Performance Measurement and Metrics

A meta-analysis of service quality of Iranian university libraries based on the LibQUAL model

Aboozar Ramezani, Seyed Javad Ghazimirsaeed, Fereydoon Azadeh, Mohammad Esmaeilpour Bandboni, Mohammad Hossein YektaKooshali,

Article information:

A meta-analysis of service quality of Iranian university libraries based on the LibQUAL model

Aboozar Ramezani
Virtual School, Students' Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran
Seyed Javad Ghazimirsaeed and Fereydoon Azadeh
Department of Medical Informatics and Librarianship, School of Paramedicine, Research Center for Health Information Management, Tehran University of Medical Sciences, Tehran, Iran
Mohammad Esmaeilpour Bandboni
School of Nursing, Midwifery and Paramedicine, Guilan University of Medical Sciences, Rasht, Iran, and
Mohammad Hossein YektaKooshali
Student Research Committee, School of Nursing, Midwifery and Paramedicine, Guilan University of Medical Sciences, Rasht, Iran

Received 12 May 2017
Revised 25 February 2018
16 April 2018
17 June 2018
11 August 2018
Accepted 19 August 2018

Abstract

Purpose – The purpose of this paper is to assess the quality of Iranian university libraries.
Design/methodology/approach – This first systematic review and meta-analysis were based on the PRISMA guidelines by searching in national and international databases from 2003 to January 2017 with standard Persian and English keywords. Data searching, extracting and quality appraising were completed by two researchers, independently. Any unexpected documents were assessed by a third expert researcher. Data were extracted in accordance with the "Strength of the Reporting of Observational Studies in Epidemiology" checklist after the final selection of appraised documents. Random effects size based on Cochrane test and I^2 were used for combining the obtained results from different studies together by considering the heterogeneity of studies.
Findings – Based on the meta-analysis conducted in 25 (6.42 percent) included studies, the total sample size was estimated. According to three dimensions of LibQUAL, findings of current information control, affect of service and the library as a place were estimated as 5.37 [CI95%: 5.02, 5.73], 6.91 [CI95%: 5.56, 6.26], and 5.46 percent [CI95%: 5.2, 5.73], respectively. Also, mean of service adequacy and superiority gap are equal to 0.07 [CI95%: −0.22, 0.36] and −2.06 [CI95%: −2.89, −1.23], respectively. There was a significant correlation between three dimensions of service quality and service superiority gap of LibQUAL and geographical regions of Iran ($p < 0.01$). Also, a significant correlation was found between the gaps of services and three aspects of LibQUAL model and published years through a meta-regression test ($p < 0.01$).
Practical implications – The results obtained from the present study showed that users are relatively satisfied with the quality of services provided by Iranian university libraries. An improvement in the quality of library services can promote the scientific level of universities.
Originality/value – The results of the present systematic review and meta-analysis study demonstrate a vital connection between primary research studies and decision-making for policymakers in Iranian university libraries to increase quality services.

Keywords Iran, Perception, Customer satisfaction, Quality assessment, LibQUAL, Library service quality
Paper type Literature review

Introduction

Measuring service quality is a necessity when it comes to planning in the respect of and improving the quality of the organizational services. University libraries are especially important since they are regarded as centers where a country's specialized information is provided. The universities of Iran are planning to improve the quality of their library services,

Performance Measurement and Metrics

1467-8047
DOI 10.1108/PMM-05-2017-0014

by measuring the quality of services and being aware of the gap of users' expectations. Measuring service quality provides information necessary to identify the strengths and weaknesses of library services. Thus, such assessment provides opportunity for strategic planning and improving the quality of various domains of information-related services (Esmaeilpour Bandboni *et al.*, 2015). According to the studies of Association of Research Libraries (ARL), LibQUAL is the most commonly used method for measuring the quality of library services as far as issues such as identifying the expectations of library users and reviewing and analyzing the gap between their expectations and their interpretation of the received services (Cook *et al.*, 2016). This model is specifically used for measuring the quality of library services. This tool has been used widely in the libraries of 31 different countries all around the 5 continents and it has been translated into 21 various languages (Town, 2016). According to the results obtained from studies focused on this method, which have been conducted over the past few years, has been an adequate model for measuring the quality of library services (Isfandyari-Moghaddam *et al.*, 2013; Neshat and Dehghani, 2013). This model aims (Association of Research Libraries, 2017):

- to create an excellent culture and prepare a tool for assessing the quality of library services;
- to help libraries have a better understanding of their users' expectations;
- to collect and interpret users' feedbacks in a principal way at any point in time;
- to provide a substrate for similar libraries to prepare a mechanism and a protocol for comparison and evaluation; and
- to specify the best measures to be taken regarding library services.

In addition to demographic specifications, the LibQUAL study survey includes 22 items designed in three dimensions including five, nine and eight questions in the dimension of the library as a place (LP), affect of service (AS) and information control (IC), respectively (Miller, 2008). These 22 questions have been prepared for respondents to answer for three purposes: to assess the minimum level of expectation from library services, to assess the maximum level of expectation from library services and to determine the interpretation of current library users regarding the quality of these services, respectively. The users under investigation could select numbers 1 to 9 in order to answer. If number 9 was selected, it would be indicative of the highest level of expectations. In this method, both the users' expectations and their interpretation of the quality of the services were measured to calculate the gap between users' expectations and the quality of services (Voorbij, 2012; Esmaeilpour Bandboni *et al.*, 2015). This gap has come to be known as both service adequacy gap (SAG) and service superiority gap (SSG) (Cook *et al.*, 2016).

Over the past two decades, the LibQUAL model has been used in the universities of Iran for measuring the quality of library services. This tool can be used as a model for assessing the quality of libraries services as well as for presenting information which can be used for facilitating the improvement of targeted services in libraries of Iranian universities (Isfandyari-Moghaddam *et al.*, 2013; Neshat and Dehghani, 2013).

One of the most important objectives of meta-analyses is to properly combine the existing studies to enlarge the sample size. Due to the increasing number of relevant studies, by creating a meta-analysis, the differences between the existing parameters would be decreased and also, there would be lower confident intervals. Because of all of the above-mentioned results, ultimately, all of the problems of using the previous methods will be solved (YektaKooshali *et al.*, 2016; Mansouri *et al.*, 2017; Zaker Jafari and YektaKooshali, 2018).

Due to the variety in reporting the mean of service quality of Iranian academic libraries (Isfandyari-Moghaddam *et al.*, 2013; Esmaeilpour Bandboni *et al.*, 2015), this systematic review of all documentation, and combining them by using meta-analysis method, was

conducted to assess the overall quality of Iranian university libraries. Due to the high importance quality of university libraries and lack of knowledge by the global community of service expectations in Iran, it is important to report the final conclusions to policymakers and properly manage planning at the country level.

Background in Iran

Iranian universities are operating under the supervision of two ministries, The Ministry of Science, Research and Technology (include 137 public and 494 private universities), and the Ministry of Health and Medical Education (include 51 universities). Over the past three decades, the number of students taught and the number of graduates have increased. Higher education institutions in Iran have enrolled more than 3m students. Also, Iranian universities graduate almost 750,000 students annually (Karimi *et al.*, 2010; Da Wan *et al.*, 2016; Naderi, 2016). Each of the Ministries has specific criteria to establish and develop its library services (Farajpahlou, 1994; Davarpanah, 2001, 2003). In addition, university library standards in Iran have been developed since 1995 and used as a guideline to all universities. Given the dispersion of the economic resources of Iranian universities and the allocation of different budgets, the quality of service provisions in libraries is also affected, such that, different geographical regions have various allocation of budgets (Ilali *et al.*, 2010; Seifouri *et al.*, 2018; Janafzaei and Hossein Khorshidi, 2012; Davarpanah and Dadkhah, 2012; Ansari, 2008).

Methods

The present study is the first meta-analysis and systematic overview aimed to review the studies which have investigated the quality of library services from the perspective of users of Iranian university libraries that used LibQUAL[1] in the time interval of 2003 to the January of 2017. The present meta-analysis study was conducted according to the PRISMA guidelines (Moher *et al.*, 2009).

Inclusion and exclusion criteria

The main criterion for entering the study was related to the subject of evaluation of a library using the LibQUAL+™ tool. If the studies had the following criteria, they would be eliminated from the current study: studies that evaluated general libraries or a target population of a library outside of a university; reviews that had incomplete information and not representing the standard deviation; studies that used the pre-2003 edition of LibQUAL; studies with subjects that were not relevant to the subject; studies with a non-random sample size; letters to editor; and repeated articles.

Search strategy and study selection

All of the results obtained came from documents published in international and national databases such as the national databases: ISC, SID, Magiran, Irandoc, Noormags, Elmnet, and Medlib and also, international databases and publishers such as Web of Sciences, Scopus, Google Scholar, PubMed, Embase, ProQuest, Sage, ScienceDirect, CINAHL WILEY, Taylor & Francis, Springer, Emerald, JSTORE, EBSCO and ERIC. In addition, specialized databases, for example, Library and Information Science Abstract; Library Literature & Information Science; Library, Information Science, and Technology Abstract; and Library & Information Science Source were searched.

The Persian keywords and their English equivalents were used to search the subject, including: "quality assessment," "service quality assurance," "LibQUAL model," "LibQUAL+™," "gap analysis," "library quality service," "library users (faculty members and students)," "customer satisfaction," "Iran" and all of the probable combinations of words. A combination of Boolean operators was used for databases which were in English. Additional articles were found by searching the cited references of articles within the study (Figure 1).

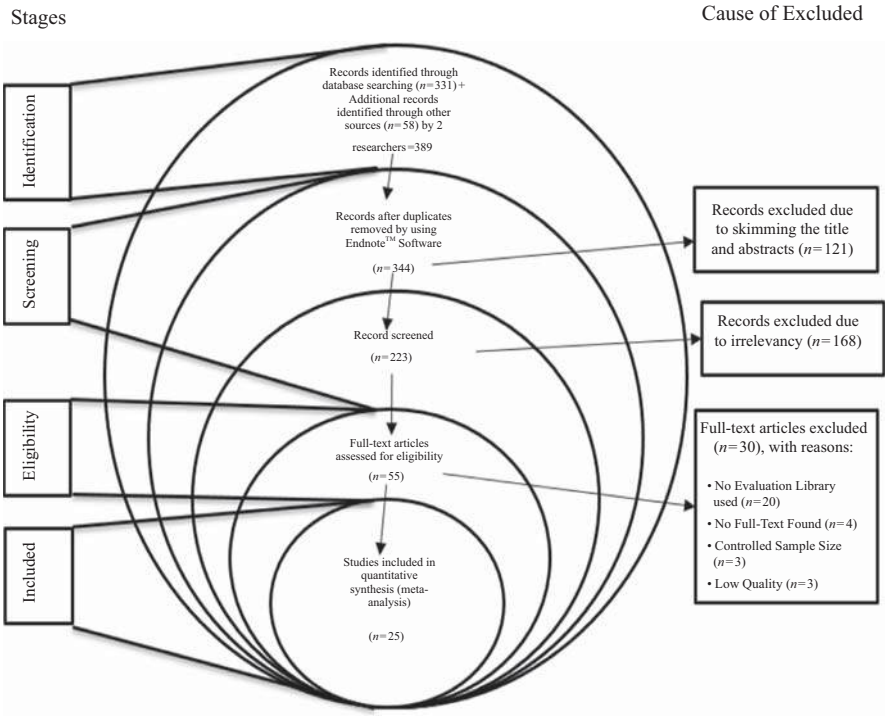

Figure 1.
A flow diagram (stacked Venn) following the PRISMA

After that, the titles of collected articles were imported into EndNote™ software to find duplicated papers. To prevent bias, all of the stages of conducting the research, including searching, selecting studies, qualitative evaluation of studies and data extraction were done by two independent researchers ("M.H.YK" and "A.R"). A third expert researcher ("F.A") decided the last decision in the case of any disagreement between the two researchers.

Quality assessment

In the next stage, researchers used The Strength of the Reporting of Observational Studies in Epidemiology (STROBE) checklist (Von Elm *et al.*, 2007) to determine the quality of each of the papers. The STROBE checklist has 22 sections and evaluates the methodological aspects of the selected articles, including research population and sampling method, statistical analysis and study objectives. The articles that obtained a minimum score of 16, according to this checklist, were entered for the meta-analysis stage (ZakerJafari and YektaKooshali, 2018; Amiri-Andy *et al.*, 2018; Badfar *et al.*, 2018).

Data extraction

At first, a checklist was designed based on aim of the study and reading other available and gathered papers. The designed checklist had the following items: author's name, published year, location, sample size, targeted group, mean and standard deviation of the LibQUAL model information extraction (IC, AS, LP, SAG and SSG). This information was extracted by two researchers independently and blind in the name of the author, institution and journal. The researchers asked the third expert researcher ("F.A") to reach out to the relevant author if more information and raw data were necessary (by contacting via e-mail, phone or fax to the first author, corresponding author or the department of authors).

Statistical analysis

The mean scores of each dimension and its gaps are analyzed using the LibQUAL tool. Based on binomial distribution analysis, Cochran and I^2 indices were used to evaluate the heterogeneity of the studies. As the mean of three dimensions of LibQUAL is a quantitative variable, normal distribution was used to estimate the standard error in each study. Due to the high inconsistency of the studies, the random effects model was used with 95% confidence interval. To examine the publication bias, funnel chart and the Egger and Begg's test were used.

Data were analyzed using the meta-analysis specialized software comprehensive meta-analysis. The significance level was considered less than 0.05. Standard errors were estimated automatically using the formula: SE = (Standard deviation)/$\sqrt{}$(Sample size) (Altman and Bland, 2005). There was 95.33 percent heterogeneity in this study which means that there was high inhomogeneity.

Results

A brief explanation of entered studies

In the systematic review, 389 probable relevant articles were identified. After reviewing the titles, 45 articles were eliminated because of duplication. In total, 344 probable relevant articles were thoroughly reviewed. After assessing the criteria for entering/exiting the study and measuring the quality of articles, 25 (6.42 percent) qualified studies conducted in the time span from 2003 to January 2017 entered the meta-analysis (Table I, Figure 1). The first meta-analysis and systematic review studied 7,484 people. Also based on three dimensions of LibQUAL, findings of current IC, AS and LP were described in five geographical regions of Iran.

A meta-analysis of three aspects of the LibQUAL model for Iranian university libraries

(1) The mean of IC (library as a set of sources) is equal to 5.37 [CI95%: 5.02, 5.73]. The means of this factor in south and east were 5.99 [CI95%: 3.55, 8.42] and 5.06 [CI95%: 3.77, 6.34], respectively; which are the maximum and minimum means. In a comparative review of the regions, a significant relationship was reported ($p = 0.0001$). The mean of IC in the center region was equal to 5.36 [CI95%: 4.91, 5.82] which was closest to the all-around reported value of this factor for Iran (Table II; see supplementary figures at: www.researchgate.net/publication/327744250_A_meta-analysis_of_service_quality_of_Iranian_university_libraries_based_on_the_LibQUAL_model).

(2) The mean of AS (library as a set of employees) is equal to 6.91 [CI95%: 5.56, 6.26]. The means of this factor in north and south were 5.69 [CI95%: 3.93, 7.45] and 6.72 [CI95%: 4.3, 9.14], respectively; which are the minimum and maximum means. In a comparative review of the regions, a significant relationship was reported ($p = 0.0001$). The mean of AS in the south was equal to 6.72 [CI95%: 4.3, 9.14] which was closest to the all-around reported value of this factor for Iran (Table II; see supplementary figures at: www.researchgate.net/publication/327744250_A_meta-analysis_of_service_quality_of_Iranian_university_libraries_based_on_the_LibQUAL_model).

(3) The mean of the LP (library as a set of locations) is equal to 5.46 [CI95%: 5.2, 5.73]. The means of this factor in the west and south were 5.21 [CI95%: 4.54, 5.89] and 6.67 [CI95%: 4.93, 8.41], respectively; which are the minimum and maximum means. In a comparative review of the regions, a significant relationship was reported ($p = 0.0001$). The mean of LP in the north was equal to 5.39 [CI95%: 3.84, 6.93] which was closest to the all-around reported value of this factor for Iran (Table II; see supplementary figures at: www.researchgate.net/publication/327744250_A_meta-analysis_of_service_quality_of_Iranian_university_libraries_based_on_the_LibQUAL_model).

Table I.
Iranian university libraries studies' based on LibQUAL model

References (sorted by date[a])	Place of libraries	Regions	Sample type	SS[b]	Information control	Effect of service	Library as place	Service adequacy gap	Service superiority gap
Hariri and Afnani (2008a)	Iran University of Medical Sciences	C	Stu[a] and Fac[a]	361	5.59 ± 0.59	5.93 ± 0.29	6.03 ± 0.48	0.36 ± 0.62	−2.52 ± 0.57
Ali-Ramezany *et al.* (2008)	Kerman University of Medical Sciences	E	Stu and Fac	200	5.98 ± 2.07	5.96 ± 2.03	5.89 ± 2.12	na	na
Hariri and Afnani (2008b)	Universities of Medical Sciences In Tehran	C	Stu and Fac	821	na	na	na	−0.56 ± 0.51	−3.02 ± 0.46
Ashrafi Rizi *et al.* (2008)	Islamic Azad University (IAU) Shahrekord Branchs	E	Stu	110	5.19 ± 0.37	6.76 ± 0.30	5.77 ± 0.02	0.76 ± 0.68	−1.74 ± 0.69
Najafgholinezhad and Hassanzadeh (2009)	Tarbiat Modares University	C	Stu and Fac	287	5.71 ± 1.38	5.21 ± 1.84	6.13 ± 1.38	0.22 ± 1.63	−2.45 ± 1.53
Hariri and Afnani (2009)	Iran University of Medical Sciences	C	Stu	193	5.41 ± 0.46	6.15 ± 0.30	5.67 ± 0.52	0.13 ± 2.60	−2.57 ± 2.23
Farajpahlou and Shams Ejieh (2009)	Shahid Chamran University of Ahvaz	S	Stu	358	4.75 ± 0.80	5.48 ± 0.36	5.79 ± 0.48	−0.28 ± 0.43	−2.42 ± 0.51
Hariri and Shahvar (2010)	Industrial Management Institute	C	Stu and Fac	237	6.40 ± 0.26	7.58 ± 0.31	6.90 ± 0.29	0.51 ± 0.43	−1.54 ± 0.19
Asemi *et al.* (2010)	Colleges of engineering in Tehran City	C	Stu	200	5.74 ± 0.40	5.43 ± 0.30	5.18 ± 0.33	0.47 ± 0.35	−2.86 ± 0.26
Omidifar and Mousavizadeh (2010)	Allameh Tabataba'i University	C	Stu and Fac	346	4.05 ± 1.80	5.63 ± 1.88	3.21 ± 1.69	0.87 ± 1.24	−3.48 ± 1.39
Ghaffari and Korani (2010)	Kermanshah University of Medical Sciences	W	Stu	195	6.03 ± 2.03	5.45 ± 2.26	5.57 ± 2.30	0.12 ± 0.47	−2.22 ± 0.44
Neshat and dehghani (2011)	National library and Archives of Iran	C	Stu and Fac	333	5.03 ± 0.61	5.63 ± 0.43	5.96 ± 1.36	−0.31 ± 0.11	−2.35 ± 0.13
Hashemian *et al.* (2012)	Isfahan University of Medical Sciences	C	Stu and Fac	354	5.71 ± 1.50	4.95 ± 1.61	5.40 ± 1.69	−0.93 ± 0.34	−2.84 ± 0.35
Mardani and Sharif Moghadam (2012)	University of Medical Sciences in Tehran City	C	Stu	261	3.70 ± 0.69	4.90 ± 0.86	4.37 ± 1.21	na	−3.11 ± 0.67
Razmi Shendi *et al.* (2013)	Imam Sadiq University	C	Stu and Fac	345	5.47 ± 1.84	5.30 ± 1.89	5.89 ± 1.88	0.97 ± 0.13	1.86 ± 0.12
Bairanvand *et al.* (2013)	Regional information Center for Science and Technology	S	Stu and Fac	120	7.23 ± 0.39	7.96 ± 0.33	7.56 ± 0.69	0.39 ± 0.28	−0.38 ± 0.60
Ashrafy Rizi and Kazem Pour (2014)	Isfahan Government Universities	C	Stu	317	5.28 ± 1.21	5.19 ± 0.55	4.92 ± 1.09	0.35 ± 0.34	−2.47 ± 0.29

(*continued*)

Table I.

References (sorted by date[a])	Place of libraries	Regions	Sample type	SS[b]	Information control	Effect of service	Library as place	Service adequacy gap	Service superiority gap
Nooshinfard and Tahmasebi (2014)	Islamic Azad University (IAU) Branches of east and center, Mazandaran province	N	Stu	225	4.71 ± 0.29	4.80 ± 0.86	4.60 ± 0.21	−1.88 ± 1.49	−2.08 ± 0.56
Sotudeh and Mirlohi (2015)	Shiraz University	S	Stu	365	5.30	6.10	5.75	−0.44 ± 0.34	−1.63 ± 0.40
Azimi Vaziri *et al.* (2015)	Kermanshah Razi University	W	Stu &and Fac	325	5.07 ± 1.75	5.97 ± 1.77	4.88 ± 2.01	−0.35 ± 0.39	−1.60 ± 0.35
Bahari-Movafagh *et al.* (2015)	Hamedan University of Medical Sciences	C	Stu and Fac	400	na	na	na	−0.24 ± 0.72	−1.86 ± 0.93
Ahmadimirgaed *et al.* (2015)	University of Science & Culture	C	Stu and Fac	328	6.27 ± 0.65	7.33 ± 0.48	3.58 ± 1.06	1.70 ± 1.55	−2.54 ± 1.21
Esmaeilpour Bandboni *et al.* (2015)	Guilan University of Medical Sciences	N	Stu	135	5.89 ± 0.21	6.59 ± 0.21	6.18 ± 0.24	0.31 ± 0.24	−1.76 ± 0.20
Yaghobifar *et al.* (2016)	Sabzevar University of Medical Sciences	E	Stu and Fac	296	5.80 ± 0.25	6.59 ± 0.25	5.76 ± 0.36	0.98 ± 0.23	−1.67 ± 0.47
Pourahmad *et al.* (2016)	Universities of North Khorasan	E	Stu and Fac	372	3.29 ± 0.65	5.22 ± 0.44	4.98 ± 0.57	−1.56 ± 0.76	−2.33 ± 0.65

Notes: [a]SS, sample size; Stu, students; Fac, faculty member; [b]regions: N, north; S, south; W, west; E, east; C, center

	Mean [confidence interval 95%]	I^2(%)	p-value	Online supplementary
Information control				
Region				
North	5.30 [4.14, 6.45]	99	($p = 0.0001$)	
South	5.99 [3.55, 8.42]	99		
Center	5.36 [4.91, 5.82]	99		
East	5.06 [3.77, 6.34]	99		
West	5.54 [4.6, 6.48]	96		
Total	5.37 [5.02, 5.73]	96	–	
Affect of service				
Region				
North	5.69 [3.93, 7.45]	99	($p = 0.0001$)	www.researchgate.net/publication/327744250_A_meta-analysis_of_service_quality_of_Iranian_university_libraries_based_on_the_LibQUAL_model
South	6.72 [4.3, 9.14]	99		
Center	5.77 [5.26, 6.27]	99		
East	6.13 [5.34, 6.92]	99		
West	5.72 [5.21, 6.23]	86		
Total	6.91 [5.56, 6.26]	99	–	
Library as place				
Region				
North	5.39 [3.84, 6.93]	99	($p = 0.0001$)	
South	6.67 [4.93, 8.41]	99		
Center	5.27 [4.68, 5.85]	99		
East	5.59 [5.26, 5.91]	99		
West	5.21 [4.54, 5.89]	91		
Total	5.46 [5.2, 5.73]	99	–	

Table II.
A meta-analysis of three aspects of LibQUAL model for Iranian university libraries

A meta-analysis of the gap of services based on LibQUAL model for Iranian university libraries

(1) The mean of SAG is equal to 0.07 [CI95%: −0.22, 0.36]. The means of this factor in the north and center were −0.78 [CI95%: −2.93, 1.36] and 0.27 [CI95%: −0.152, 0.69], respectively; which are the minimum and maximum means. In a comparative review of the regions, no significant relationship was reported ($p = 0.873$). The mean of SAG in the east was equal to 0.06 [CI95%: −1.68, 1.81] which was closer to the reported value of this factor all around Iran (Table III; see supplementary figures at: www.researchgate.net/publication/327744250_A_meta-analysis_of_service_quality_of_Iranian_university_libraries_based_on_the_LibQUAL_model).

(2) The mean of SSG is equal to −2.06 [CI95%: −2.89, −1.23]. The means of this factor in center and south were −2.26 [CI95%: −3.49, −1.04] and −1.47 [CI95%: −2.34, −0.61], respectively; which are the minimum and maximum means. In a comparative review of the regions, a significant relationship was estimated ($p = 0.0001$) (Table III; see supplementary figures at: www.researchgate.net/publication/327744250_A_meta-analysis_of_service_quality_of_Iranian_university_libraries_based_on_the_LibQUAL_model).

Meta-regression

The meta-regression for the gaps in services and the three aspects of the LibQUAL model for Iranian university libraries according to the years of the study was done and p-value was estimated to be 0.0001. The slope is ascending in AS (B), SAG (D) and, SSG (F) and descending in IC (A) and LP (C) (see supplementary figures at: www.researchgate.net/publication/327744250_A_meta-analysis_of_service_quality_of_Iranian_university_libraries_based_on_the_LibQUAL_model).

	Mean [confidence interval 95%]	I^2	p-value	Online supplementary
Service adequacy gap				
Region				
North	−0.78 [−2.93, 1.36]	99	($p = 0.873$)	www.researchgate.net/publication/327744250_A_meta-analysis_of_service_quality_of_Iranian_university_libraries_based_on_the_LibQUAL_model
South	−0.11 [−0.57, 0.36]	99		
Center	0.27 [−0.152, 0.69]	99		
East	0.06 [−1.68, 1.81]	99		
West	−0.11 [−0.57, 0.34]	99		
Total	0.07 [−0.22, 0.36]	99		
Service superiority gap				
Region				
North	−1.91 [−2.23, −1.6]	99	($p = 0.0001$)	
South	−1.47 [−2.34, −0.61]	99		
Center	−2.26 [−3.49, −1.04]	99		
East	−1.91 [−2.38, −1.44]	99		
West	−1.91 [−2.52, −1.3]	99		
Total	−2.06 [−2.89, −1.23]	100		

Table III.
A meta-analysis of gap of services based on LibQUAL model for Iranian university libraries

Publication bias

Publication bias was also examined by Begg and Egger's tests and was determined as $p = 0.69$ and $p = 0.28$, respectively. In this test, the probability of publication bias was not statistically significant (Figure 2).

Discussion

The present study is the first document using the LibQUAL model through the meta-analysis method in Iran. In these studies, the universities, fields of study in various levels, type of sampling and the number of samples have been distributed among libraries of different universities all over the country. Also, the mean of scores of the three dimensions of the LibQUAL model is an indication of the difference in the quality of services in different universities. The findings presented in Table II show the five regions of geographical distribution of studies focused on quality of services provided by universities libraries in Iran.

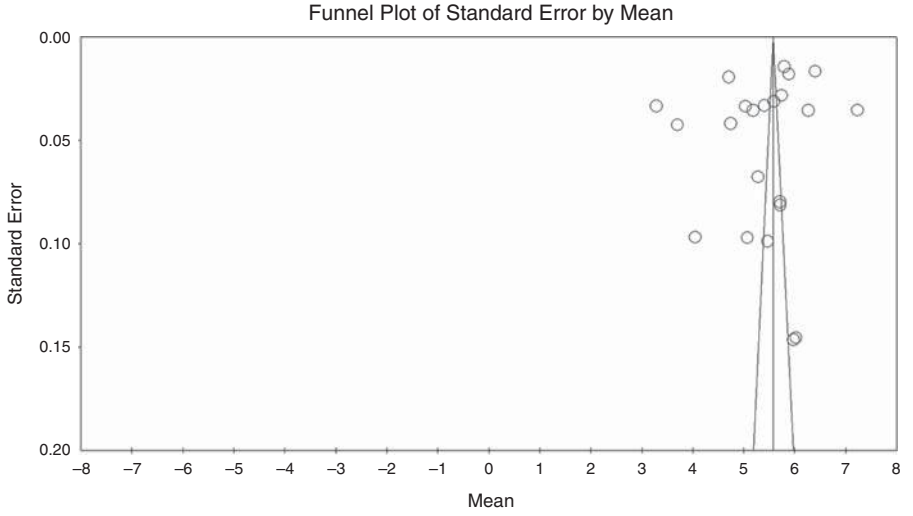

Figure 2.
The funnel plot of the studies related to quality of the services provided by Iran's university libraries based on the LibQUAL model

In some of them, like universities located in the south of the country, the mean score of the service quality has been higher (Farajpahlou and Shams Ejieh, 2009; Bairanvand *et al.*, 2013; Sotudeh and Mirlohi, 2015). According to the findings, it is possible that users' expectations have been influenced by research and educational facilities in these areas might have affected the level of users' expectations (Town, 2016). According to Miller's opinion, users of large libraries have high expectations would be decrease the scores of LibQUAL (Miller, 2008).

Mean score of the current level of quality of the services provided by libraries of different universities in Iran in the three dimensions of LibQUAL is quite different from similar studies, conducted in libraries outside of Iran by ARL in consecutive years (Cook *et al.*, 2016). The mean score of IC, AS and PL in ARL users' expectations are an average of 7.15, 7.32 and 6.92 in past seven years, while in Iranian user expectations were 5.37, 6.91 and 5.46, respectively through this meta-analysis study(Association of Research Libraries, 2017).

In the review conducted by Isfandyari-Moghaddam *et al.* (2013), it was reported the 18 university libraries had used LibQUAL for evaluating the quality of services. To analyze LibQUAL studies, three levels of quality were determined: less than a minimum, at least and slightly above the minimum. Four libraries: the Central Library of Tabriz University, Library of Medical Sciences of Yazd University, Libraries of Islamic Azad University of Shahrekord and Library of Mashhad's Ferdowsi University provided services under the minimum level of expectation in AS dimensions. The level of services provided by the other 14 libraries was minimum or slightly higher. In dimensions of the IC factor, there were only two libraries that had provided services with a higher quality than expected, which were libraries of Imam Sadegh University and University of Medical Sciences of Kermanshah. The service quality of the other 16 libraries was lower than expected or minimum. In terms of the LP factor, only four (out of 18) university libraries provided services that had a quality level higher than minimum, libraries of Imam Sadegh University, Ilam University, University of Medical Sciences of Kermanshah and Central Library of Tabriz University and the other libraries had provided services with minimum-level quality or lower (Isfandyari-Moghaddam *et al.*, 2013). The quantitative findings of this study are similar in three dimensions especially "IC".

According to the results obtained from the meta-analysis, the AS dimension was better than the other two dimensions in the dimensions of quality. These findings show that librarians of the aforementioned libraries have been able to provide services with a higher level of quality than the level expected by library users. Therefore, it is better than other dimensions of library services. The staff of the libraries can play an effective role when it comes to AS. Librarians located in the south (Farajpahlou and Shams Ejieh, 2009; Bairanvand *et al.*, 2013; Sotudeh and Mirlohi, 2015) and east (Ali-Ramezany *et al.*, 2008; Yaghobifar *et al.*, 2016; Pourahmad *et al.*, 2016) of the country have been able to get the highest mean in this dimension, respectively. An increase in the level of education caused by the increase in the number of opportunities for studying librarianship at the graduate level over the past few years and the improvement of professional skills of librarians in Iran are the reason why the level of satisfaction of library users with library services have been exponentially increased (Davarpanah, 2003). On the other hand, with the launch of provincial branches of Iranian Library and Information Science Association (www.ilisa.ir/) for librarians all over the country, numerous specialized educational workshops and scientific assemblies are now held, which can help the effectiveness of the quality services provided by libraries (Esmaeilpour Bandboni *et al.*, 2015).

The IC dimension considers the collection library sources. The mean of users' satisfaction of university libraries located in east (Ali-Ramezany *et al.*, 2008; Yaghobifar *et al.*, 2016; Pourahmad *et al.*, 2016) and north (Esmaeilpour Bandboni *et al.*, 2015; Nooshinfard and Tahmasebi, 2014) areas of Iran has been lower than other areas and this

might depend on the level of research and scientific activities in universities and education of librarians of these areas in comparison with other areas (Farajpahlou, 1994; Davarpanah, 2001; Davarpanah, 2003). Although the system of library has changed from traditional to online software, which can make the library sources more visible and accessible for users (Bruce *et al.*, 2009; Hall *et al.*, 2014). However, according to the findings of this study, it seems that the quality of the electronic and published sources available in libraries of universities in Iran does not meet the minimum level of expectations of users in comparison with other LibQUAL dimensions.

Three years in a row (2014–2016), in studies conducted by ARL, the mean of expectations from the dimension of the library as the place was lower than other LibQUAL dimensions (Association of Research Libraries, 2017). The findings of the present study also indicated that despite the renovation and development of the space of universities of the country, from the perspective of users, the library is not considered as a proper environment for studying. In addition, the mean score of users' satisfaction has not increased in this time interval and, therefore, the mean of minimum expectations of users is low. Nonetheless, the findings showed that libraries located in the south (Farajpahlou and Shams Ejieh, 2009; Bairanvand *et al.*, 2013; Sotudeh and Mirlohi, 2015) and east (Ali-Ramezany *et al.*, 2008; Yaghobifar *et al.*, 2016; Pourahmad *et al.*, 2016) areas of the country have had the highest mean of satisfaction with the LP.

Since the issue that is considered by the mean of adequacy gap is meeting the expectations of users (Town, 2016), in the present study it has been attempted to discuss the variations of adequacy gap in the findings section. The findings of the present study showed that libraries of universities in Iran have met the minimum level of expectation of their users when it comes to all of the services provided by libraries (with an adequacy gap of 0.07). Since libraries of different universities located in central (Hariri and Afnani, 2008; Hariri and Afnani, 2009; Hariri and Shahvar, 2010; Asemi *et al.*, 2010; Omidifar and Mousavizadeh, 2010; Neshat and dehghani, 2011; Hashemian *et al.*, 2012; Mardani and Sharif moghadam, 2012; Razmi Shendi *et al.*, 2013; Ahmadimirgaed *et al.*, 2015; Ashrafy Rizi and Kazem Pour, 2014; Ashrafi Rizi *et al.*, 2008; Bahari-Movafagh *et al.*, 2015) and east (Ali-Ramezany *et al.*, 2008; Yaghobifar *et al.*, 2016; Pourahmad *et al.*, 2016) areas of Iran have provided services with a higher quality than expected by users, these aforementioned libraries have been relatively more successful when it comes to providing services. Also, the users of these libraries have been satisfied with these services at a minimum level. After reviewing the findings of similar studies conducted outside of Iran, it became clear that services provided by libraries reviewed in this study have a relatively lower quality than similar foreign libraries. Adequacy gap of services has been usually positive in foreign studies and library services having a higher quality than the level that is acceptable to the users (Cook *et al.*, 2016; Town, 2016).

According to the ARL organization reports (Cook *et al.*, 2014, 2016), in 2014 and 2016 in Europe, IC were estimated 7.10 ± 1.27 and 7.7 ± 1.34, respectively; AS were estimated 6.85 ± 1.39 and 7.24 ± 1.41, respectively; LP were estimated 6.68 ± 1.61 and 6.74 ± 1.64, respectively; SAG were estimated 0.55 ± 1.36 and 0.66 ± 1.44, respectively; and SSG were estimated -0.85 ± 1.19 and -0.7 ± 1.24, respectively. The current status of Iranian libraries in gaps and dimensions of LibQUAL (IC, LP, SSG and SAG) is very different in comparison with ACR studies. Inappropriate infrastructure and non-compliance with international standards, lack of suitable cultural and social platforms and aged libraries and their resources which were caused by inappropriate budget allocations, have reduced reading per capita and the overall average of the LibQUAL dimensions and gaps in Iran (Krashen *et al.*, 2012; Kibirige, 1977; Chiu *et al.*, 2012).

Other findings showed that quality of services provided by libraries of Iranian universities were lower than the most desirable level (maximum level) that is expected by

users (with a SSG of −2.06) and libraries have not been able to improve the quality of their services to the desired level that is expected by the users. The same result has been obtained in all of the studies conducted in foreign universities and the findings have been indicative of a negative gap between library services and the most desirable level of quality expected by users (Shorb and Driscoll, 2004; Jankowska *et al.*, 2006; Roszkowski *et al.*, 2005). According to the obtained results, the qualitative level of services is not desirable to users and there is a gap between users' perceptions and expectations. As it is clear, the observed gap in libraries of the universities studied in this meta-analysis is larger than that of the libraries of foreign universities (Association of Research Libraries, 2017). Given the gap between current services and expectations of their users, these libraries can plan for improving the quality of services more cautiously by accurately prioritizing their attempts. In addition to the necessity of consideration of all of the aspects of services, given the weakness of libraries in association with the dimensions of IC and LP, the libraries must attempt to provide the necessary space, facilities and sources for the users to have access to the information they are needed. In terms of location of the library, by taking into consideration the opinions of users, it is essential to predict proper spatial and environmental conditions for beginning the study, learning and researching in a library (Hariri and Afnani, 2008).

In the present study, the degree of heterogeneity (I^2) has been calculated to be equal to 95.33 percent which means that this study has high heterogeneity (an I^2 index of lower than 25 percent is indicative of low heterogeneity, an I^2 index of between 25 and 75 percent shows middle heterogeneity and an I^2 index of higher than 75 percent shows high heterogeneity). It has been assumed that the observed differences have been resulting from using various sampling methods and the difference in the measured parameter in various societies (YektaKooshali *et al.*, 2016; Mansouri *et al.*, 2017; ZakerJafari and YektaKooshali, 2018).

Limitation

(1) Because of the variety of writing those research findings conducted by the LibQUAL, data extraction is difficult.

(2) In most studies, average LibQUAL dimensions were reported without standard deviation.

(3) The researchers had limited access to databases and full text of articles.

Conclusion

The results obtained from the present study show that users are relatively satisfied with the quality of services provided by Iranian university libraries. However, in order to increase the quality of library services, a better and more cohesive plan is needed. An improvement in the quality of library services can promote the scientific level of universities.

Recommendations

(1) Since the reviewed libraries were not even close to the desired level of services that are expected by the users, it is necessary to consider all of the aspects of library services. Given the gap between the level of quality of current services and the level of quality expected by the library staff in the findings of Iranian studies in comparison with foreign studies, it is better for university administrators to plan modern educational courses for library staff and employ responsible, qualified and skilled employees with sufficient amount of knowledge so that they would accurately guide users and meet their informational needs.

(2) Moreover, in order to improve the quality of the services provided by the aforementioned libraries and to reduce the gap between users' expectations and services, three suggestions have been presented including development of the library space and allocation of a proper space for forming scientific groups and further, creation and expansion of electronic library sources for the users to have access to information sources at any time and place and ultimately, the assessment of users' expectations of online tools such as The "LibQUAL+® Lite and TechQual+" be provided.

(3) By taking into account the results obtained from studies, it becomes clear that using LibQUAL+ as a tool is of help when it comes to reviewing the quality of services and its improvement, changing organizational culture and library service marketing. The commercial version of this tool is used all around the world for evaluating all of the university libraries that depend on the Ministry of Science, Research and Technology and Ministry of Health and Medical Education as a cooperation/consortium so that comprehensive data would be obtained as a consortium that would be shared for education, procedures, results and interpretations.

Acknowledgments

This research has been supported by Tehran University of Medical Sciences (TUMS); no. 35326, May 20, 2018 with IR.TUMS.SPH.REC.1396.3969 (Ethical Committee Code) and the authors would like to thanks Young Researchers, and Elite Club, Rasht Branch, Islamic Azad University, and Guilan University of Medical Sciences with for providing their cooperation and their contributions to the conduction of this first meta-analysis. Respective authors' contributions for this paper are as follows: the conceptualizing and refining research ideas were presented by Aboozar Ramezani and Mohammad Hossein YektaKooshali. Literature search was conducted by Aboozar Ramezani and Mohammad Hossein YektaKooshali. The included studies were selected by Aboozar Ramezani, Mohammad Hossein YektaKooshali, Seyed Javad Ghazimirsaeed and Fereydoon Azadeh (as an Expert). The research design was created by Mohammad Hossein YektaKooshali and Aboozar Ramezani. The checklist was designed by Seyed Javad Ghazimirsaeed, Aboozar Ramezani, and Fereydoon Azadeh. Quality appraisal of the finalized studies was performed by Aboozar Ramezani, Mohammad Hossein YektaKooshali, Seyed Javad Ghazimirsaeed and Fereydoon Azadeh. The selection of statistical tests/analyses was done by Mohammad Hossein YektaKooshali and Aboozar Ramezani. The statistical analyses and computations (including computer work) were performed by Mohammad Hossein YektaKooshali. The interpretation of statistical analyses was done by Mohammad Hossein YektaKooshali and Aboozar Ramezani. The manuscripts were drafted by Aboozar Ramezani and Mohammad Hossein YektaKooshali. The first draft was prepared by A.R, M.H.YK; whereas the second draft was prepared by Aboozar Ramezani, Mohammad Hossein YektaKooshali, Mohammad Esmaeilpour Bandboni, Seyed Javad Ghazimirsaeed, Fereydoon Azadeh. Redraft of a page (on later drafts) was done by Aboozar Ramezani and Mohammad Hossein YektaKooshali. The manuscript was edited by Aboozar Ramezani, Mohammad Hossein YektaKooshali, and Fereydoon Azadeh. Proofreading of the text was done by Aboozar Ramezani, Mohammad Hossein YektaKooshali, Mohammad Esmaeilpour Bandboni, Seyed Javad Ghazimirsaeed, and Fereydoon Azadeh. These authors contributed equally to this work.

Glossary

IC	Information control
AS	Affect of service

LP	Library as place
SAG	Service adequacy gap
SSG	Service superiority gap

Note

1. To the point of completion of the stages of the survey of the year 2003, LIBQUAL is comprised of four dimensions and 25 items. After the 2003 survey, with validity measurement analyses, according to the findings of numerous surveys, two dimensions of information access and personal control were combined and after that, the LIBQUAL tool, with 22 items or components, measures library services in three dimensions.

References

Ahmadimirgaed, A.R., Maleki, R. and Momeni, E. (2015), "The assessment of services quality in the central library of science & culture university as viewed by users", *Knowledge Studies*, Vol. 1 No. 4, pp. 107-128.

Ali-Ramezany, H., Javadi, M., Abbaszadeh, A., Ranjbar, H. and Ghazavi, M. (2008), "Faculty members and students' opinion about quality of services provided by the central library of Kerman University of Medical Sciences", *Strides in Development of Medical Education, Journal of Medical Education Development*, Vol. 5 No. 2, pp. 112-118.

Altman, D.G. and Bland, J.M. (2005), "Standard deviations and standard errors", *British Medical Journal*, Vol. 331 No. 7521, pp. 903-903.

Amiri-Andy, S.-A., Sarokhani, D., Azami, M., Vazini, H., Rezaei-Tavirani, M. and Dehkordi, A. (2018), "Systematic review and meta-analysis of otitis media in Iran: prevalence, etiology, antibiotic susceptibility, and complications", *Indian Journal of Otology*, Vol. 24 No. 1, pp. 1-8.

Ansari, M. (2008), *New Solutions for Making Electronic Government Information Available to the Public: Management and Planning Organization of Iran: Official Publications. Best Practices in Government Information: A Global Perspective*, De Gruyter Saur, München, pp. 99-106.

Asemi, A., Kazempour, Z. and Ashrafi Rizi, H. (2010), "Using LibQUAL +TM to improve services to libraries: a report on academic libraries of Iran experience", *Electronic Library*, Vol. 28 No. 4, pp. 568-579.

Ashrafi Rizi, H., Kazempour, Z. and Shabani, A. (2008), "To assess service quality of libraries of Islamic Azad university branch of Shahrekord from users' perspective based on LibQUAL model", *Journal of Academic Librarianship and Information Research*, Vol. 42 No. 48, pp. 25-50.

Ashrafy Rizi, H. and Kazem Pour, Z. (2014), "Quality gap analysis of the Central Library of State Universities of Isfahan based on LibQUAL model", *Scientific Journal Management System*, Vol. 1 No. 1, pp. 71-83.

Association of Research Libraries (2017), *LibQUAL+® Publications*, Washington, DC, available at: www.libqual.org/publications (accessed April 2, 2017).

Azimi Vaziri, A., Famil Rouhany, A. and Moradi, M. (2015), "Gap analysis of services quality in Razi University Libraries", *Epistemology*, Vol. 8 No. 30, pp. 73-86.

Badfar, G., Shohani, M., Nasirkandy, M.P., Mansouri, A., Abangah, G., Rahmati, S., Aazami, S., Soleymani, A. and Azami, M. (2018), "Epidemiology of hepatitis B in pregnant Iranian women: a systematic review and meta-analysis", *Archives of Virology*, Vol. 163 No. 2, pp. 319-330.

Bahari-Movafagh, Z., Hamidi, Y. and Giti, A. (2015), "The quality study of library services in Hamadan University of medical sciences using LibQUAL devices", *Journal of Modern Medical Information Science*, Vol. 1 No. 3, pp. 63-70.

Bairanvand, A., Ebrahimsamiei, M. and Rahmanian, S. (2013), "Evaluating the quality level of services provided by the Regional Information Center for Science and Technology (RICeST) using the Six Sigma methodology", *Epistemology*, Vol. 6 No. 20, pp. 20-37.

Bruce, T., Martha, K. and Colleen, C. (2009), "Item sampling in service quality assessment surveys to improve response rates and reduce respondent burden: the 'LibQUAL+® Lite' example", *Performance Measurement & Metrics*, Vol. 10 No. 1, pp. 6-16.

Chiu, M.M., Mcbride-Chang, C. and Lin, D. (2012), "Ecological, psychological, and cognitive components of reading difficulties: testing the component model of reading in fourth graders across 38 countries", *Journal of Learning Disabilities*, Vol. 45 No. 5, pp. 391-405.

Cook, C., Heath, F., Thompson, B., Davis, M., Kyrillidou, M. and Roebuck, G. (2016), *ARL Notebook*, Association of Research Libraries, Washington, DC.

Cook, C., Kyrillidou, M., Heath, F., Roebuck, G., Thompson, B. and Yeager, A. (2014), "European College and University Libraries, available at: www.libqual.org/documents/LibQual/publications/2014/Euro_2014.pdf (accessed Junuary 12, 2018).

Da wan, C., Ismail, R., Lai, Y.M., Ayub, Z.A. and Ahmad, A.R. (2016), "Islamic republic of iran", *Higher Education in the Middle East and North Africa*, Springer Berlin Heidelberg, New York, NY, pp. 87-105.

Davarpanah, M.R. (2001), "Level of information technology application in Iranian university libraries", *Library Review*, Vol. 50 No. 9, pp. 444-450.

Davarpanah, M.R. (2003), "University libraries in Iran: a study based on published sources", *Library Review*, Vol. 52 No. 5, pp. 218-227.

Davarpanah, M.R. and Dadkhah, N. (2012), "Use and cost of electronic resources in central library of Ferdowsi University based on e-metrics", *Iranian Journal of Information Processing Management*, Vol. 27 No. 3, pp. 777-797.

Esmaeilpour Bandboni, M., Abbaspour, H., Ramezani, A., Gholipoor, F. and Ramezani Pakpour Langeroudi, F. (2015), "Evaluating the quality of library services at Guilan University of Medical Sciences using LibQUAL tool", *Journal of Guilan University of Medical Sciences*, Vol. 23 No. 92, pp. 16-24.

Farajpahlou, A. (1994), "Status of library automation in Iranian academic libraries", *The International Information & Library Review*, Vol. 26 No. 2, pp. 107-137.

Farajpahlou, A. and Shams Ejieh, M. (2009), "A new approach in the studies of quality measurement of library services", *Studies on Library & Information Science*, Vol. 16 No. 3, pp. 29-60.

Ghaffari, S. and Korani, A. (2010), "Review of Quality of services offered in libraries of kermanshah university of medical sciences using gap analysis model", *Journal of Academic Librarianship and Information Research*, Vol. 44 No. 51, pp. 121-143.

Hall, I., Stephens, J. and Kennedy, S. (2014), "Can you measure IT? The UK experience of TechQual+", *Performance Measurement & Metrics*, Vol. 15 Nos 1/2, pp. 32-40.

Hariri, N. and Afnani, F. (2008), "Service quality gap analysis of the Central Library of the School Medicine Iran, SBMU and AZAD on Tehran", *Library and Information Science*, Vol. 11 No. 2, pp. 25-52.

Hariri, N. and Afnani, F. (2009), "Service quality gap analysis of the Central Library of the School of Medicine", *Faslname-ye Ketab*, Vol. 19 No. 4, pp. 165-180.

Hariri, N. and Shahvar, S. (2010), "Quality assessment of services provided by Central Library of Industrial Management Institute from users' viewpoint: a LibQUAL-based study", *Epistemology*, Vol. 3 No. 9, pp. 25-36.

Hashemian, M., Alemokhtar, M.J. and Hasanzadeh, A. (2012), "Quality assessment of services provided by Libraries of Isfahan University of Medical Sciences using gap analysis model (LibQUAL), Iran", *Health Information Management*, Vol. 9 No. 3, pp. 440-444.

Ilali, E.S., Taraghi, Z., Siamian, H., Mahdian, P., Raad, A.M.A., Mohammadpour, R.A. and Mazaheri, K. (2010), "Assessment of academic libraries in Mazandran, Goleston and Babol medical universities", *Journal of Mazandaran University of Medical Sciences*, Vol. 20 No. 74, pp. 84-90.

Isfandyari-Moghaddam, A., Razmi Shendi, M. and Norouzi, Y. (2013), "The study of history of researches about LibQUAL model in Iran", *Journal of Academic Librarianship and Information Research*, Vol. 47 No. 2, pp. 191-208.

Janafzaei, N. and Hossein Khorshidi, G. (2012), "Study and development of governmental services cost price accounting model in Iran", *Life Science Journal*, Vol. 9 No. 4, pp. 2672-2684.

Jankowska, M.A., Hertel, K. and Young, N.J. (2006), "Improving library service quality to graduate students: Libqual+ TM survey results in a practical setting", *Portal: Libraries and the Academy*, Vol. 6 No. 1, pp. 59-76.

Karimi, S., Chizari, M., Biemans, H.J. and Mulder, M. (2010), "Entrepreneurship education in Iranian higher education: the current state and challenges", *European Journal of Scientific Research*, Vol. 48, pp. 35-50.

Kibirige, H. (1977), "Libraries and illiteracy in developing countries: a critical assessment", *Libri*, Vol. 27 No. 1, pp. 54-67.

Krashen, S., Lee, S. and McQuillan, J. (2012), "Is the library important? Multivariate studies at the national and international level", *Journal of Language and Literacy Education*, Vol. 8 No. 1, pp. 26-36.

Mansouri, A., Norouzi, S., Sharifi, A., Yektakooshali, M.H. and Azami, M. (2017), "The relationship of maternal subclinical hypothyroidism during pregnancy and preterm birth: a systematic review and meta-analysis of cohort studies", *The Iranian Journal of Obstetrics, Gynecology and Infertility*, Vol. 19 No. 40, pp. 69-78.

Mardani, A.H. and Sharif Moghadam, H. (2012), "Evaluation of the quality of library services from the viewpoints of users and librarians using LibQUAL scale at Tehran University of Medical Sciences", *Journal of Health Administration*, Vol. 15 No. 47, pp. 47-58.

Miller, K.F. (2008), *Service Quality in Academic Libraries: An Analysis of LibQUAL+(TM) Scores and Institutional Characteristics*, University of Central Florida, Orlando, pp. 1-122.

Moher, D., Liberati, A., Tetzlaff, J. and Altman, D.G. (2009), "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement", *Annals of Internal Medicine*, Vol. 151 No. 4, pp. 264-269.

Naderi, A. (2016), "The application of production functions to Iranian higher education system", *International Journal of Education Economics and Development*, Vol. 7 Nos 1/2, pp. 53-78.

Najafgholinezhad, A.Z. and Hassanzadeh, M. (2009), "Evaluation of collection, staff and space of the central library of tarbiyat modarress university based on LibQUAL instrument", *Journal of Information Processing and Management*, Vol. 25 No. 1, pp. 131-152.

Neshat, N. and Dehghani, M. (2011), "Correspondence of user expectations with staff presumptions regarding the quality of services offered at [Iranian] National Library", *Journal of Academic Librarianship and Information Research*, Vol. 45 No. 2, pp. 97-118.

Neshat, N. and Dehghani, M. (2013), "Review of the current gap between clients' expectations and perceptions of received service in national library by using gap analysis model", *Performance Measurement & Metrics*, Vol. 14 No. 1, pp. 45-60.

Nooshinfard, F. and Tahmasebi, S. (2014), "Surrey of users' satisfaction status with library service of central Azad universities and developing remedies to improve contentment level using client relationship mod", *International Research Journal of Management Sciences*, Vol. 2 No. 12, pp. 378-385.

Omidifar, S. and Mousavizadeh, Z. (2010), "Evaluating the quality level of services provided in library of faculty of psychology and education in Allame Tabataba'i University using LibQUAL model", *Research on Information Science and Public Libraries*, Vol. 15 No. 4, pp. 61-80.

Pourahmad, A.A., Neshat, M. and Hasani, M.R. (2016), "Using LibQUAL model for improving the level of students' satisfaction from quality of services in academic libraries: a case study in North Khorasan province, Iran", *Journal of Information & Knowledge Management*, Vol. 15 No. 1, pp. 12.

Razmi Shendi, M., Isfandyari Moghaddam, A. and Norouzi, Y. (2013), "Evaluating the quality of services provided by the Library and Information Center of Imam Sadegh (PBUH) University using LibQUAL model", *Journal of Information Systems and Services*, Vol. 2 No. 4, pp. 69-80.

Roszkowski, M.J., Baky, J.S. and Jones, D.B. (2005), "So which score on the LibQUAL plus (TM) tells me if library users are satisfied?", *Library & Information Science Research*, Vol. 27 No. 4, pp. 424-439.

Seifouri, V., Babalhavaeji, F., Nooshin Fard, F. and Matlabi, D. (2018), "Analysis of factors that influence users' willingness to pay for the services of Iranian academic libraries by using the contingent valuation method", *Library Philosophy and Practice (e-journal)*, 1755, available at: https://digitalcommons.unl.edu/libphilprac/1755 (accessed January 9, 2018).

Shorb, S.R. and Driscoll, L. (2004), "LibQUAL+(™) meets strategic planning at the University of Florida", *Journal of Library Administration*, Vol. 40 Nos 3-4, pp. 173-180.

Sotudeh, H. and Mirlohi, M.S. (2015), "The study of library service quality at Shiraz University using LibQUAL model", *Quarterly Journal of Knowledge and Information Management*, Vol. 1 No. 4, pp. 37-49.

Town, S. (2016), "LibQUAL+: a quality survey case study", in Atkinson, J. (Ed.), *Quality and the Academic Library: Reviewing, Assessing and Enhancing library Provision*, Chandos Publishing, Oxford, pp. 209-220.

Von Elm, E., Altman, D.G., Egger, M., Pocock, S.J., Gotzsche, P.C. and Vandenbroucke, J.P. (2007), "Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies", *British Medical Journal*, Vol. 335 No. 7624, pp. 806-808.

Voorbij, H. (2012), "The use of LibQUAL+ by European research libraries", *Performance Measurement & Metrics*, Vol. 13 No. 3, pp. 154-168.

Yaghobifar, M.A., Feizabadi, M., Dalili Saleh, M. and Saffari, E. (2016), "Evaluation of central library in Sabzevar University of Medical Sciences based on the Iranian standards of academic libraries", *Journal of Sabzevar University of Medical Sciences*, Vol. 22 No. 6, pp. 1052-1062.

Yektakooshali, M.H., Esmaeilpour-Bandboni, M., Sharemi, S. and Alipour, Z. (2016), "Survival rate and average age of the patients with breast cancer in Iran: systematic review and meta-analysis", *Journal of Babol University of Medical Sciences*, Vol. 18 No. 8, pp. 29-40.

Zakerjafari, H.R. and Yektakooshali, M.H. (2018), "Work-related musculoskeletal disorders in Iranian dentists: a systematic review and meta-analysis", *Safety and Health at Work*, Vol. 9 No. 1, pp. 1-9.

Appendix 1. Supplementary data

Supplementary data related to this paper is available at: www.researchgate.net/publication/327744250_A_meta-analysis_of_service_quality_of_Iranian_university_libraries_based_on_the_LibQUAL_model

Corresponding author

Mohammad Hossein YektaKooshali can be contacted at: Yektakooshali.mh@gums.ac.ir; yektakooshali.mh1995@yahoo.co.uk