Original Article

Evaluation of the Effectiveness of Academic Writing Workshop in Medical Students Using the Kirkpatrick Model

Reza Ghasemi[1], Maryam Akbarilakeh[2], Azam Fattahi[3], Ensieh Lotfali*[4]

[1] Student Research Committee, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[2] Department of Medical Education, School of Management and Medical Education, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[3] Center for Research and Training in Skin Diseases and Leprosy, Tehran University of Medical Sciences, Tehran, Iran
[4] Department of Medical Parasitology and Mycology, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Abstract

Background: Research is an important part of the clinical practice. In recent years, several workshops are held to teach research skills to medical students. Evaluating workshops determine that workshop content can lead to higher performance in individuals. The present study aimed to evaluate effectiveness of writing scientific papers workshop for medical students using Kirkpatrick's model.

Materials and Methods: This was a quasi-experimental study using pretest-posttest design and face to face communication to assess the learning effect of the training intervention. Immediately after workshop, the participants filled out a satisfaction questionnaire for evaluation of level one. To assess level two, pretest and posttest questionnaire was used. To assess level three and four, number of students who started their first research project and who published their first research articles were considered for a 6 months' period after workshop.

Results: Based on our results, contributors' gender and semester had no efficacy on knowledge improvement of the participants. Results of four levels of Kirkpatrick's model showed all participants were satisfied from workshop and participation in this workshop has had a positive effect on participants' knowledge about writing articles. Obviously, the workshop affect on transfer of knowledge to contributors and it leads to maintenance of change over time.

Conclusion: Impressively the authors found strong evidence to validate that the training effect on students' understanding of the research process, positively. Such courses enable medical students to investigate properly and improve their knowledge in their field. Therefore, universities must encourage medical students to participate in these workshops.

Keywords: Continuing medical education, Kirkpatrick's model, Research, Scientific writing, Training evaluation

*Corresponding Author: Dr. Ensieh lotfali, Department of Medical Parasitology and Mycology, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: ensiehlotfali@sbmu.ac.ir. ORCID ID: 0000-0001-6709-1320

Introduction

Research has a significant role in the clinical practice. Medicine is an active field and its content is changing frequently. Medical practitioners and medical students must investigate these changes. The best way to observe these changes and find novel responses is research. Research is the base for improvements in the clinical

field, and skillful physicians need to understand its principles[1]. Publishing papers in English-language is important for researchers, their organizations, and the academic community. For many researchers, writing scientific papers is an important challenge. In recent years, several workshops are held to teach research skills and writing scientific papers to medical students. Assessment is one of the essential components of the educational programs. Evaluating workshops can answer whether workshop content has led to higher performance in individuals, which can be concluded by gathering information in a questionnaire, and analyzing it. According to this issue, evaluation of these programs can improve the development and effectiveness of workshops. Several evaluation models have been proposed for evaluation of academic processes. The most common method to evaluate the effectiveness of education may be krikpatrick's model[2,3]. This evaluation model delineates four levels of training outcomes: reaction, learning, behavior changes, and results[4]. It looks at the outcomes from the improved performance of the participants[2]. In this study, Kirkpatrick's model was applied to evaluate effectiveness of writing scientific workshop for medical students.

Methods

Study design
This survey was a semi experimental study to assess effectiveness of writing scientific papers workshop by using pretest-posttest design (level two) and face to face communication (level three and four). In this study, four levels of Kirkpatrick's model were applied. Level one includes assessment of training participants' reaction to the training course[4,5]. Immediately after workshop, the participants filled out a satisfaction questionnaire. The questionnaire asked about feedback on content, instructional design and outcome. To assess level two, pretest and posttest questionnaire was used. The questionnaire consisted of 29 items and regarding different aspects of writing papers. These questions were divided into three groups:
- Research methodology;
- Database and Internet knowledge;
- Paper submission process.

Before workshop, all of the participants completed the pretest. At the end of the workshop, participants filled out posttest according to the information they gained during the course. The effect of training program on learning was determined by the difference between scores of pre and posttests.

The third level of Kirkpatrick's model comprises behavioral changes of contributors[6]. To assess this level, number of students who started their first research project were considered for a 6 months' period after workshop. In level four, to show how participants use the learning in writing papers, number of students who published their first research articles were counted for a 6 months' period after workshop. After workshop, the research committee surveys the participants' research activities via e-mail, or by face-to-face communication. After holding workshop, some of incomplete questionnaires were given back to the participants to complete them, properly.

Presentation of papulation
The ethics committee of Shahid Beheshti University of Medical Sciences (SBMU) approved this cross-sectional study. The study was conducted in April 2019 at the Faculty of Medicine of SBMU. A total of 150 medical students participated in this writing papers workshop. Attending the workshop was voluntary naturally. Studying medicine at SBMU and consent were Characteristic for contribution to the study. At the end of the workshop, 150 of the participants completed questionnaire.

Presentation of workshop
The workshop of writing scientific papers was held for medical students in two five-hour sessions. At the beginning of the workshop, the learning issues were described. The presenter made sure that the participants understood the main themes. The teaching method used to achieve the workshop objectives was interactive lecture that focused on important concepts. The lecturer demonstrated common faults in writing papers. She tried to illustrate pitfalls in writing papers. Participants were also provided with books and clips as a stimulus and guide. At the end of the workshop, a 15-minute discussion was held on interpretation of items discussed during workshop.

Sampling tools
During workshop, participants were asked to complete several workshop evaluation tools as a pretest and

posttest, and feedback evaluation questionnaire. The aim of pretest and posttest are to assess the changes in participants' knowledge, understanding and application of research methodology, manuscript writing and basic concepts in research. Pretest and posttest were developed based on the workshops objectives and contents.

A questionnaire with eight questions was used to evaluate the first level of criteria. These questions ask about information improvement, reach to the aims of the course, necessity of holding of the course for students, scientific level of the course, scientific level of the presenter, ability of the presenter to control the class, rhetorical and presentation capabilities of the lecturer. Responses were selected on a scale of 1-5 with 1=lowest and 5=highest. No open-ended questions were used.

A two-part questionnaire was used to evaluate the second level. Demographic information (name, age, and email) of participants was recorded in the first part. The second part of the questionnaire contains 29 items about the research contents. These items were related to the workshop content. Participants were recorded their knowledge about these 29 items from 1 to 9. If they had no information, they had to score 1 to 3, if their information was average, they had to score 4 to 6, and if they were informed, they had to score 7 to 9.

Research objectives

In the present study, the authors intended to achieve the following objectives:

• To determine students' baseline knowledge about research process;

• To estimate effectiveness of the course on participants' understanding of research process;

• To reveal if there is an association between attending a workshop on the research process and the improvement of a participants' knowledge;

• To compare male with female students; and

• To detect the perceived convenience of the workshop and chances to boost or develop future workshops based on participants' feedback.

Statistical analysis

The differences of participants' activities were measured before and after the session, and differences between the pretest and posttest was used to estimate the effect of the intervention. Statistical analyses were performed using SPSS software version 21.0. The findings were informed using descriptive statistics such as Wilcoxon signed ranks test, paired-samples T test, standard deviation and mean.

Results

Of the 150 medical students participated in the present study, 63 (42%) were men and 87 were women (58%). The average semester of participants was 5±2. There was no meaningful difference between male and female contributors in reaction, learning, and behavioral changes (P=0.147).

In the second level of Kirkpatrick's model, which was divided into three groups (1. Research methodology, 2. Database and internet knowledge, 3. Paper submission process) demonstrated that participants' semester had
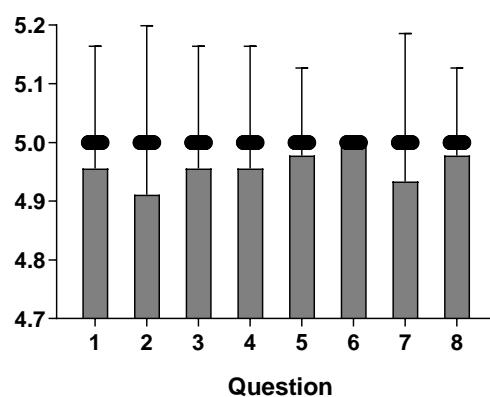

Figure 1. The mean scores of the participants according to the first level of Krickpatrick's model.

no efficacy on database and internet knowledge and their information about paper submission process (P>0.1). However, research methodology knowledge could be affected by Participants' semester (P<0.05).

Level 1: Reaction

The mean score of each reaction question in questionnaire of the first level was showed in Fig 1. According to the results of this figure, average score of students to eight reaction questions was 39.88±1.4. Results show all participants were satisfied from workshop. Amazingly, all participants showed their reactions to questions with scoring 5 and 4.

Level 2: Learning

The results of the second level Kirkpatrick model, which was divided into three groups revealed there is a significant difference between the scores of research methodology items before and after participation of medical students in workshop (P<0.001). The mean score before participation in workshop is 27.09 ± 11.69 and the mean score after participation in workshop is 48.07 ± 4.29.

According to the scores of the internet knowledge questions, participation has improved medical students' information level (P<0.001). The mean score before participation in workshop is 50.64 ± 28.89 and the mean score after participation in workshop is 109.58 ± 10.16.

Similarly, a significant difference between the scores of paper submission process items before and after participation of medical students in workshop was seen (P<0.001). The mean score before participation in workshop is 16.98 ± 14.36 and the mean score after participation in workshop is 59.13 ± 8.61. These results indicate that participation in the workshop has had a positive effect on their knowledge about submission processes.

Totally, as shown in Table 1, results of this study indicate that participation in this workshop has had a positive effect on medical students' knowledge about research and writing scientific papers (P<0.001). The mean of total score of the students before workshop is 97.84 ± 51.57 and the mean of total score of the students after workshop increased to 224.59 ± 21.52.

Level 3 and 4: Behavioral Change and Results

The authors predicted that knowledge improvement could be temporary, so, they followed workshop contributors over a 6 months' period to detect how students used the information of the workshop. Post workshop follow-up revealed that outcomes of the workshop at third and fourth level as follows: of 150 participants, 129 (86%) had started their first research project and among them, 15 had published their first research article.

Discussion

Today, our knowledge about diseases and their pathogenicity and proper therapeutic processes, is increasingly changing. One of the best ways to accompany by these constant changes is research. Several workshops are held to educate writing scientific papers to medical students. Regard to accelerating rate of holding these workshops, their efficacy and performance must be assessed. In the present study, efficacy of a paper writing workshop on knowledge improvement of medical students evaluated by using the Kirkpatrick's model.

In the present study, based on our findings, reaction, learning, behavioral changes were not affected by gender. In contrast with internet knowledge and submission processes questions, just scores of research

Table 1: Participants' mean score before and after participation in workshop.

	pretest	posttest	P value
research methodology	27.09 ± 11.69	48.07 ± 4.29	P<0.001
internet knowledgement	50.64 ± 28.89	109.58 ± 10.16	P<0.001
submission processes	16.98 ± 14.36	59.13 ± 8.61	P<0.001
Total score	97.84 ± 51.57	224.59 ± 21.52	P<0.001

methodology questions influenced by participants' semester.

These values correlate with Akbari *et al.* and Pourjahromi *et al.* who demonstrated that age and gender of participants could not impress on reaction, learning, and behavioral changes[7,8].

In this study, according to the results of the first level of Kirkpatrick's model, average score of students to 8 reaction questions was 39.88±1.4. It is interesting to note that all the participants reacted to questions by choosing 5 and 4 options. Results showed all the participants were satisfied from workshop and lecturer.

Our results are consistent with other previous results. Alfaris *et al.* reported that Writing Multiple-Choice Questions workshops were rated as helpful, relevant, and useful and were well-received[9]. Also, in another study, Dorri *et al.* reported that participants evaluated presenter and content of cardiopulmonary resuscitation course as favorable[10]. Further experiment carried out by Shirazi *et al.* showed that participants were satisfied from lecturer and content of the course[11]. Also, Pourjahromi *et al*. described that nurses were satisfied from lecturer, content and equipment of the training course on working with shock device[7]. In contradiction with our findings, Bakhshandeh *et al*. conveyed that many participants were not gratified from managers of the coaching courses[12].

The results of the second level of Kirkpatrick's model indicated there is an important difference between the scores of participants before and after holding workshop. The mean of total score of the students before workshop was 97.84±51.57 and the mean of total score of the students after workshop increased to 224.59±21.52. Our results indicated that the participation of medical students in workshop had increased their knowledge about research methods. Participation has improved medical students' internet knowledge. In addition, the workshop affects their knowledge about submission processes positively.

This substantiates findings in the study performed by Alfaris *et al.* reported that participants' knowledge score has improved after the training intervention[9]. Also, Dorri *et al.* reported that changes made in knowledge and learning of participants were desired[10]. Shirazi *et al.* described that workshop improved

participants' knowledge about librarianship[11]. Our findings differ considerably from those of Bakhshandeh *et al*., it can be argued that the coaching courses were not effectiveness[12]. Also, Wade *et al*. reported that coach education programs could not effect on information level of coaches participated in the courses[13].

Evaluation of Kirkpatrick's third and fourth level are often challenging for researchers in any training evaluation and should not be conducted before completing level one and two[2]. Training effectiveness is based merely on results measures. However, it was reported that participants might have the knowledge taught in the course, but still there is no guarantee of their application on the practice[2,14,15].

The third level (Behavioral change) is not commonly investigated[9], Although it is an important element of any training exercise. This level, investigates maintenance of the learnings of the workshop over a period, leading to transfer of learning to practice. This study showed that a paper-writing workshop provided obvious effectiveness and had a positive impact on transfer of knowledge to contributors and it leads to maintenance of positive change over time. In most cases, students found the workshop to be helpful and have a lasting impact.

These values correlate favorably well with Alfaris *et al.* who showed the writing multiple-choice questions workshop had a positive impact on them after holding workshop[9]. In addition, this is in complete agreement with Abdolghani *et al*. who reported that the majority of the participants of Research methodology workshops considered themselves capable of managing a research project independently[2]. Furthermore, Simpson *et al*. explained that Breast Surgical Oncology Fellowship Programs are dramatically changing the consequent behavior of surgeons who involve in this training program[16]. Although our findings differ slightly from those of Dorri *et al*. and Abbasian *et al*. who showed that training programs had not a significant impact on participants of the courses over a period of time after workshops[10,17].

In our study, Kirkpatrick's Level 4 explored by considering the change in organizational practice. Incredibly, sustained positive institutional change took place as a result of two five-hour sessions workshop[9]. Our findings demonstrated that this course has an

obvious effect on continuous changes in participants. During post workshop interviews, contributors explained that the workshop stimulated them to begin writing projects, gave them skills that made their writing more effective. These results differ from some earlier studies conducted by Dorri *et al*. and Abbasian *et al*.[10,17], but our findings are consistent with those of Abdolghani *et al.* and Simpson *et al.*[2,16].

Conclusion

Research is an important part of clinical practice. To reflect this, many clinical programs require a piece of research to be performed by advanced trainees. As far as we know, it is the first study on evaluation of effectiveness of writing scientific papers workshop on general medical students using the Kirkpatrick model in Iran. Our findings revealed that age and gender had no significant influence on reaction, learning, and behavioral changes. Participants' feedback is valuable for improving the paper-writing workshop. Results showed all the participants were satisfied from workshop and lecturer. Our results indicated that the participation of medical students in the workshop might lead to a large effect size on their knowledge about research methods. Participation has improved medical students' internet knowledge. In addition, the workshop affected their knowledge about submission processes positively. A significant continuous change in the institutional assessment strategy was also observed. Impressively the authors found strong evidence to validate that the training had a positive impact on students' understanding of the research process. We believe, and our participants agreed, that such courses should be widely available. Therefore, universities must encourage medical students to participate in these workshops. Projects similar to our study, which assess effectiveness of these workshops, could resolve weaknesses and improve quality of these workshops. Such courses enable medical students to investigate properly and improve their knowledge in their field. It is plausible that a number of limitations may have influenced the results obtained. First, the current survey was conducted with a limited number of participants. Another source of error in our study could be lacks of control group. Further studies should focus on individual and environmental factors that affect transfer of

information. Besides, future studies should survey more participants.

Acknowledgment

References

1. Bydder S, Packer D, Semmens J. The value of a scientific writing training workshop for radiologists and radiation oncologists. Australas radiol. 2006;50(1):29-32.
2. Abdulghani HM, Shaik SA, Khamis N, Al-Drees, A. A., Irshad, M., Khalil, M. S, et al. Research methodology workshops evaluation using the Kirkpatrick's model: translating theory into practice. Med teach. Apr 2014;36 Suppl 1:S24-29.
3. Clark CM, Ahten SM, Macy R. Using problem-based learning scenarios to prepare nursing students to address incivility. Clin Simul Nurs. 2013;9(3):e75-e83.
4. Bates R. A critical analysis of evaluation practice: the Kirkpatrick model and the principle of beneficence. Eval program plann. 2004;27(3):341-347.
5. Dick W, Johnson RB. Evaluation in instructional design: The impact of Kirkpatrick's four-level model. Trends and issues in instructional design and technology. 2002:145-153.
6. Lillo-Crespo M, Sierras-Davó MC, MacRae R, Rooney K. Developing a framework for evaluating the impact of Healthcare Improvement Science Education across Europe: a qualitative study. J Educ Eval Health Prof. 2017;14.
7. Pourjahromi N, Nezamian Z, Ghafarian Shirazi H, Ghaedi, H., Momeninejad, M., Mohamadi Baghmolaee, M., et al. The effectiveness of training courses on "How to work with DC Shock device" for nurses, based on Kirkpatrick Model. Avicenna J Med Biotechnol. 2012;11(8):896-902.
8. Laleh MA, Mollakazemi M, Seyedmehdi SM. Assessment of occupational medicine retraining course on general practitioners' efficacy using Kirkpatrick's model. Journal of Health in the Field. 2018;6(2).
9. AlFaris E, Naeem N, Irfan F, Qureshi, R., Saad, H., Abdulghani, H. M., et al. A one-day dental faculty workshop in writing multiple-choice questions: an impact evaluation. J dentl educ. 2015;79(11):1305-1313.
10. Dorri S, Akbari M, Sedeh MD. Kirkpatrick evaluation model for in-service training on cardiopulmonary resuscitation. Iran j nurs midwifery res. 2016;21(5):493.
11. ShiraziA., Poor AhmadA., & HassaniM. (2016). The Effectiveness of the Educational Workshops Held by the

Iranian Library and Information Science Association of Khorasan Branch Based on Kirk Patrick Model. Libr Inf Sci Res (LISRJ), 6(2), 244-260. https://doi.org/10.22067/riis.v6i2.53575.

12. Bakhshandeh H, Ahmadi H, Behnam M, Hamidi M. Evaluating the Effectiveness of Coaching and Refereeing Courses from University Students' Viewpoints Based on Kirk Partric's Model. J Sport Manage. 2014;5(4):161-178.

13. Wade G, Trudel P. An evaluation strategy for coach education programs. J Sport Behav. 1999;22(2):234.

14. Baldwin TT, Ford JK. Transfer of training: A review and directions for future research. Pers psychol. 1988;41(1):63-105.

15. Rouse DN. Employing Kirkpatrick's evaluation framework to determine the effectiveness of health information management courses and programs. Perspect health inf manag. 2011;8(Spring).

16. Simpson JS, Scheer A. A review of the effectiveness of breast surgical oncology fellowship programs utilizing Kirkpatrick's evaluation model. J Cancer Educ. 2016;31(3):466-471.

17. Abbasiann A, Salimi G, Azini R. Evaluation of Engineering Training: Survey the Effectiveness of Resistant Welding Training Course Based on Kirkpatrick Model, Irankhodro Co. as a Case Study. Iranian Journal of Engineering Education. 2008;10(39):37-62.

Appendix

Appendix I: Feedback evaluation questionnaire used for evaluating level one

NO	feedback evaluation questionnaire	SCORE				
		5	4	3	2	1
1	Did this course improve your information?					
2	Did you reach to the aims of this course?					
3	How much did you need to intend to such courses?					
4	Were you satisfied with scientific level of the course?					
5	Were you satisfied with teaching method?					
6	Could the presenter control the class?					
7	Were you satisfied with rhetorical and presentation capabilities of the lecturer?					
8	Could the presenter effect on your knowledge positively?					

Appendix II: Pretest questionnaire used for evaluating level two
Name: **Semester:**
Gender: **E-mail:**

Please score your knowledge about each object from 1 to 9

1) I know characteristics of a good article.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

2) I know ethical issues of research.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

3) I know conditions of the authors.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

4) I can search in Pubmed database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

5) I can search in Scopus database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

6) I can search in Google scholar database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

7) I can search in Magiran database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

8) I can search in SID database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

9) I know meaning of the word "MESH"

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

10) I know different types of articles.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

11) I know structure of an article.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

12) I can use Endnote to cite articles.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

13) I can assess different journals.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

14) I know meaning of the word "impact factor".

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

15) I know meaning of the word "indexing".

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

16) I can find related journals to my manuscript.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

17) I know how to submit a manuscript to a journal.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

18) I know what is the cover letter.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

19) I have information about process from submitting a manuscript to final result.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

20) I know meaning of the word "retracted".

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

21) I know meaning of the word "withdrawal".

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

22) I know what is the galley proof.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

23) I can make a profile in Google scholar.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

24) I know what is the ORCHID code.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

25) I know how to calculate H index.

  1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

26) I know how to apply.

  1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

27) I know meaning of the word "DOI".

  1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

28) I know what is the volume of the journals.

  1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

29) I know what is the issue of the journals.

  1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

Appendix III: Posttest questionnaire used for evaluating level two
Name: Semester:
Gender: E-mail:

Please score your knowledge about each object from 1 to 9

1) I know characteristics of a good article.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

2) I know ethical issues of research.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

3) I know conditions of the authors.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

4) I can search in Pubmed database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

5) I can search in Scopus database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

6) I can search in Google scholar database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

7) I can search in Magiran database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

8) I can search in SID database.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

9) I know meaning of the word "MESH"

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

10) I know different types of articles.

1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

11) I know structure of an article.

1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

12) I can use Endnote to cite articles.

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

13) I can assess different journals.

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

14) I know meaning of the word "impact factor".

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

15) I know meaning of the word "indexing".

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

16) I can find related journals to my manuscript.

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

17) I know how to submit a manuscript to a journal.

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

18) I know what is the cover letter.

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

19) I have information about process from submitting a manuscript to final result.

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

20) I know meaning of the word "retracted".

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

21) I know meaning of the word "withdrawal".

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

22) I know what is the galley proof.

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

23) I can make a profile in Google scholar.

 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐

24) I know what is the ORCHID code.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

25) I know how to calculate H index.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

26) I know how to apply.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

27) I know meaning of the word "DOI".

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

28) I know what is the volume of the journals.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐

29) I know what is the issue of the journals.

    1☐   2☐   3☐   4☐   5☐   6☐   7☐   8☐   9☐