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Assessment of the Accessibility to and Usage of E-Resources in Articles in Turkish Nursing Journals

Hemşirelik Alanında Yayınlanan Bilimsel Dergi Makalelerinde E-Kaynakların Kullanımı ve E-Kaynakların Erişilebilirliğinin Değerlendirilmesi

Zuhal EMLEK SERT ^a, Esin ATEŞ^{b1}, Ayla BAYIK TEMEL^c

^a PhD, RN Lecturer, Department of Public Health Nursing Ege University Faculty of Nursing

^b Research Assistant, Department of Public Health Nursing Ege University Faculty of Nursing

^c Professor Department of Public Health Nursing Ege University Faculty of Nursing

Özgün Araştırma

Abstract

Objective: There appears to be an increased tendency to use Uniform Resource Loader in scientific articles. However they are extremely useful sources of information, they may decay in time and become inaccessible. The current study aimed to assess the accessibility to and usage of e-resources in articles in Turkish Nursing journals (2015-2016).

Method: Data of this descriptive study were collected in a three-month period between January and March of 2017. The universe of the study was composed of all the journals (34 in total) published in the field of nursing that allow the use of e-resources and that can be accessed free of charge.

Results: Distribution of e-resource use shows that 492 e-resources were used in 2015 and 636 e-resources were used in 2016. The accessibility of e-resources used in journal articles was examined, and it was realized that 203 (41.2%) of 492 e-resources could not be accessed in 2015, and 260 (40.9%) of 636 e-resources could not be accessed in 2016.

¹E-mail address: esinates0@gmail.com

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Conclusion: According to the results of the research, the use of e-resources in journals and inaccessibility tends to increase over the years. Authors, editors and referees/reviewers should take the responsibility to decrease the loss of information created by inaccessibility to e-resources that are cited in scientific research articles. Authors should access the primary source and present the Uniform Resource Loader address or the Digital Object Identifier number of the cited e-resources accurately and include the date of retrieval at all cases.

Keywords: Journal article, accessibility, e-resources.

Öz

Amaç: Bilimsel yazılarda Tekdüzen Kaynak Bulucu kullanma eğiliminde artış olduğu görülmektedir. Ancak son derece yararlı bilgi kaynakları olsalar da bu kaynaklar zaman içinde bozulabilir ve erişilemez hale gelebilir. Bu çalışmanın amacı, Türk Hemşirelik dergilerindeki (2015-2016) makalelerde e-kaynakların erişilebilirliğini ve kullanımını değerlendirmektir.

Yöntem: Bu tanımlayıcı çalışmanın verileri, 2017 Ocak ve Mart ayları arasındaki üç aylık bir sürede toplanmıştır. Çalışmanın evrenini, hemşirelik alanında e-kaynak kullanımına izin veren ve ücretsiz olarak erişilebilir tüm dergiler (toplam 34) oluşturmaktadır.

Bulgular: E-kaynak kullanımının dağılımı, 2015 yılında 492, 2016 yılında da 636 olup, 2016 yılında kullanımda bir artış gözlenmiştir. Dergilerde yayınlanan makalelerde kullanılan e-kaynakların erişilebilir olup olmadıkları incelenmiş olup 2015 yılında 492 e-kaynaktan 203'üne (%41.2), 2016 yılında 636 e-kaynaktan 260'ına (%40.9) erişilemediği görülmüştür.

Sonuç: Araştırma sonuçlarına göre dergilerde yıllara göre e-kaynak kullanımı ve buna paralel erişilememe durumu yıllara göre artma eğilimi göstermektedir. Bilimsel araştırma makalelerinde kaynak gösterilen e-kaynaklara erişilememesinden kaynaklı bilgi kaybı düzeyini azaltma sorumluluğu yazarlar, editörler ve hakemler tarafından sağlanmalıdır. Yazarlar ise birincil kaynağa ulaşmalı ve atıfta buldukları e-kaynağın Uniform Resource Loader adresini ya da Digital Object Identifier (Dijital Nesne Tanımlayıcı) numarasını eksiksiz olarak yazmalı ve mutlaka erişim tarihi güncel olmalıdır.

Anahtar Sözcükler: Dergi makalesi, erişilebilirlik, e-kaynaklar.

Introduction

In a scientific study, references section is an important part which increases the reliability of the study and demonstrates that the researcher is able to access information which allows the grasp of relevant theoretical foundations, formation of hypothesis and prediction of results.¹ Citations in studies are important to show respect to other researchers' studies and guide the reader to reach additional resources. These resources may include books or book sections that are print or retrieved directly from a link or a data base, periodicals, translated publications, electronic science articles (with or without Digital Object Identifier [DOI]), poster presentations, theses (published or unpublished), individual studies without date or an author, online governmental/legal/official reports, the online conferences and presentations, newspaper articles, popular journal articles, leaflets and individual websites.² Therefore, resources should be cited in the article accurately.³ Cited resources should be accurately recorded in the references section. Citations from accessible and reliable information obtained from public and private sectors available in print and web environment should be provided both in the text and in the references.² However, authors report that resources section in an article is the most problematic part.⁴

Use of the web first started in 1960's to establish communication among the limited number of researchers in the U.S. Ministry of Defense. Scientists have been using internet since 1969 and Uniform Resource Locator (URL) was developed as a new format when the strings of characters were created

in 1994 to identify and locate an existing web based Manuscript resource to access information in electronic formats.^{5,6} Today, URLs are regularly used in billboards, packages, business cards, advertisements, apparel and scientific articles as references.⁷ Annual increase in internet use in the period of 1997-2002 was reported as 47% with increased widespread use each passing day.⁵

Electronic resources are defined as “materials, electronic texts, bibliographic data bases, software applications and so forth that are composed of data and/or computer program(s) operated on a computer by connecting to a remote server or using a CD-ROM with the help of peripheral units connected to a computer network”. The most common e-resource types are “digital collections, digital archives, electronic libraries, electronic books/journals/magazines/texts/theses and databases”. These resources are usually created and or distributed by commercial publishers and/or professional associations.⁸

While URLs are extremely useful sources of information, they may decay in time and become inaccessible. In other words, web based content, as opposed to print media, may suddenly disappear and researchers may have difficulty in re-accessing these resources.⁹ In the absence of internet and a permanent digital library, URLs -by their nature- have disadvantages in terms of accessibility, content and stability. Many internet users have come across “404 not found” response code when they clicked the specified URL address.⁵ Hence, URL addresses are the most critical components that need to be updated and accurate.¹⁰ A web connection cited in a scientific journal but cannot be accessed has wider implications that may seriously weaken the foundations of scientific studies. The risk of overnight changes or even loss of web references creates an increased scientific threat to scientists.^{7,11}

Studies conducted in this field demonstrate the seriousness of this problem.¹²⁻¹⁸ Dellavalle et al.¹⁴ examined three journals with high impact in their study and reported that the URLs listed in the references sections had 3.7% and 13% rate of inaccessibility in three and 27 months respectively. Crichlow et al.¹⁵ investigated in six outstanding medical journals the URL reference rates that were misspelled or unavailable and identified that the rate of inaccessibility changed between 0% and 22% in three months after publication. Evangelou et al.¹⁶ examined that rates of inaccessibility of web based content in six leading scientific journals and found that the 4.7% rate of inaccessibility when the journal was first published reached 9.6% in two years. In another study, it was observed that 12% of the abstracts published in Medline were submitted in inaccurate formats, 18.6% of these were accessible after revision and additionally, 18.8% were accessible intermittently.⁵ Hester¹⁷ examined the journals in the field of medical profession and reported that 9.5% of the URLs in articles published in the field of oncology were inaccessible in five months after publication. In a follow-up study, the author identified that only 33% of the cited e-resources were available in 29 months after publication.

Wren¹⁹ determined that unavailability of URLs in the articles published in the field of dermatology increased from 10.9% to 34.6% in the first nine months of a five year period. In another study, Wren⁵ investigated 1630 e-resources and established that 63% were accessible. Saberi and Abedi¹⁸ examined five journals published in the period of 2002-2007 and found in their first assessment that 73% of the e-resources cited in the articles was available and observed that e-resources with PDF formats had the highest accessibility rate (97%). When the errors verified in the studies conducted to identify erroneous citations and the rate and type of erroneous citations in articles published in bio-medical journals were evaluated; it become clear that resources are unavailable either due to misspelling or erroneous citation or due to the fact that resources are inaccessible. Results of the

studies conducted to examine the frequency of citations through URLs and the availability of these resources show that e-resources are increasingly used while problems are experienced in areas related to permanency of the content and the accessibility of the resources due to the changeable nature of the web.⁶

The number of scientific journals published in the field of nursing is increasing day by day. While there are studies that examined the characteristics of journal articles published in the field of nursing,^{20,21,22,23} No studies have been conducted to investigate the publication ethics and availability of the web based content used in journal articles published in the field of nursing. It is expected that this study will guide the researchers in the field of nursing and the editors to enhance the quality in scientific publications.

Methods

Study design

Data of this descriptive study were collected in a three-month period between January and March of 2017. The universe of the study was composed of all the journals (research by Dergipark, Google scholar, nursing association websites [34 in total]) published in the field of nursing that allow the use of e-resources and that can be accessed free of charge. First of all; it was determined whether the e-journals accepted the submission of articles with web based content and the journals that do not accept e-resources or the journal which charge processing fee were excluded from the study. In this direction, 10 professional nursing journals published in electronic format by nursing faculties or professional associations were identified as samples (Koç University Faculty of Nursing Journal of Nursing Education and Research, Cumhuriyet Nursing Journal, Dokuz Eylül University Nursing Faculty Electronic Journal, Journal of Ege University Nursing Faculty, Hacettepe University Faculty of Nursing Journal, Turkish Journal of Research and Development in Nursing, Journal of Cardiovascular Nursing, Journal of Psychiatric Nursing, Journal of Intensive Care Nursing, Florence Nightingale Journal of Nursing).

Setting and samples - Data collection

Articles that were published between January 2015 and December 2016 were included in the research. The electronic journals were accessed via Internet and the references of the studies published as full text and the articles that were submitted in the theoretical format (original research articles, reviews, case presentations) were examined to include the articles with at least one e-resource. A total of 1128 e-resource and 233 articles were reviewed. The name of the journal in which the article appeared, the date of publication, the issue of the journal, the volume of the journal, total number of articles in the journal, the type of article, the number of references in the article, the number of e-resources in the article and the number of Turkish and foreign references were identified. For each article, information related to the following was obtained and recorded in the data base: the accessibility of the e-resource, the reason of unavailability if the e-resource was inaccessible (404 not found, forbidden 403 etc.), type of e-resource (.com, .edu, .gov, .mil, .net, .org domains) and date of retrieval. The URL addresses of the resources that were used as reference in the articles published in the time frame of the study (2015-2016) were copied on a word document and these addresses were tried separately to see if they could be accessed. Each researcher involved in the study cross checked the e-resources included in another researcher's URL list to ensure data reliability. No discrepancies were found among researchers.

Data analysis

Statistical analysis of the data was completed by using IBM SPSS Statistics 21.0 package program and margin of error was accepted as 0.05. Frequency, percentage and Kruskal-Wallis statistical analysis were used for data analysis.

Ethical issues

In this study, the research articles included in the sample open search engine and electronic databases ethical permission was not required.

Limitations of research

Although there are some important results in this study, the main limitation of this study is that it covers only nursing journals published in our country and covers a certain period.

Results

The features of the e-journals included in the study are displayed in Table 1. First year of publication for these journals varies between 1991 and 2012. Since the number of issues published by these journals varies between 2 and 4, a total of 10 journals with 58 issues were investigated. References and e-resources of the articles in the journals were examined and it was determined that the number of scientific articles with e-resources was 233. The total Turkish, foreign and e-resource references for these 233 articles were 2921, 5192 and 1128 respectively.

Table 1. The Characteristics of The Journals Examined in The Framework of The Study (n=1128).

Journal Title	First publication year	Total number of issue reviewed	Total number of articles reviewed	Number of Turkish resources	Number of foreign resources	E-resources n (%)
Koç University Faculty of Nursing Journal of Nursing Education and Research	2004	6	31	364	688	117 (11.12%)
Cumhuriyet Nursing Journal	2012	4	6	120	115	34 (14.46%)
Dokuz Eylül University Nursing Faculty Electronic Journal	2008	8	16	201	396	91 (15.24%)
Journal of Ege University Nursing Faculty	2004	6	41	539	840	203 (14.72%)
Hacettepe University Faculty of Nursing Journal	1994	6	32	453	681	92 (8.11%)
Turkish Journal of Research and Development in Nursing	1999	6	13	153	335	53 (10.86%)
Journal of	2010	6	25	268	481	228

Cardiovascular Nursing						(30.44%)
Journal of Psychiatric Nursing	2010	6	22	298	617	68 (7.43%)
Journal of Intensive Care Nursing	1997	4	13	125	350	90 (18.95%)
Florence Nightingale Journal of Nursing	1991	6	34	400	689	152 (13.96%)
TOTAL		58	233	2921	5192	1128 (13.90%)

Annual distribution of the type of articles with e-resources shows a total of 120 articles with 61 original research articles, 55 reviews and 4 case reports in 2015 and a total of 113 articles with 63 studies, 45 reviews and 5 case reports in 2016. A total of 233 articles were published in these journals with e-resources in the two year period between 2015 and 2016.

Distribution of e-resource use shows that 492 e-resources were used in 2015 and 636 e-resources were used in 2016. An increase in e-resource use was observed in 2016 compared to 2015. When each e-resource included in the journal articles was reviewed by the researchers to determine whether they were accessible it was seen that 203 (41.2%) e-resources out of 492 used in 2015 were inaccessible while 260 (40.9%) out of 636 e-resources used in 2016 were unavailable. Accordingly, the rate of inaccessibility in the e-resources published in 2015 was found to be 41.2% and the rate of inaccessibility in the e-resources published in 2016 was 40.9%.

As seen in Table 2, examination of response codes for inaccessible URL addresses for 463 e-resources shows that the response code with the highest frequency (49.5%) was “not found 404” closely followed by “Http 501 or Http 505” response codes (47.3%). In this context “page not found, server error in ap., this web site cannot be reached” response codes were observed as well as problems related to accessing different pages or previous pages and non-existence of the specific URL address.

Table 2. Reasons for not Accessing E-Resources (n=463).

Reasons for not Accessing	Number	Percent
Not found 404	229	49.5
Http 501 or Http 505	219	47.3
Forbidden 403	7	1.5
Method not allowed 405	3	0.6
Internal server error 500	2	0.4
Timeoutafter 30 seconds	2	0.4
Unauthorized 401	1	0.2
TOTAL	463	100.0

The web resources that cannot be accessed in the study generally (45.6%) belonged to non-commercial and non-profit organizations (.org domain) followed by governmental organizations (.gov domain) (17.3%) and commercial institutions (.com domain) (12.3%). It was found in the study that 57.2% of the unavailable web resources were cited correctly and 42.8% were inaccurately cited. The

data demonstrates that e-resources with .org, .gov and .com domains have the highest inaccessibility rates. Accessibility and inaccessibility to all e-resources were examined in the study based on domain names with the help of Kruskal-Wallis statistical analysis and statistically significant differences were observed ($X^2= 17.652$, $p=0.007$).

Table 3. Distribution of Access States by Extensions of E-Resources (n=1128).

E-resource Extension/ Abbreviation	Accessing		Inaccessible		Total	X ^{2*}	p ^{**}
	n	%	n	%			
Commercial Organizations/.com	57	8.6	57	12.3	114		
Educational Institutions/.edu	43	6.5	35	7.6	78		
Government Organizations/.gov	177	26.6	80	17.3	257	17.636*	p=0.007**
International Organizations/.int	56	8.4	32	6.9	88		
Service Providers/.net	10	1.5	6	1.3	16		
Non-Commercial Organizations/.org	268	40.3	211	45.6	479		
Other	54	8.1	42	9.1	96		
TOTAL	665	100	463	100	1128		

* Kruskal-Wallis statistical analysis, **p<0.05

When all domains were subjected to multiple statistical comparison analysis with Post-Hoc tests, it was found that the difference was generated by the e-resources with .org, .com and .gov domains (Figure 1).

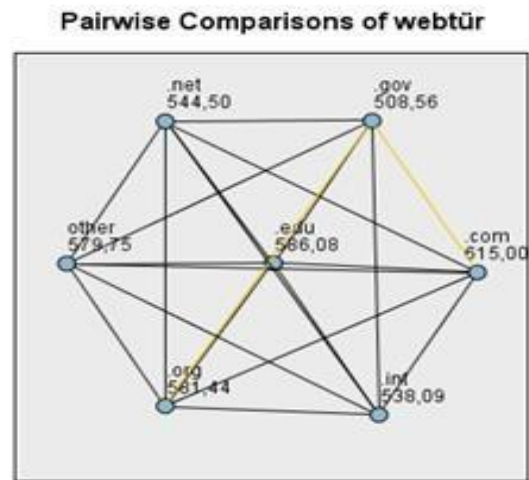


Figure 1. Post-Hoc Test Analysis

Discussion

This study examined the URL references in 10 nursing e-journals that can be accessed free of charge and in which e-resources were allowed as references. 233 articles were examined and it was found that a total of 1128 e-resources were used in these articles (Table 1) (492 in 2015, 636 in 2016), a rate of 4.8 e-resource per article. A study points to the fact that the number of articles with web citations published in the period of 2000-2004 increased each year and while this number was 46% in 2000, it increased to 69% in 2004. According to this study, the number of e-resources cited in the articles increased to 195 in 2004 from 52 in 2000.¹⁰ In their study, Hoe, Goh & Ng (2007) found the rate of e-resources per article in 1997 to be 0.88 while this rate increased to 6.59 in 2001.²⁴ Use of web resources was reported to be 83.82% in 2010 while this rate reached 87.68% in 2012 in the study conducted by Gul, Mahajan & Ali (2014).²⁵ In their study, Kumar & Kumar (2013) reported that URL percentages by years increased to 30.82% in 2008 from the rate of 9.54% in 2007.²⁶ Based on the results of these studies, it can be argued that the researchers in the world are aware of the increase in web citations per article. However, along with the increase in the use of web resources, a new problem of inaccessibility of these e-resources has emerged. Results of the studies in this field show that 23% of the e-resources used as citations are not available after one year and 52% are inaccessible after 5 years.^{27,28} These studies reported the rate of inaccessibility of these URL references as 40-50% in four years.^{29,10} Studies conducted on outstanding medical journals reported the rates of inaccessibility of URL references as 3.8%-11.8% in the first 3 months and as 13% in 27 months after publication.^{5,10} Another study examined the URL references that were cited in bio-informatics articles and identified the rate of decay or inaccessibility as 18.6%.¹⁰ Studies conducted by Spinellis (2003) determined that about 50% of the cited URLs were inaccessible in four years after the publication.⁷ Also, it was determined that 20% of the URLs were inaccessible in a year after publication and the decay of URLs was about 10% in the next three years.

The inaccessibility rate of the URL references investigated in this study for the e-resources used in 2015 was found to be 41.2% while this rate decreased to 40.9% in 2016. The reason for this decrease may be related to the use of Digital Object Identifier (DOI) numbers or the fact that there was only one year gap between the study and the year of publication in this current research. When URL addresses were assessed with the inaccessibility, it was found that 463 e-resources were unavailable. It was

identified that “not found 404” was the most frequently (49.5%) observed code among the reasons for inaccessibility followed by “other” response codes (47.3%) (“page not found, server error in ap.,” response codes, access to a different URL or access to previous pages, the site cannot be accessed, no URL address etc.) (Table 2). According to the results of the study conducted by Carnevale & Aronsky (2007), the three most common reasons for inaccessibility to the unavailable 113.737 URLs were “page not found” “timeouts” and “access denied/forbidden” and it was determined that this rate comprised of more than 97% of unsuccessful access attempts. ³⁰ Based on the results of Spinellis’ (2003) study, the most common reason for inaccessibility in e-resources was “not found 404” response code, followed by invalid host name (error 901) (22% of the problems) and network issues (error 504) (8% of the problems). 83% of the errors were related to invalid URL host names or paths (errors 901 and 404) and it was determined that this is the main factor in URL problems. ⁷ The findings of Kumar & Kumar’s (2013) study are parallel to the findings in the other studies. ²⁶ The response code “not found 404” comprised of 58.86% of the inaccessible URLs in the current study as well followed by HTTP 500 (26.85%) and HTTP 403 (14.01%) response codes. It was also identified in the current study that almost half of the inaccessible web resources (42.8%) were inaccurately written but that authors specified the date of retrieval in inaccessible e-resources to a high extent (79.7%).

It was identified that inaccessible web resources mostly belonged to .org domain (noncommercial, non-profit organizations) with the rate of 45.6% followed by .gov domain (governmental organizations) with the rate of 17.3% and .com domain (commercial institutions) with 12.3% (Table 3). The results of Sellitto's (2005) and Casserly & Bird’s studies also showed that .edu websites have the highest loss in URLs. ^{31,32} Results of this study demonstrated that the most inaccessible e-resources were associated with the domain names such as .org, .gov and .com and there was a statistically meaningful difference in accessibility and inaccessibility based on domain names. The difference was found to be related to resources associated with .org, .com and .gov domains (Figure 1).

Conclusion

Based on the results of this study, it was found that a total of 1128 e-resources were used in the articles in the examined journals published in 2015 and 2016 (492 in 2015, 636 in 2016). According to the results, there was an increase in the use of e-resources in 2016 compared to 2015. Examination of accessibility of these e-resources showed that 463 of the e-resources out of 1128 were inaccessible. Distribution of inaccessible e-resources based on years pointed to the fact that 203 e-resources were inaccessible in 2015 (41.2%) while the number of unavailable e-resources was found to be 260 in 2016 (40.9%). The most common reasons for inaccessibility were related to response code “not found 404” (49.5%) and “other” response codes (47.3%). The study demonstrated that the domains associated with inaccessible e-resources were .org (45.6%), .gov (17.3%) and .com (12.3%) domains. Examination of accessibility and inaccessibility of all e-resources in the current study based on domain names presented a significant difference caused by .org, .com and .gov domains.

According to research results, use of e-resources in journals increased by year. In order to ensure accessibility to e-resources, authors should specify the date of retrieval. It is believed that copying and pasting the URL addresses instead of typing them will prevent errors and prove to be more effective. The most common problem identified in this study was related to the mismatch between the URL address and the title and the provision of a general address instead of a specific URL. It is suggested that the web address where the cited document is hosted should be copied and pasted. Web addresses

may be changed, removed or deleted and it may be difficult to obtain the cited document, if not impossible. In order to prevent this, DOI number should be used and they should be copied and pasted again instead of typing them in. If the DOI number does not allow access, then the author should also include the URL.

Authors, editors and referees/reviewers should take the responsibility to decrease the loss of information created by inaccessibility to e-resources that are cited in scientific research articles. In the long run, editors and reviewers should adopt minimum standards in all research articles for the use of e-resources by taking the changeable nature of the web into consideration. Authors should access the primary source and present the URL address or the DOI number of the cited e-resource accurately and include the date of retrieval at all cases.

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