fear of risking collegial relationships with students by seeming or becoming authoritarian through a focus on minimizing plagiarism; a concern that following through with cases of repeated plagiarism that may lead to student expulsion might damage the international reputation of the faculty or university; and a further concern that such damage to reputation may result in reduced international enrolments; fear of harassment from the student(s) accused of plagiarism and/or from their friends (such harassment occurred previously in the faculty); fear of student complaints if accusations of plagiarism are made (this had been an issue for some sessional staff who were concerned that a student complaint might mean the end of their employment) [55].

**Detecting Plagiarism**

Detecting plagiarism is hard and this makes plagiarism a threat to the health of scientific literature. Often plagiarism is recognized by learned reviewers who possess up-to-date knowledge in their own specialist filed [23].

The following include some of the methods that can be used by researchers to detect plagiarism. 1) General sight overview: the academic staff should assess the sentence structure, grammar and idioms used in the students’ assignments. They should examine the work which is lower or higher than the student’s abilities can afford; 2) Search of online bookstores: these stores help the academic staff to decide whether the students mentioned the right dates for publications or whether the sources used were appropriate to the subject in hand; 3) Search of keywords: searching keywords in search engines is another tool in the hands of academics to find instances if plagiarism, although today’s searching technology makes it possible for us to search a whole text, too; 4) a use of plagiarism services: there are many software applications and tools and web sites that can help us detect plagiarized texts [56]. Most of these tools use correlation techniques to detect similarities between documents. Only some of these applications are free and they are all good for English texts. There are methods, however, that can be used in any language. The Glatt plagiarism service, for example, is a computer application which does not depend on correlation techniques. It deletes every fifth word in a paper suspected of plagiarism and the author of the paper is then asked to fill in the missing words. If the student can’t fill in 77% of the missing words, the work is most probably plagiarized [17]. Wcopyfind is a free application on the Internet which can be used to detect plagiarism. This software examines a group of document files to compare their content [57].

There are other tools such as http://ithenticate.com, http://www.crossref.org) and http://turnitin.com to discover plagiarism, but these tools can examine the papers indexed in MEDLINE only [42]. This area of study has been attended to by Turnitin and Safe Assign in the last 10 years. Kohler and Weber-wulf carried out a study in 2010 on 47 systems of direct plagiarism detection and concluded that only 5 of them were to some extent useful [58].

There are three approaches to detecting plagiarism. The most common approach is by comparing the document against a number of other documents on a word by word basis. The second approach is by taking a characteristic paragraph and just doing a search with a good search engine like Google. And the third is by style analysis, which is usually called stylometry [30]. Computer applications report cannot be simply relied here and there will be need for specialist interpretation in such cases [30]. Detecting plagiarism is sometimes very difficult, especially when rephrasing has occurred, when non-electronic sources have been used and when there is shift of language between the original document and the plagiarized one [30]. Although comparing abstracts is a good way to detect plagiarism, a comparison of the full texts will render better results [23].

Systems of retrieving data or plagiarism detecting applications are capable of finding plagiarism where a verbatim copy of words has happened, but what happens when the order of words has been changed but not the overall meaning of the sentences? Naturally, in such cases, the software will not be able to detect plagiarism and the plagiarizer will be able to deceive it. Therefore, these systems
may become useless in the short run [11].

**Strategies to Tackle Plagiarism**

As Delvin points out universities do not like to endanger their reputations for the sake of plagiarizers [59]. One of the measures needed to assure the quality of universities is to make sure that their assessing policies and activities are useful enough that their assessment is effectively examined in terms of its validity, reliability and fairness. Some of the plagiarism preventing measures recommended by quality assuring organizations include providing a definition of academic misconduct with regard to plagiarism, cheating, identity fraud and using inappropriate content” [60]. In order to effectively and fairly fight against plagiarism, students and staff need to have the same definition of it [61]. A preventing approach on the part of the staff can eradicate this sort of misconduct and make for academic progress and consistency in freshmen. Along with practical approaches based on skills, interactive prevention can not only improve the students’ skill in referencing and citing and avoiding plagiarism but also increase their awareness of and sensitivity to this matter [62].

University authorities are responsible for preventing plagiarism in all departments of their universities. The universities’ policies in this regard should be clearly defined and announced and disseminated among students and staff, preferably published on the universities’ web sites, in libraries, student deputy offices, research centers and dormitories. Academic staff should always talk to students about academic values and avoiding plagiarism. Students, on the other hand, should try to improve their skills in writing papers, research methodology, and organizing data. University teachers should encourage academic honesty in students, clearly define plagiarism for them, and point out to them that they should reference the accessed materials. University policies can also help staff to decide how to deal with plagiarism [17].

Burke points out that universities should focus on teaching student as to how they should avoid plagiarism [63]. The results show that teaching students, especially in the first year, is more effective than other ways of preventing plagiarism. Landau argues that taking an active approach to plagiarism is very important because students who are not fully aware of such misconduct may suppose that they know well about it and not try to learn more. Similarly, the staff may also wrongly think that students are well aware, and thus lose the opportunity to teach students to avoid plagiarism [40]. Although the preventing approach takes more time, it is more effective than other approaches [64]. Exercises and activities encouraged by staff have led to good results. These activities include methods of appropriate citation, quotation, paraphrasing, phrasing and presenting some instances of plagiarism [40].

The attempt by some Australian universities to hide their management of plagiarism has made it difficult to share the best practices in this field. Although it seems that common policies are in practice with respect to plagiarism, there is nothing to indicate the success of these policies. Delvin reports that for some, “catch and persecute” leads to a decrease in plagiarism [59] while there is little evidence to suggest the effectiveness of such a measure [52]. Gallant similarly argues that traditional methods of preventing plagiarism, such as persecution as a preventing measure, honor code systems and instructor detection are not effective today [8]. In the UK, in order to minimize plagiarism, they makes use of special courses, assessment, giving awareness to students, teaching student the necessary skills, detecting plagiarism, persecution and special policies, and instructional programs [65].

Conway and Groshek have shown that student ethics is flexible and can be shaped at any level of education. Students showed in this research that they are concerned about ethical violations and expect that severe punishment will be considered for those students who plagiarize or fabricate materials.” Repeating anti-plagiarism actions at any stage of education can empower students [66]. MIT has defined good methods and policies to manage academic misconduct. In this university, teachers are rewarded for teaching the right academic behavior to students [67]. The Online Writing and Communication Center of this university runs a program for improving students’ writing skills and explains different aspects of plagiarism [68]. In some universities, such as Berkeley, people are academically sanctioned for plagiarism [69]. In Stanford University, students learn about the university policies to deal with academic misconduct, copyright and
fair use of materials. Although there is always need for good inspections, the responsibility to keep research integrity lies with the scientific community itself and academic staff should make sure that students learn about this integrity. Authors should guarantee that their reported work is new and correct. Scholars who agree to review papers should feel responsible for doing informed, thorough and conscientious reviewing. Journal editor, who are themselves distinguished scholars, should assure the originality of the material they publish [42]. The ideas and thoughts of different thinkers and authors are inevitable connected. So, it is a great responsibility of authors to make sure that no plagiarism occurs when they publish their results. This means that the authors must do whatever they can to ensure that the words of their papers are theirs. They should be always sure that it is clear for their readers whether the ideas presented in the papers are theirs or others’ and this could be clear by citing earlier published sources [24].

The process of peer-reviewing is the best mechanism to ensure the high quality of publications. But recent studies have shown that lack of appropriate standards can result in duplicate publication as well as publication of papers which include plagiarism [42]. At present, plagiarism tackling approaches focus on instructions to students and making them aware of the related policies and possible outcomes. For instance, students are taught to utilize to access and use sources in the right way. Also, developing scientific integrity and honor code systems are among good approaches to plagiarism [70]. Carroll argues that teachers should focus on prevention [71]. McCabe similarly thinks that reducing the chances of plagiarism is an important tool in reducing scientific misconduct [72]. Authors should bear in mind that it is not acceptable to republish a paper which has already been published, but this rule has the following exceptions, if the right disclosure is made to the editors and reader:

Prior publication in abstract form only (generally <400 words);
A study is too large and/or complex to be reported in one article. A proposed rule of thumb is an expansion of the original article by 50%. However, each article should address a different distinct and important question;
Competing submissions of coworkers who disagree on analysis and interpretation of the same study;
Articles from different groups of authors who have analyzed the same data. This is often the case with very large administrative data sets or large national surveys sponsored by government agencies;
Republication of an article in another language with cross-referencing. There are mixed thoughts on the acceptability of this practice. Typically the two (or more) journals need to work together and often permission to publish is needed. The International Council of Medical Journal Editors has published criteria for this practice. While publication of data in an uncommon language need not necessarily prevent it being presented in English, secondary publication should follow the International Council of Medical Journal Editors guideline in the uniform requirements [9].

**Strategies to Avoid Plagiarism**

1. Read the instructions for authors provided by the journal.
2. Always acknowledge the contributions of others and the source of ideas and words, regardless of whether paraphrased or summarized.
3. Use of verbatim text/material must be enclosed in quotation marks.
4. Acknowledge sources used in the writing.
5. When paraphrasing, understand the material completely and use your own words.
6. When in doubt about whether or not the concept or fact is common knowledge, reference it.
7. Make sure to reference and cite references accurately.
8. If the results of a single complex study are best presented as a cohesive whole, they should not be sliced into multiple separate articles.
9. When submitting a manuscript for publication containing research questions/hypotheses, methods, data, discussion points, or conclusions that have already been published or disseminated in a significant manner (such as previously published as an article in a separate journal or a report posted on the Internet), alert the editors and readers. Editors should be informed in the cover letter, and readers should be alerted by highlighting and citing the earlier published work.
10. When submitting a manuscript for potential
publication, if there are any doubts or uncertainty about duplication or redundancy of manuscripts originating from the same study, the authors should alert the editors of the nature of the overlap and enclose the other manuscripts (published, in press/submitted, unpublished) that might be part of them an unsupervised under consideration. Augmenting old data that was previously published with new additional data and presenting it as a new study can be an ethical breach and should be fully disclosed to the editors.

11. Write effective cover letters to the editor, especially regarding the potential for overlap in publication. The cover letter should detail the nature of the overlap and previous dissemination and ask for advice on the handling of the matter.

12. Become familiar with the basic elements of copyright law [28].

**Conclusion**

Ethical problems in science are quickly increasing and have become controversial issues in universities and educational research institutes. These problems have also been reflected in media news recently. The growth of information technology, competition between countries, rapid growth of knowledge, fast multiplication of scientific journals, lack of good explication of plagiarism and different understandings of it, lack of awareness, mismanagement of time, and low culture etc. have all contributed to the prevalence of plagiarism in the scientific community. This has worried scientific institutes and has made them react to it. Some institutes focus on detecting and persecuting while others concentrate on preventions and teaching the right behavior. Excessive stress on detection of plagiarism has made for the development of data retrieving systems in recent years, but these are not effective enough, and even if they were, they would not be the best solutions. Effective prevention through proper education at the right time, proper interaction between teachers and students and devising appropriate policies for this purpose are possible means of tackling plagiarism.

**References**

ic dishonesty. Internet and Higher Education. 1999;2:21-34.
36. Kellogg AP. Students plagiarize online less than many think, a new study finds. Chronicle of Higher Education. 2002;48(23):44.
47. Macdonald R. Why don’t we turn the tide of plagiarism to the learners’ advantage.Times Higher Educational Supplement. 2000;24.