






Assessing Service Quality of Library and Medical Information Center Based on Users' Perceptions: A Case Study of Hamadan University of Medical Sciences

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Abstract

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Introduction: Academic libraries must continuously evaluate the quality of their services and adapt to users' evolving information needs to ensure sustainability and development. This research investigated the quality of services in the libraries of Hamadan University of Medical Sciences from the perspective of users according to gap analysis models (LiveQual, DigiQual, and SERVQUAL).

Methods: This research is an applied, cross-sectional study. The statistical population includes 9916 active members in the portal of the central library of Hamadan University of Medical Sciences in 2023, which was determined by random sampling with a sample size of 407. The data was collected using a questionnaire and analyzed using descriptive and analytical statistics (paired t-test and non-parametric Wilcoxon test) using SPSS version 26 software.

Results: Based on Wilcoxon's non-parametric test, there were seven areas with an average difference >12 in assessing the gap between the quality of existing services and what was expected. In the hypothesis under consideration, namely, the mean difference in quality of available services with users' expectations, a significant difference was reported in most dimensions ($p < 0.001$). The most significant service gap was in the online service sector with an average difference of (-24.92), followed by educational programs (-21) and physical space (-15).

Conclusion: There was a considerable gap between users' expectations and service quality at Hamadan University of Medical Sciences library centers, necessitating a serious review of the services. Current services provided fail to satisfy users. To stay pertinent and effective within the educational system, libraries must adapt to evolving user needs by embracing modern technologies and improving physical spaces, equipment, and access to information.

Introduction

The development of information technologies has led to drastic changes in library information resources and services. One of these changes was related to the digital transformation, which led to the rapid dissemination of information resources

and knowledge sharing in the digital space, thereby changing the expectations of library users regarding the type of services (1). Service quality in libraries is associated with the difference between expectations and actual performance perceived by patrons (2) or



with a mechanism ascertaining whether the library has fulfilled its mission properly (3). According to Ranganathan, a famous philosopher in librarianship and information, the user is the core of all library activities, emphasizing that librarians must provide the correct information to the right user at the right time (4). The most important distinguishing factor between these centers is the quality of services offered to win user satisfaction. For this reason, clients' dynamic needs should be identified and appropriate solutions should be considered (5). Appraising the quality of library services only based on the collection of resources is no longer valid (6). Still, users' perceptions and expectations of library services should also be evaluated, which forms the basis of service quality (4). As a service quality evaluation tool, the gap analysis model measures the gap between users' expectations and what exists. Gap analysis models such as LibQual, DigiQual, and SERVQUAL are suitable for evaluating the quality of services in libraries. They are highly effective in becoming aware of users' expectations. These analysis models can evaluate library services, understand users' needs, guide decision-making, and support administrative initiatives. LibQual tool evaluates the three dimensions of service impact, information control, and library as a place; it originated from a research project conducted in 2000 to determine the expectations of users and customers (7). The SERVQUAL model examines the five core factors: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. The DigiQual tool has been designed based on LibQual to evaluate the service quality of digital libraries. All these tools analyze the service quality gap in an organization (8).

People with different scientific backgrounds and viewpoints use the services of libraries of medical sciences universities, and various valuable resources, including printed and electronic books, research projects, and other scientific resources, are collected in these centers. In addition, information services, namely the provision of articles and the presentation of consultations in various research fields, are available to users. Whether these services and resources align with users' real needs must be specified. Moreover, in assessing universities

seeking to improve the quality of their services, measuring the quality of library services and knowing the expectations and level of services provided to users can be helpful in relation to the current state of libraries to be considered in planning. As a result, studies conducted in recent years have shown that the changes resulting from technology in different service sectors should be regarded as a means to uphold libraries and information centers in universities. The quality of libraries and users' satisfaction with their services have been examined using various tools. Studies have been conducted by Mahmood et al. (9), Barfi et al. (10), Sayekti et al. (11), Habiburrahman and Erlianti (12) using the LibQUAL tool in academic libraries in Pakistan, Ghana, and Nigeria. The results of these studies have indicated a large gap between the level of expectations and the existing services, which is related to the differences in users' information needs. The services should be evaluated regularly, given the changing trend of users' needs. The LibQUAL model provides valuable information that can be used by library management to develop a service quality measurement scale and plan for service quality (10). In addition, Hasannejad (13) evaluated the quality of library services at Jundishapur University of Technology in Dezful, Ashrafi Rizi and Kazempour (6) analyzed the quality of services at central libraries of public universities in Isfahan, and Hashemian et al. (14) assessed the quality of services at the faculty libraries of Isfahan University of Medical Sciences in recent years.

Questionnaires, interviews, and a quality management model have been other tools for assessing the quality of library services. Sekhavatmanesh et al. (7) used a questionnaire to investigate the relationship between the qualities of library services from the faculty member's perspective at Jundishapur University of Technology in Dezful. Vakilimofrad et al. (15) also evaluated the quality of library services at Hamadan University of Medical Sciences using the European Foundation for Quality Management (EFQM) model and a questionnaire and stated that library services have been improving at Hamadan University of Medical Sciences. The quality of electronic services was assessed at

Ferdowsi University libraries using a combined model of LibQUAL, DigiQUAL, and electronic service quality model (ESQUAL), and it was found that the quality of electronic services provided in the libraries in question failed to meet users' expectations. Moreover, Molson (16) investigated the quality of library services at Mesozo University from the perspective of postgraduate students using an experimental method and a questionnaire tool. Ajith et al. (17) examined the effect of developing a conceptual framework for the effectiveness of university library services using a literature review method and considered the dimensions of collection development, management, and staff participation, service efficiency, and accessibility to provide quality service to users, along with continuous evaluation of services as the basic needs of these centers. Rahimi et al. (18) evaluated the quality of services of public and university libraries in Ahvaz using a combined DEMATEL-SERVQUAL method. Pharcy et al. (19) evaluated public library services in Murshidabad and West Bengal cities using questionnaires, interviews, and observations.

To provide the best service related to users' information needs, it is necessary to understand the level of users' expectations of service quality. Therefore, the main goal of this study is to evaluate the quality of library services provided in the libraries of Hamadan University of Medical Sciences from the users' perspective. The objectives include determining the extent to which users use different services, the gap between the quality of existing services and the level of users' expectations of the services provided, their satisfaction with the level of services available in these centers, and the difference between the current situation and the level of services expected by users in these centers. Since medical library services are often provided exclusively to users in the clinical and basic sciences, they are usually considered specialized services. On the other hand, people with different scientific qualifications and perspectives use the services of these libraries. An accurate tool that aligns with the various services of these libraries is needed to assess the quality of services. For this purpose, analyzing the gap between the services provided and the level

of users' expectations has been implemented using a consolidated tool based on LiveQual, DigiQual, and SERVQUAL to examine different service dimensions in these centers (20).

Methods

Research Type and Community

This research is a cross-sectional, applied study conducted with a survey method from September 2023 to March 2024 in libraries and medical information centers of Hamadan University of Medical Sciences. The research involved 9916 active members of the central library portal in 2023. The sample size, namely 370 people, was calculated based on Cochran's sample size formula. Considering the possibility of 10% drop in sample size, the final sample size was considered 407 people. The samples were selected using simple random sampling method according to the random number table. The inclusion criteria for the study were as follows: The sample must have been a student, faculty member, or university employee at Hamadan University of Medical Sciences during the 2023-24 academic year and should have used the facilities and services of the university's libraries.

Data collection and analysis

To collect data, this study used the tool "measuring the quality of services of libraries and medical information centers in medical sciences universities" (20). The intended tool consists of eight main areas and 72 items. The validity of its approved components was based on CVR scores, all of which were higher than the value of Lawshe's Table (0.49). In the CVI review, all the components scored >79 . In connection with the internal consistency check (Cronbach's alpha), all the items meet the necessary validity with reliability >0.90 (20). The questionnaire was organized in three sections: demographic information, general questions, and main questions. The main questions were assessed based on a seven-point Likert scale. After obtaining informed consent from the participants, data were collected in two forms: face-to-face and e-mail. Data analysis was done based on descriptive and analytical statistics using

SPSS software (version 26). The descriptive part is reported based on frequency distribution in tables and graphs. The non-parametric Wilcoxon test was used for the analytical part. In reporting results, as an ethical consideration, the identity data of research participants remained confidential, and the research findings were accurately reported. Ten questionnaires were removed due to incorrect answering processes or incomplete information after the questionnaires had been examined and

their completed information verified. Finally, the data from 397 questionnaires were confirmed.

Results

According to an analysis of demographic information and the number of visits to university library centers, nearly 75% of the users were in the 20-30 age range, and the majority of users were students (81.2%). The characteristics of library users are listed separately in Table 1.

Table 1. The characteristics of users of libraries and information centers of Hamadan University of Medical Sciences

Characteristics	Levels	Frequency	Percent
Sex	Female	280	70.5
	Male	117	29.5
	Total	397	100
Age	<20 years	27	6.8
	20-30 years	299	75.3
	30-40 years	36	9.2
	40-50 years	27	6.9
	<50 years	7	1.8
	Total	396*	100
	Students' level of study	BSc	176
MSc		47	14.6
Ph.D.		10	3.2
General practitioner		88	27.4
Total		321	100
Level of Education of Employee	Associate degree	2	4.7
	BSc	12	28.6
	MSc	18	42.9
	Ph.D.	10	23.8
Total	42	100	
Citizenship	Iranian	322	99.4
	Foreign	2	0.6
	Total	324*	100
Users	Student	321	81.2
	Employee	42	11
	Faculty	33	7.8
	Total	396*	100

*The difference in numbers is due to missing data.

Table 2 shows the number of users of libraries and information centers' services in response to the first question of the research concerning the usage rate of various services.

Of the 397 users, the majority were related to

the faculties of Paramedical Sciences (29.9%) and Medicine (28.9%), and most of the time (31%) visited these centers in person. However, most users (46.6%) have not used electronic services.

Table 2. The number of users of the services of libraries and information centers: number (percentage)

Row	Services	Number (%)
1	The number of visits to libraries and information centers	Everyday 98 (24.7)
		Mostly 32 (31.1)
		Monthly 79 (19.9)
		Occasionally 59 (14.9)
		Rarely 37 (9.4)
2	The usage rate of electronic library services such as ordering articles or other resources	Everyday 31 (7.9)
		Mostly 41 (10.4)
		Monthly 47 (11.9)
		Occasionally 47 (11.9)
		Rarely 45 (11.3)
3	Familiarity with the services of libraries and information centers	No use 185 (46.6)
		Low 87 (22)
		Medium 228 (58)
4	The usage rate of resources in the library	High 79 (20)
		Borrowing books 268 (73)
		Reference works (encyclopedias, dictionaries) 18 (4.6)
		Dissertations and research projects 30 (7.8)
5	The number of visits to different sections of the library	Electronic resources and databases 57 (14.6)
		Book circulation 181 (46)
		Reference 14 (3.8)
		Digital library (databases) 68 (17.5)
		Information consultation 10 (2.7)
6	Service utilization rate by center	Study halls 118 (30)
		Faculty of Medicine 108 (28.9)
		Faculty of Paramedical Sciences 112 (29.9)
		Faculty of Nursing and Midwifery 36 (9.7)



Table 2. The number of users of the services ... (continued)

Row	Services	Number (%)
	Faculty of Health	50 (13.5)
	Faculty of Pharmacy	17 (4.6)
	Faculty of Dentistry	8 (2.1)
	Faculty of Rehabilitation	23 (6.2)
	Hospitals	4 (1.1)
	Others	16 (4.3)

One of the research objectives deals with the gap between the existing services and the users' expectations of the services of libraries and medical information centers in eight dimensions. Concerning the average quality of existing and expected services in eight dimensions of the primary services of libraries and information centers, as shown in table 3, the highest average difference in the actual and expected services of users was related to the quality of services provided through Online services (-24.92), educational programs (-21.99) and electronic services (-18.70). In addition, the library's physical space in relation to the study halls and the physical space of the library building was far from the expectation level of users, with an average difference of (-15.03). Based on Wilcoxon's

non-parametric test, there was an average difference of >12 between the current situation and the level of users' expectations from the services in seven areas. Also, the calculated effect sizes for various service quality dimensions demonstrate a significant difference between the quality of available services and users' expectations. All Cohen's d values are >1.2, indicating a considerable gap; this means that the current quality of services is substantially lower than users expected. The largest effect sizes were observed in the areas of equipment and facilities and physical space, suggesting that these areas should be improved. Concerning the research hypothesis, there is a significant difference between the average quality of existing and expected services (Table 3).

Table 3. The results of the non-parametric Wilcoxon test to check the service quality of libraries and information centers

Dimensions	Average quality of available services from users' standpoint (SD)	Average service quality expected by users (SD)	Difference of means	Z-score	P-value	Cohen's d*
Online services	64.82 (19.52)	89.85 (10.00)	-24.92	-14.79	<0.001	1.72
Digital library	26.75 (8.56)	39.60 (5.88)	-12.61	-15.04	<0.001	1.72
Electronic Services	52.85 (14.99)	71.95 (7.40)	-18.70	-14.89	<0.001	1.59
Central library portal	43.78 (13.39)	59.19 (6.20)	-15.13	-14.43	<0.001	1.49
Equipment and facilities	17.56 (5.93)	26.40 (3.19)	-8.88	-15.17	<0.001	1.88
Education programs	56.70 (18.04)	78.99 (8.39)	-21.99	-14.74	<0.001	1.49

Table 3. The results of the non-parametric Wilcoxon test ... (continued)

Dimensions	Average quality of available services from users' standpoint (SD)	Average service quality expected by users (SD)	Difference of means	Z-score	P-value	Cohen's d*
Physical space	37.02 (11.20)	52.52 (5.29)	-15.14	-15.03	<0.001	1.82
Library website	42.27 (11.60)	53.68 (5.99)	-11.32	-14.56	<0.001	1.27

*Cohen's d: Effect size

Table 4. Evaluating differences in service quality and user expectations among students, faculty members, and staff using ANOVA

Dimensions	users	Average quality of available services from user's standpoint		P-value	Average service quality expected by users		P-value
		Mean	SD		Mean	SD	
Online services	Faculty member	61.62	16.56	0.144	90.48	7.68	0.656
	Student	64.45	20.34		89.67	10.06	
	Employee	70.31	14.40		91.18	10.78	
Digital library	Faculty member	24.74	9.39	0.088	40.90	2.68	0.448
	Student	26.64	8.44		39.50	6.25	
	Employee	29.15	8.54		39.47	5.048	
Electronic Services	Faculty member	56.03	13.58	0.017*	73.25	5.74	0.612
	Student	51.71	14.89		71.93	7.30	
	Employee	58.27	15.21		71.75	8.07	
Central library portal	Faculty member	42.29	13.87	0.001*	59.54	5.53	0.957
	Student	42.87	13.19		59.22	5.83	
	Employee	51.37	11.70		59.35	7.90	
Equipment and facilities	Faculty member	18.12	5.29	0.002*	26.77	2.62	0.819
	Student	17.10	5.98		26.39	3.16	
	Employee	20.57	5.09		26.42	3.46	
Education programs	Faculty member	56.32	16.10	0.010*	81.93	5.20	0.126
	Student	55.65	18.24		78.75	8.31	
	Employee	64.8	15.69		79.05	9.26	

Table 4. Evaluating differences in service quality ... (continued)

Dimensions	users	Average quality of available services from user's standpoint		P-value	Average service quality expected by users		P-value
		Mean	SD		Mean	SD	
Physical space	Faculty member	36.29	9.79	<0.001*	53.96	3.50	0.207
	Student	36.13	11.05		52.31	5.26	
	Employee	43.76	10.83		53.07	6.26	
Library website	Faculty member	46.09	9.24	0.001*	54.35	3.050	0.794
	Student	41.21	11.67		53.61	6.31	
	Employee	47.61	9.95		53.87	5.45	

* The scores show significant differences

Table 4 shows the average quality of available and expected services from the perspective of users in different library dimensions differs among various groups of users. The results of ANOVA test indicate significant differences between the standpoint of user groups (i.e., faculty members, students, and staff) about the quality of available services in some dimensions. Specifically, Tukey test shows that staff scored significantly higher than faculty members and students in the dimensions of Electronic Services, Central library portal, Equipment and

facilities, Education programs, Physical space, and Library website ($p < 0.05$). These differences indicate that employees have a different and more positive perception of the quality of services available compared to other groups. In contrast, no significant difference was observed between faculty and students in these dimensions. However, no significant difference was found between the groups for most dimensions in examining the expected quality of services, indicating similar expectations among faculty members, students, and employees.

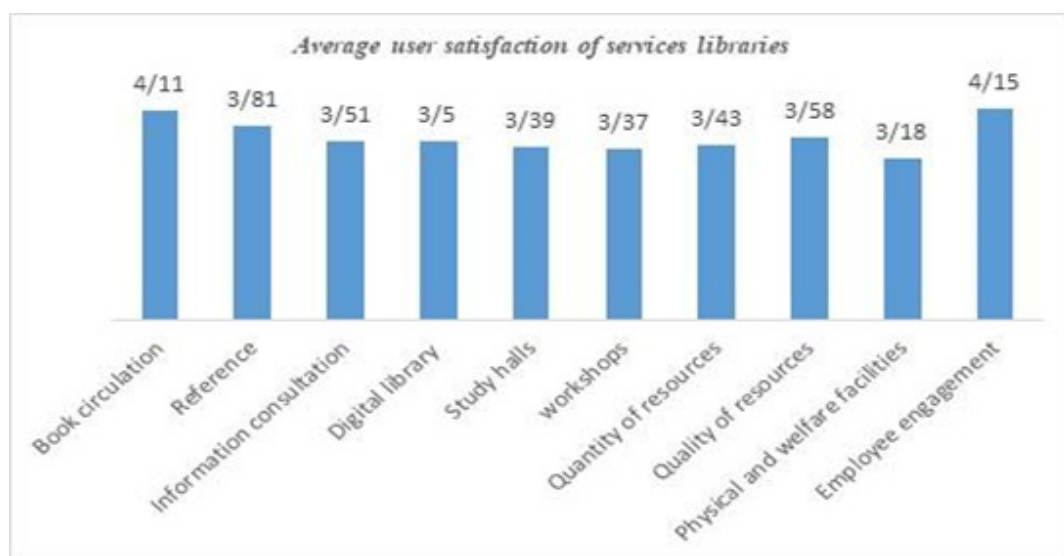
**Figure 1.** The satisfaction level of users with the services provided

Figure 1 shows the level of user satisfaction with the services provided. Various services are currently

provided in university libraries, but due to the lack of proper and independent physical space, users have

not been satisfied with the services. The highest and lowest satisfaction levels from the users' point of view were related to how the employees behaved (4.15) and physical facilities (3.18).

Discussion

Based on our findings, paramedical and medical faculties constituted the most significant number of users at libraries and information centers of Hamadan University of Medical Sciences. As a result, the management of libraries in this university should focus on providing information resources for these two faculties. They should also remember that most users were undergraduates; therefore, providing teaching resources must be an essential priority of these centers. It should not be overlooked that other users, including faculty members and graduate students, need services and electronic resources such as articles, e-books, and access to information bases, which are among the basic requirements of this group. Hence, the principle of balancing the resources has to be observed. In addition, the analyses indicated a significant gap between users' current and expected status in seven dimensions of the studied sections. In fact, regarding the hypothesis under study, according to the z-statistic values of the difference in means, there was a significant difference between the average level of quality of existing and expected services of users, in some indicators, which requires review and attention of managers and librarians in providing services. It is also worth noting that the average quality of available services in different dimensions of the library was significantly different from the perspective of users (i.e., faculty members, students, and staff). Analysis of variance (ANOVA) and Tukey's tests showed a significant difference in some dimensions, such as electronic services, central library portal, equipment and facilities, educational programs, and physical space between user groups (faculty members, students, and staff).

On the other hand, various services are currently provided in the Hamadan University of Medical Sciences libraries. Still, the authorities have not achieved high user satisfaction with the services due to the lack of a suitable and independent

physical space. According to these descriptions, it can be concluded that libraries and medical information centers should design and provide their services based on the special requirements of users. As a result, to attract and retain users with different education levels, libraries should provide their services suitably and extensively. Mahmood et al. (9) also confirmed that due to the changes in the conditions and services of libraries, users have higher expectations than the current services provided and need separate and extensive spaces. There should also be services such as providing electronic resources through the library website and providing an environment with sufficient light, namely a quiet and safe environment for users in the library (16).

Because the services of libraries are not limited to book borrowing resources and study space, libraries have many more tasks and roles than they had in the past, given the development of communication and information technologies. As a result, the users should be familiar with various services provided in libraries as well as the skills and capabilities of librarians to get the most out of library services. The information skills of the staff and the provision of various resources to users have led to their satisfaction with the services of the libraries of Hamadan University of Medical Sciences. This issue has also been confirmed in Molson's study (16). Since users are, on average, familiar with all types of services, the conditions for presenting information services should be provided at the beginning of membership in the libraries. This is necessary for better development of these centers' physical spaces, electronic services, and websites, motivating capable librarians to reasonably reduce the gap between the current situation and that expected by users. The importance of addressing this issue is evident in the studies conducted regarding the evaluation of the quality of library services. For example, Pharcy et al. (19) suggested that users need more services such as computers, photocopying, and drinking facilities, newspapers, magazines, books related to various topics, and magazines in the public libraries of the Murshidabad region. Alam and Mazbahul-Islam (21) also stated that library resources, staff competence,

behavioral approach, and tangible library facilities significantly impact users' satisfaction. The highest satisfaction of library users in Hamadan University of Medical Sciences has been from the librarians' approach and response to their information needs. On the other hand, they have raised the lowest level of satisfaction with the physical space in different parts of libraries. However, in the study of Kumar and Mahajan (22), library users were delighted with the location and information control. Still, they were least satisfied with the knowledge and efficiency of library personnel.

Mahmood et al. (23) investigated and reported the service quality of university libraries of Pakistan, and none of the features and dimensions of service quality met the expectations of group and individual users. In addition, there were significant differences in the quality of library services based on gender, type, and user field of study. This issue was also evident in the quality of Hamadan University of Medical Sciences' library services. According to the results of the non-parametric Wilcoxon test to check for the service quality of these centers, it can be concluded that the difference between the average service quality expected by users and the actual service quality provided in different departments is significant according to the z-score, P-value, and the difference between the averages. Moreover, ANOVA and Tukey's tests showed significant differences in some dimensions, such as electronic services, central library portal, equipment and facilities, educational programs, and physical space between user groups (faculty members, students, and staff). In other studies, it has been emphasized that continuous assessment of the quality of services and their improvement according to users' needs should be part of the essential programs of libraries (14). Based on studies, qualified librarians are another requirement for providing services due to increased information sources, recognition of credibility, and access to resources. In addition, appropriate budget allocation is the most fundamental principle in developing libraries, so libraries must have a high financial capacity to provide the best services based on specialized knowledge. Managers in all university decision-making departments should

pay attention to this issue. Finally, it should be stated that continuous evaluation is a vital need for the sustainability of a system, especially libraries. Ajith et al. (17) have also considered planning for strong service to the community in continuous evaluation of library services based on issues such as user satisfaction, collection development, management, staff participation, service efficiency, and accessibility.

Research Limitations

The main practical limitation of this study was that some respondents inaccurately completed the questionnaires. To solve this problem, the research team again explained the importance of the subject to participants through face-to-face and telephone follow-ups and created suitable conditions. Moreover, the replacement method was used to achieve maximum participation.

Conclusion

In general, a significant gap ($P < 0.001$) exists between the quality of services provided and users' expectations of Hamadan University of Medical Sciences libraries in most dimensions. In seven dimensions of online services, digital library, electronic services, central library portal, educational programs, physical space, and quality of library websites, an average difference of >12 was reported between the current situation and the level of users' expectations of services. The average quality of existing services from the perspective of different groups (faculty members, students, and staff) revealed a significant difference in these seven dimensions according to the analysis of variance (ANOVA) and Tukey test. Given that various services are provided in the central library and other libraries of this university, due to the lack of appropriate and independent physical space, the provided services have not achieved high user satisfaction. Additionally, users had the lowest level of satisfaction with the library's physical facilities. Therefore, it is essential to develop reading rooms, collaborative spaces, and computer equipment to provide better services to students. In the next stage, it is recommended that digital library services, such as access to databases and electronic resources, be

improved and adapted to user expectations. The need to take appropriate measures and improve processes for the electronic services, physical space, websites, and equipment in the libraries and information centers of Hamadan University of Medical Sciences is an essential requirement to improve the quality of services. On the other hand, because more than six faculties and five teaching hospitals are active in the university, the need for ample independent physical space that can serve this volume of users should be one of the critical priorities of university administrators. Furthermore, authorities should pay attention to librarians' specialized, scientific, and communication skills when employing and hiring library employees. As a result, the professional staff in the field of librarianship will have more self-confidence and willingness to cooperate in meeting the needs of library users. Appropriate measures in these fields can lead to increased satisfaction and overall improvement of the quality of services provided by the libraries and information centers of Hamadan University of Medical Sciences. In general, it should be noted that university libraries must continuously apply the changes resulting from information technology in their services and put the needs and demands of users at the forefront of their actions and plans.

Declaration

Acknowledgment

The authors would like to thank all participants in the study.

Conflict of Interest

The authors declare that they have no competing interests.

Ethical Statement

The study procedure was approved by the

Medical Ethics Committee of Hamadan University of Medical Sciences [date: 2023-07-08, ID: IR.UMSHA.REC.1402.322]. As of the research proposal "Evaluation of the service quality of libraries and medical information centers from the users' point of view in Hamadan University of Medical Sciences". All participants' information was private and nameless; no personal information could link the answers with any of the participants in the present study. All methods in the study were in accordance with relevant regulations & guidelines (General Ethical Guidance for Medical Research with Human Participants in the Islamic Republic of Iran).

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Authors' Contribution

All authors contributed to the study conception and design.

Hossein Vakilmofrad: Conceptualization, Methodology, data analysis, writing review, and editing of the final manuscript.

Maryam Zarghani: Conceptualization, Methodology, data analysis, first draft manuscript was written & writing review, and editing of the final manuscript.

Parastoo Ansari: data collection.

Mohammad Kharabati-Neshin: data collection.

Soraya Moamer: data analysis. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Use of Artificial Intelligence

Not applicable.

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