Technology and Information Tool Preferences of Academics in the Field of Anaesthesiology

Akcan Akkaya¹, Murat Bilgi¹, Abdullah Demirhan¹, Adem Deniz Kurt¹, Ümit Yaşar Tekelioğlu¹, Kadir Akkaya¹, Hasan Koçoğlu¹, Hikmet Tekçe²

¹Department of Anaesthesiology and Reanimation, Abant İzzet Baysal University Faculty of Medicine, Bolu, Turkey

²Department of Internal Medicine, Abant İzzet Baysal University Faculty of Medicine, Bolu, Turkey

Abstract

Objective: Researchers use a large number of information technology tools from the beginning until the publication of a scientific study. The aim of the study is to investigate the technology and data processing tool usage preferences of academics who produce scientific publications in the field of anaesthesiology.

Methods: A multiple-choice survey, including 18 questions regarding the use of technology to assess the preferences of academicians, was performed.

Results: PubMed has been the most preferred article search portal, and the second is Google Academic. Medscape has become the most preferred medical innovation tracking website. Only 12% of academicians obtain a clinical trial registration number for their randomized clinical research. In total, 28% of respondents used the Consolidated Standards of Reporting Trials checklist in their clinical trials. Of all participants, 21% was using Dropbox and 9% was using Google-Drive for sharing files. Google Chrome was the most preferred internet browser (32.25%) for academic purposes. English language editing service was obtained from the Scribendi (21%) and Textcheck (12%) websites. Half of the academics were getting help from their specialist with a personal relationship, 27% was doing it themselves, and 24% was obtaining professional assistance for statistical requirements. Sixty percent of the participants were not using a reference editing program, and 21% was using EndNote. Nine percent of the academics were spending money for article writing, and the mean cost was 1287 Turkish Liras/year.

Conclusion: Academics in the field of anaesthesiology significantly benefit from technology and informatics tools to produce scientific publications.

Key Words: Anaesthesiology, scientific publication, biomedical information tools

Introduction

There are many ethical, scientific, structural and even legal procedures (1) that researchers must comply with during the process, including preparation of an article designed for providing scientific contribution to contemporary modern medicine and conversion of it into an acceptable scientific paper with publication value. During this period, researchers use the internet very often; reach databases, such as PubMed, Web of Science and Scopus, via the internet (2); register their original clinical trials on websites, like www.clinicaltrials.gov; complete a CONSORT diagram (3) and buy academic correction (proofreading) services for translation from their own language into English.

In addition, researchers frequently benefit from various scientific analysis programs (4) for evaluating the size of the sampling in the planning stage or purchase or use similar statistical services. Nowadays, not only can all of these services be reached through portable computers but also academic requirements related to technology can be met by smart phones. In order to assess the interests of academicians on this topic who study anaesthesia in our country, we planned a questionnaire study consisting of 18 questions and investigated how often the participants used information technology related to scientific studies.

Methods

This questionnaire study was approved by the Clinical Research Ethics Committee of Abant İzzet Baysal University (Decision No: 2013/67). The questionnaire forms, including 18 questions prepared for identifying the use of technology and

Figure 1. Distribution of participants in terms of gender, institutions and titles

Figure 2. The ratio of the use of databases apart from PubMed while scanning scientific studies

information systems by academicians doing scientific studies on anaesthesia, were given to academicians who were invited to and participated in the “Abant Anaesthesia Symposium” conducted in the Büyük Abant Hotel on 1-4 May, 2013. Two hundred questionnaire forms were distributed, and only 78 of them were taken back. The first 4 of the 18 questions were about demographic information on the existence of academic study, academic title, gender and institution. The other 14 questions investigated the use of scientific databases preferred for academic studies, study registry websites required by editors for qualified articles, statistical programs, scientific redaction websites recommended for presentation in a foreign language, file-sharing programs for academicians doing a joint study, citation management software and smart phones. The questions were multiple-choice, more than one alternative could be chosen and the participants could write down their own answers as the last choice. The percentage distribution of survey questions and the answers obtained are presented in “Results”.

Statistical Analysis

Mean values in our study were presented in graphics calculated with maximum and minimum scales. The Microsoft Excel® program was used for this aim.

Results

Percentage distributions of the survey questions and the responses are demonstrated in successive order in Figures 1-15. In some figures, the responses of many questions that were asked for the same purpose are given in one graphic or more than one graphic are presented in a single square. All results are shown in graphics, not given in the text in order to avoid repeating.

Discussion

It was seen that most of the participants (80%) were academicians working at universities. While this participation rate is expected, it can be envisaged that in case the survey is carried out at national congresses, the distribution may change in favour of educational and public hospitals. Pubmed is the most widely used biomedical database, since it is free and comprehensive. It has been hosting visual and auditory media, besides 12 million books and journals, since 1836. In addition to 18 million journals having been registered since 1948, it contains very powerful searching technologies within itself (5, 6).

Web of Science, Scopus and Google Academic are the other most commonly used database registry, research and indexing instruments. Web of Knowledge and ISI Web of Science, which are the products of the Thomson Reuters company, provide access to 23,000 journals, 23,000,000 patents, 110,000 conference outputs and 9000 internet pages. Web of Science, which initiated the first indexing in 1900, has been a prominent multi-database searcher and indexer up to our day (5). Contrary to PubMed, it hosts more than biomedical sciences and has the capacity to search for targets according to impact factor; moreover, it is not free and requires a subscription.

Web of Science began citation mapping (8). Scopus is the world's largest database with abstracts and indices, which started its business activity in 2004. It consists of 27,000,000 documents, back to the midst of the 1960s. It is owned by Elsevier and requires a subscription, and almost half of the

Figure 3. Websites that participants prefer for keeping their medical knowledge up to date

Figure 6. Methods that academicians prefer for sharing their joint studies

Figure 4. Ratio for registration of randomised clinical trials (e.g., www.clinicaltrials.gov)

Figure 7. Internet browsers preferred by the academicians

Figure 5. The ratios for completion of the "CONSORT" flow diagram or checklist

Figure 8. Websites used for organising English-translated studies in an academic manner (proofreading, editing)

documents are from 1994 and after. (9). Google Academic is a very comprehensive internet data search engine. However, the relevance level of the results found with the searched content and the order of time scale may be incompatible. There

are studies suggesting that Google Academic can not access the Elsevier database (10).

Its one distinctive property is that it can access even unsearchable articles (2). The most successful search in languages other

Figure 9. Choices of academicians for meeting their scientific statistics needs

Figure 10. Ratio of academicians who preferred having statistical sample size and power analysis done before the study

Figure 11. Programs preferred for sample size analysis

than English is conducted by Scopus (7). CINAHL (Cumulative Index to Nursing and Allied Health Literature) is a database operating under the EBSCO company and containing 300 journals and 2.2 million registries on 17 different health topics, including particularly nursing, consumer health and complementary and alternative medicine (11). In our survey, Google Academic took second place in the preference ranking after PubMed. Searching databases other than PubMed

Figure 12. Statistics for the use of citation management software

Figure 13. Ratios for the expenses of academicians on information needs, the mean annual expense and lower and upper limits of these expenses

carries the potential of getting together more target resources, which reduces the waste of time, besides accessing the resources that are not included in PubMed but can be valuable.

Uptodate, Medscape, Epocrates and National Guideline Clearing House are electronic medicine encyclopaedias, internet portals and indices for physicians to access information in following evidence-based medical literature and produce solutions facilitating drug use (12). There are also studies finding that these kinds of encyclopaedias useful for bedside decision-making and claiming that the regular use of them reduces hospitalisation duration (13). In our survey, it was observed that Medscape was the first preference, and Uptodate was the second preference.

Registry of clinical studies has almost become obligatory in recent years. Before, as a result of the fact that AIDS had

Figure 14. Statistics for smart phone trademarks preferred for reaching academic information sources

Figure 15. Distribution of smart phone operating systems in terms of their trademarks

gained prevalence among homosexuals who were a subgroup of the male population and had desired to take part in clinical studies about AIDS, the American Congress obliged the registry of clinical studies about the issue and their opening to public access. Thus, the Clinical Trials Information System (ACTIS) was established. The benefit of this registry system attracted attention, and the American Food and Drug Administration (FDA) asked for the registry of clinical studies in the country at www.clinicaltrials.gov in 1997.

A registration system having the priority target of opening new drug investigations to the public and registering has become desirable for academicians planning scientific research in the process of publications by many prominent medicine journal editors. The International Committee of Medical Journal Editors (ICMJE) obliges the registration of the methodology for the member journals; however, it leaves the results out of scope and recommends the addition of the registry number at the end of the abstract. This clinical study registration system may be a specific system of any country open to the public, as well (15).

It is useful to establish the registration system in question nationally. The studies are required to be registered at the

Clinicaltrials.gov website before the first patient is involved in the study. Therefore, as a result of the application made by the official of a university or educational institution to the site administrator, predetermined persons are appointed as responsible, and the registrations can be made by the password and username sent (16). In our study, the rate of academicians who used the registration system in question was determined as 12%. Those who used this system made use of the registration system in their studies at a rate of 41%.

The Consolidated Standards of Reporting Trials (CONSORT) flowchart and checklist arose as a result of efforts to develop a worldwide compatible system for carrying out and publishing randomised controlled studies. Two scientific research groups, having concentrated on the same subject and gotten together with the recommendations of Dr. Drummond Rennie, who was among the editors of the JAMA journal in 1995 for the first time, gathered in Chicago, US, and established the CONSORT group and prepared the first CONSORT report (17). The flowchart and checklist, having been revised since then, are recommended to be subjected by ICJME again to journal editors for the acceptance of randomised controlled studies (18). Only 28% of the academicians who joined our study stated that they filled the CONSORT checklist, and the rate of filling in their studies was 61%.

Academic studies are mostly prepared by the shared efforts of more than one researcher and become publishable documents. The data, graphics, citations, original source and article file prepared in this process often have to be shared many times for probably one file. This sharing may be done by electronic mail and USB from hand to hand or by an internet disk space provider (Dropbox, Netdisk, Google Drive, etc.) or, in other words, a cloud storage system (19). Even if the shared file volume is small, it is time-consuming and gives rise to the formation of too many copies of shared files.

Information sharing with USB leads to the production of many copies and also forms a basis for software viruses to spread. In cloud computing systems, one file can be accessed through all computers of its owner. Files and folders can be used by other co-workers non-simultaneously. This system prevents unnecessary file redundancy, saves time, prevents the occurrence of software infection and thus increases performance. In our research, we found that 80% of participants preferred e-mail for sharing information, and the ratio for the use of Dropbox, the most popular program for this aim, was 21%.

Of the academicians who participated in the study, 32% chose Google Chrome as the first internet browser. Its being ranked first might have been due to its being relatively faster and its success in opening PDF files and running some services, including Google Drive, Google Academic and Google Translate, faster. In our study, most of the participants were assistant professors, and the ratio of the participants who

did not get proofreading services was 66%. For the choice of this service, Scribendi, offering academic manner support beyond redaction of English language, was ranked first, and Textcheck, guaranteeing to add the statement of "this study was evaluated at least by two native speakers of English", was ranked second.

It was found that nearly half of the participants had their statistics done using their personal relationships, which shows that this service is still not professionally provided by educational institutions. The response given to the question "Do you make or have someone make the sample size and power analysis?" was "yes" at a rate of 68%. We feel responsible for adding that this ratio contrasts with our personal observations and experiences. This is because the ratio of 47% for the response "SPSS sample power" given to the successive question for the most frequently preferred power analysis software is probably far away from the real ratio, because SPSS sample power is not free, and G*Power program, which is out of charge and more comprehensible, was ranked second at a rate of 19%. On the other hand, in statistical solutions apart from power analysis, IBM SPSS (PASW) software, which is more commonly used compared to other free equivalent programs, might have evoked. Accordingly, it seems that the responses given to these questions were out of the expected results.

Only one-fifth of the participants used citation management software. These software programs offer services, such as organisation of figures and tables and reaching many medical and non-medical databases, as well as re-organisation of a written scientific article in accordance with the different requirements of different journals. We suggest that increased use of these software programs will positively contribute to the process for making studies ready for publication.

For the question investigating the ratios of academicians' annual expenses for language redaction, statistics or reaching an original article, 36% of the participants gave a numerical response, and the mean expense was found to be 1285.5 TL/year. It is possible that the fact that one-third of academicians spent money for academic purposes can be interpreted as a negative state. On the other hand, the reason for the remaining 55% academicians not to answer this question may be that they might have thought this question to be asked for the expenses spent for providing an article to be accepted for publication in a journal with a charge. For certain, it was aimed to evaluate only personal expenses spent for science.

Nowadays, the use of smart phones is rapidly increasing. Academicians are interested in these devices, which act like a mobile computer, offering them all information included in a library. In our trial in September, 2013, we searched for the term "smart phone" among the titles of studies in PubMed and found 35 results. We should specify that most of them were measurement and analysis progies for follow-up and diagnosis beyond a literature review (20).

As in all questionnaire studies, the rate of questionnaires that were returned was lower than expected. Two hundred questionnaire forms were distributed, but only 78 of them were completed and given back.

Conclusion

Academic anaesthesiologists benefit from technology and information systems in order to produce scientific articles to a great extent. We think that the results of our questionnaire study would be a valuable data source for those directing scientific policies and being responsible for the introduction and development of academic information services.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Abant İzzet Baysal University Clinical Research Ethics Committee.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - A.A.; Design - A.A., M.B.; Supervision - A.D., Ü.Y.T., H.K.; Funding - A.A., A.D.K., H.T., K.A.; Materials - A.D.K., K.A., H.T.; Data Collection and/or Processing - A.D.K., K.A., M.B., H.T.; Analysis and/or Interpretation - A.A., A.D.; Literature Review - Ü.Y.T., H.K.; Writer - A.A., M.B.; Critical Review - A.D., Ü.Y.T., H.K.; Other - A.D.K., K.A., A.A.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. Campbell A, Glass KC. The legal status of clinical and ethics policies, codes, and guidelines in medical practice and research. *McGill Law J* 2001; 46: 473-89.
2. Falagas ME, Pitsouni EI, Malietzis GA, Pappas G. Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. *FASEB J* 2008; 22: 338-42. [\[CrossRef\]](#)
3. Nithiavathy R. Data Integrity and Data Dynamics with Secure Storage Service in Cloud. 2013 International Conference on Pattern Recognition, Informatics and Medical Engineering (Prime) 2013.
4. Suresh K, Chandrashekar S. Sample size estimation and power analysis for clinical research studies. *J Hum Reprod Sci* 2012; 5: 7-13. [\[CrossRef\]](#)
5. Masic I, Milinovic K. On-line biomedical databases-the best source for quick search of the scientific information in the biomedicine. *Acta Inform Med* 2012; 20: 72-84. [\[CrossRef\]](#)
6. Lu Z. PubMed and beyond: a survey of web tools for searching biomedical literature. *Database* 2011; 2011.
7. Kulkarni AV, Aziz B, Shams I, Busse JW. Comparisons of citations in Web of Science, Scopus, and Google Scholar for articles published in general medical journals. *JAMA* 2009; 302: 1092-6. [\[CrossRef\]](#)
8. Simboli BD. Web of science's "citation mapping" tool. *Issues in Science and Technology Librarianship* 2008; 7.
9. Dess HM. Database reviews and reports. *Issues in Science and Technology Librarianship* 2006.
10. Burright M. Database Reviews and Reports. *Issues in Science and Technology Librarianship* 2006.

11. CINAHL, Information Systems for Nursing & Allied Health, Nursing & allied health (CINAHL) ... database search guide: Glendale, CA.
12. Addison J, Whitcombe J, William Glover S. How doctors make use of online, point-of-care clinical decision support systems: a case study of UpToDate®. *Health Info Libr J* 2013; 30: 13-22. **[CrossRef]**
13. Phua J, See KC, Khalizah HJ, Low SP, Lim TK. Utility of the electronic information resource UpToDate for clinical decision-making at bedside rounds. *Singapore Med J* 2012; 53: 116-20.
14. Wikipedia, Contributors. (2013)ClinicalTrials.gov. The Web site: <http://en.wikipedia.org/w/index.php?title=ClinicalTrials.gov&oldid=570270196>
15. ICMJE. (2013) ICMJE Recommendations:Publishing and Editorial Issues Related to Publication in Biomedical Journals: Obligation to Register Clinical Trials. The Web site: http://www.icmje.org/publishing_10register.html
16. clinicaltrials.gov. (2013)How to Apply for an Account. The Web site: <http://clinicaltrials.gov/ct2/manage-recs/how-apply>
17. Wikipedia, Contributors. (2013)Consolidated Standards of Reporting Trials-Wikipedia, The Free Encyclopedia. The Web site: http://en.wikipedia.org/w/index.php?title=Consolidated_Standards_of_Reporting_Trials&oldid=544793069
18. The-CONSORT-Group. (2013)The CONSORT Group CONSORT Statement Overview. The Web site: <http://www.consort-statement.org/consort-statement>
19. Barret V. Dropbox Me. *Forbes* 2011; 188: 82.
20. Gray LJ, Leigh T, Davies MJ, Patel N, Stone M, Bonar M, et al. Systematic review of the development, implementation and availability of smart-phone applications for assessing Type 2 diabetes risk. *Diabet Med* 2013; 30: 758-60. **[CrossRef]**