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Pattern and Magnitude of Utilization of Information Resource Facilities and Services at Health Sciences Library in the Midst of COVID – 19 Pandemic

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ABSTRACT

Background: Medical librarians support curriculum and research by delivering appropriate and high-quality information and facilities to students and faculty members. COVID-19 pandemic disrupted physical teaching and learning worldwide endorsing virtual education which was supported by digital information resources. The purpose of this study was to evaluate the extent of utilization of physical and digital learning resources along with customer satisfaction in a health science library before and during the COVID-19 pandemic.

Methods: An online self-administered questionnaire was administered using Microsoft Forms to students and faculty members. Data were analyzed using SPSS version 24. Qualitative variables were analyzed using mean and standard deviation. A Chi-square test was carried out to compare customers' satisfaction with the utilization of information resources before and during the pandemic. A p-value < 0.05 was considered to be statistically significant.

Results: A total of 230 participants were included in the study. The library was visited by 18.7% and 26.1% of customers daily, and weekly respectively before the COVID-19 pandemic. However, none of them used the library daily during a pandemic, while digital library usage increased during this time. A significant reduction in the level of customers' satisfaction was observed with the physical library services in coronavirus outbreaks compared to satisfaction before the pandemic, $p=0.028$. Participants were satisfied with the utilization of digital library services during the pandemic compared to the pre-pandemic period, $p= 0.024$.

Conclusion: The use of digital libraries surged during the pandemic resulting in a rapid adaptation of electronic books and journals. Librarians' have played a vital role in the current catastrophe by improving awareness of stakeholders regarding e-resources.

Keywords: COVID-19; OPAC; digital library; e-resources; information resources

INTRODUCTION

Coronavirus Disease (COVID-19) is a highly infectious disease manifested by severe pulmonary symptoms resulting from severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Ouassou et al., 2020). According to the WHO COVID-19 Dashboard report there are 521,920,560 confirmed cases worldwide and 6,274,323 people have died due to the deadly virus till 21 May 2022. There have been 761,624 confirmed cases of COVID-19 with 9,124 deaths in the Kingdom of Saudi Arabia (KSA) (World Health Organization, 2022). COVID-19 has emerged as a global crisis in the form of a pandemic. There was a rapid escalation of the pandemic without any preparedness and readiness to deal with it. This had a great impact on all aspects of life, especially on academic institutions. Stay and work from home were enforced all around the world (Ayittey et al., 2020). This unforeseen situation

disrupted traditional education and prompted the necessity to implement an alternative teaching strategy. All education institutions including universities were advised to suspend academic activities on March 9, 2020, and continue education through virtual learning as directed by the Ministry of Education in the Kingdom of Saudi Arabia (Al-Kadri et al., 2020; Tanveer et al., 2020).

Libraries are an essential part of medical schools, acting as learning resource centers to fulfill the mission and vision of the academic institutions by offering several services and facilities. Medical librarians have an important role in delivering appropriate and high-quality information and facilities to health care providers. They support curriculum and research by providing services including book loans, study areas, meeting rooms, computer workstations, reference services and consultations. Various online facilities are delivered through digital library platforms to the faculty, staff, students and researchers including the provision of e-books, e-reference, e-journal access, document delivery, literature search, systematic reviews, research database, online public access catalogue (OPAC) etc. (Umukoro & Tiamiyu, 2017). According to International Federation of Library Associations and Institutions (IFLA), COVID-19 pandemic has affected libraries all over the world. Some of the libraries had to undergo complete shut down while others were operating with minimal services provided to end users in order to prevent transmission of the virus (Samanta, 2020). Though the facilities were closed, still librarians continued to work from home and provided access to e-services virtually (Yu & Mani, 2020). Library facilities in KSA also faced closure as all academic institutions adopted virtual teaching due to complete lockdown imposed in the country. Presence of e-libraries, electronic materials and database in library's collections became an advantage and the librarians responded quickly by providing electronic resources to the end users. A number of steps were taken to reduce the problems faced by the consumers like extension of due dates, postponement of fine, utilization of article request form and other policies (Ali & Gatiti, 2020; Yuvaraj, 2020). American Academic Medical/ Health Sciences Libraries offered the services virtually with notifications on their websites explaining how to access e-services and facilities (Yu & Mani, 2020). Some of the libraries in Netherlands adopted click-and-collect or drive-through services to minimize direct contact with librarians while others offered facilities by appointments only (Jan & Ali, 2020).

The purpose of this study was to evaluate patterns and extent of utilization of learning resources in medical library at College of Medicine, King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS), Saudi Arabia before and during COVID-19 pandemic after re-opening of libraries. KSAU-HS is a governmental university specialized in health sciences with 14 colleges in three campuses in Riyadh, Jeddah, and Al-Ahsa offering various undergraduate and postgraduate degrees. The study explored the extent of digital library utilization as an alternate to physical facilities during the pandemic. Perception of students and faculty on adequacy of available electronic library services to ascertain their level of satisfaction was evaluated. Useful e-resources supporting end-users in conducting research during the pandemic were also identified. The role of medical librarians in ensuring strict adherence to safety protocols and preventive measures was investigated. There is scarcity of research in determining the effectiveness of e-services provided by academic libraries. Therefore, there was a need to study trends of utilization and satisfaction of e-services by the students and to determine the reasons encouraging or preventing the utilization of these facilities. This can help librarians to improve the digital library services provided to meet user needs and institutional mission even when libraries are physically closed due to any future crisis.

MATERIALS AND METHODS

A cross-sectional study using an online survey was conducted after ethical approval from the Institutional Review Board (IRB) (RYD-21-419812-80584) of King Abdullah International Medical Research Center (KAIMRC) from October to December 2021. Non-probability convenient sampling method was used. A sample size of 292 was determined through the Raosoft sample size calculator with a confidence level of 95%, response distribution of 50%, and an expected margin of error of 5% (Ali & Gatiti, 2020). Keeping in mind the possibility of a low response rate, the survey was distributed

to 320 participants. A total of 245 responses were received with a response rate of 77%. 15 forms were excluded from the study due to incomplete information. So a total of 230 preforms were included in the analysis. Participants in this study included faculty members and students. Microsoft form was electronically shared with faculty and students through email and data was collected after obtaining informed consent. All responses were kept anonymous.

A well-structured questionnaire was designed comprising of four sections. The first, section contained the demographic profile of the study participants. The second section was regarding the perception of users and their satisfaction with the utilization of library services and information resources before the COVID-19 pandemic. These services include customer services, collections, software, and e-resources. The next segment dealt with the usage of various library services and facilities on re-opening of libraries during the COVID-19 pandemic. Participants were also asked about their satisfaction with safety precautionary measures for COVID-19 undertaken by the library. Any challenges faced by the users during utilization of these resources during the pandemic and suggestions for improvement were enquired as open-ended questions in the last section. Each question has an option for responding on a 5-point Likert scale ranging from 1-5 (strongly disagree, disagree, neutral, agree, and strongly agree) (Joshi, 2015). Cronbach’s alpha was used to estimate inter-item reliability and consistency and it was found to be 0.77 for services before COVID-19 and 0.78 for services during the pandemic. All statistical analysis was performed using the software package for social sciences-SPSS (Version 24.0; SPSS Inc. Chicago, IL, USA). Quantitative continuous variables were described as mean with standard deviation. Frequency and percentages were used to evaluate categorical parameters. The cumulative score was calculated for the utilization of physical and online services provided by the library before the commencement of the pandemic; the maximum score was 55 and 50 respectively, whereas the minimum score was 11 and 10 respectively. The maximum score for the utilization of both physical and digital resources during the pandemic was 50 and the minimum score was 10. The mean score of each parameter was calculated and was used as the basis for data interpretation of satisfaction with the services provided. Scores more than mean scores were considered as being satisfied with the services while those who scored lower than the mean were labeled as unsatisfied. A Chi-square test was carried out to compare customers’ satisfaction with the utilization of information resources before and during the pandemic. A p-value < 0.05 was considered to be statistically significant.

RESULTS

A total of 230 participants were recruited for this study. The majority of the participants 206 (89.6%) belonged to 20-30 years’ age group. There were 173 (75.2%) females and 57 (24.8%) males. Respondents included 205 (89.1%) students and 25 (10.9%) faculty members. **Table 1** summarizes the socio-demographic profile of the respondents.

Table 1: Socio-Demographic Characteristics of participants

Variables	Groups	N 230 (%)
Age Group (years)	20-30	206 (89.6)
	31-40	7 (3.0)
	41-50	17 (7.4)
Gender	Male	57 (24.8)
	Female	173 (75.2)
Occupation	Students	205 (89.1)
	Faculty	25 (10.9)

Before the commencement of the COVID-19 pandemic, 18.7% and 26.1% users visited the library on a daily, and weekly basis, respectively. However, during the pandemic, none of the respondents used the library daily yet monthly library access was 43.5% as illustrated in **Figure 1**. Comparatively, digital library usage surged throughout the epidemic, with majority of customers utilizing service at least daily (23.9%) or once a week (45.7%) as depicted in **Figure 2**.

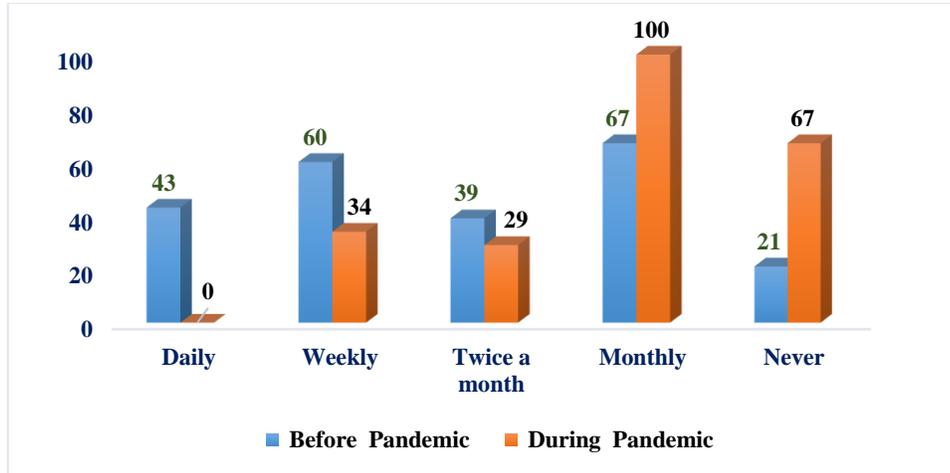


Figure 1: Physical library visits by the customers before and during the COVID-19 Pandemic

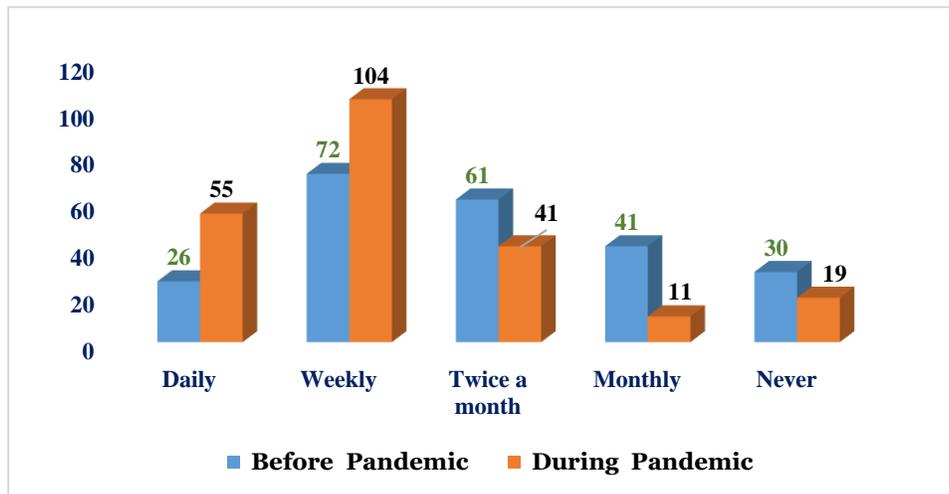


Figure 2: Digital library use by the customers before and during the COVID-19 Pandemic

Figure 3 demonstrates a significant reduction in the level of satisfaction of customers with the physical services offered by library during the COVID-19 pandemic, n=123(53.5%) as compared to satisfaction before the onset of the pandemic, n= 142(61.7%), χ^2 (4.807), p 0.028. **Table 2** gives a comparison of customer library service consumption before and during the COVID-19 pandemic, there was a drastic reduction in the mean rating of printing, scanning, and photocopy facilities (3.02) during the pandemic vs (4.06) before the pandemic. Moreover, interlibrary loan service with the delivery of books and articles borrowed from other libraries and campuses had a poor mean rating (3.34). The availability of

adequate computer workstations (mean=3.35) and group study areas (mean= 3.55) was also limited during COVID-19.

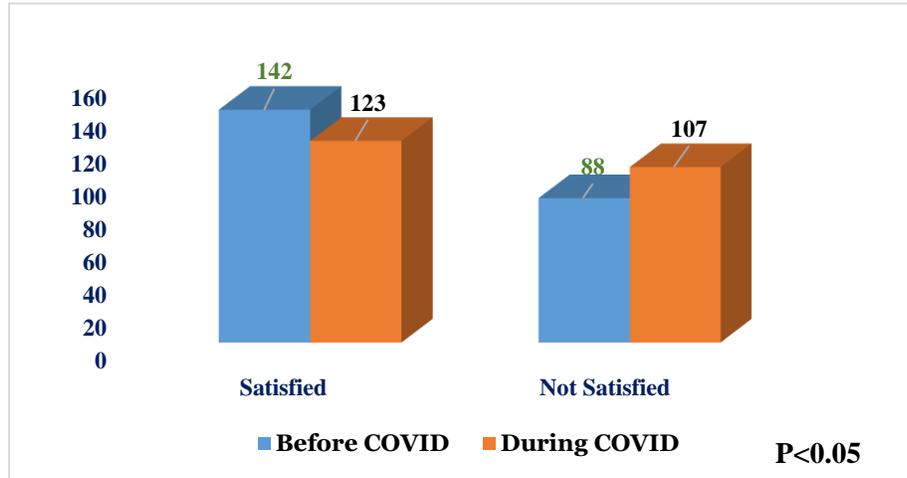


Figure 3: Satisfaction of Library services before and during the COVID-19 Pandemic

The utilization of electronic resources for learning and research increased substantially during the current outbreak. As illustrated in **Figure 4**, 146 (63.5%) study participants were satisfied with the online library resources during the pandemic as compared to 131 (57%) before COVID-19. A significant association was identified between user satisfaction on utilization of digital library services before and during pandemic, χ^2 (5.089), p 0.024. They were in high level of agreement that online reference services (mean=4.4) were absolutely crucial for learning and research. Analogously, utilization of e-books (mean=4.3), e-journals (mean=4.2), Saudi Digital library (mean=4.3) and literature search support (mean=4.2) also expanded. The library search facility, OPAC received mean score of 4.2 during the pandemic. Moreover, respondents were satisfied with expansion of online reference services as well as with the virtual orientation and training sessions (mean= 4.3) conducted by library staff for better utilization of digital information resources during the outbreak. (**Table 2**)

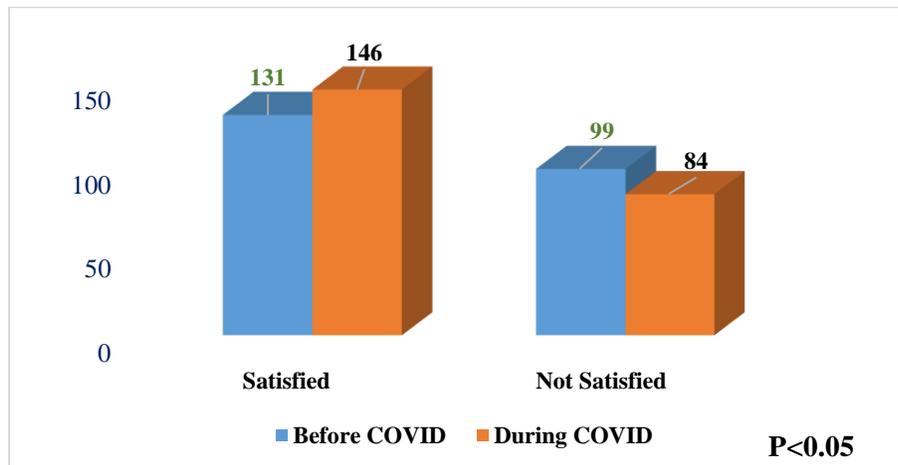


Figure 4: Satisfaction of Digital library services before and during the COVID-19 Pandemic

Reference books were rated as the major learning tool available in the library (Mean= 4.35) followed by electronic collections (Mean= 4.25), CD, DVDs (4.21), and scientific journals (4.18). Software such as SPSS, JMP, Endnote, and RefWorks was available in the library for end-users and was regarded as vital tools for conducting research in both the pre-and post-pandemic eras.

Satisfaction with the safety precaution measures taken by the library during the coronavirus outbreak was reported by 134 (58.3%) participants. Library personnel was generally considered to be supportive and cooperative (mean=4.29), tutorial and orientation sessions (mean=4.30) and brochures and guidelines (mean=4.23) were beneficial in utilizing various information resources and services. Most of the survey participants reported adequate library opening hours before the pandemic (mean=4.28).

Table 2: Mean rating of library services before and during the COVID-19 pandemic

Variables		Variables
Customer Library Services Before the COVID-19 pandemic	Frequency	Customer Library Services During COVID-19 pandemic
	Mean±SD	Mean±SD
Brouchers & guidelines	4.18±1.01	4.23±0.78
Print/scan/photocopy facilities	4.06±0.99	3.02±1.23
Article express request	4.25±0.94	4.52±0.61
Interlibrary loan	4.15±0.95	3.34±1.01
Adequate Computer workstations	4.17±0.95	3.35±1.02
Adequate group study areas	4.22±1.02	3.55±1.01
Adequate quiet places in library	4.19±1.07	4.22±0.72
Internet availability	4.31±0.85	4.21±0.70
Helpful library staff	4.29±0.86	4.20±0.74
Online resources for learning & research Before COVID-19 pandemic	Frequency	Online resources for learning and research During COVID-19 pandemic
Database	3.47±1.12	4.23±0.79
e-books	3.80±0.99	4.34±0.69
e-journals	3.84±1.01	4.13±0.76
Literature search support	3.65±1.13	4.23±0.72
Saudi Digital Library	3.58±1.13	4.26±0.73
Online reference service	3.36±1.21	4.35±0.68
Library website	4.23±0.80	4.27±0.67
OPAC	3.63±1.11	4.24±0.62
Internet	4.21±0.70	4.21±0.70
Workshops, tutorials helpful	4.31±0.85	4.30±0.70

DISCUSSION

Libraries incorporate a variety of ingenious approaches to provide support to the customers for obtaining information essential for learning and research. COVID-19 enforced closure had a substantial impact on libraries in academic institutions. In order to prevent virus transmission, the facilities in the libraries could not be executed. Academic libraries in KSA faced closure as complete lockdown was imposed in the country (Al-Kadri et al., 2020). According to American Library Association (ALA) most of public libraries in United States (US) were shut down by March 20, 2020 while few were offering limited access to physical services (Hinchliffe & Wolff-Eisenberg, 2020). The primary concern for librarians was to explore methods to ensure delivery of routine services in unprecedented circumstances. Tremendous initiatives were taken by the libraries to support smooth transition to virtual education and to facilitate research. Digital services are popular in practically all sorts of libraries. Digital information resources and online databases can be accessed virtually with convenience to explore the information needed. So there was a need to analyze and comprehend key challenges in prompt delivery of services along with recognition of future prospects of digital services. This research provided an overview of utilization of digital resources as a substitute for physical facilities in a health sciences library during COVID-19 pandemic. The level of satisfaction of students' and faculty's perceptions in the adequacy of existing digital library services was also determined. Customers' satisfaction with the rigorous adherence of librarians to follow safety precautions to prevent spread of this lethal disease was also ascertained.

According to our study, the users visited the library on a daily or weekly basis before the commencement of COVID-19 pandemic while most of the respondents visited library once in a month during the pandemic after reopening of the university and library. Our analysis revealed that most of the participants reported adequate library opening hours before the pandemic. Likewise, a survey conducted by Scoulas and De Groot (2021) as well as De Groot and Scoulas (2021) established that about 60% of study participants went to library once a week while only 12% never visited the library in 2018. They concluded that number of library visits by the students declined drastically during COVID-19 crisis. Most of the students (69%) never paid a visit to library while only few students visited library daily. Digital library use increased relatively during the epidemic. Abrupt transition from in campus sessions to virtual teaching accelerated the utilization of ever higher proportions of electronic and digital collections and the libraries had to meet the challenge to support faculty, students, staff and researchers in providing online materials and services. Our study showed that most of the consumers utilized the service either daily (23.9%) or once a week (45.7%). Landoy and Færevaag (2020) observed a surge in utilization of electronic books during the pandemic in University of Bergen Library. According to Scoulas and De Groot (2021), around 71% participants accessed digital library "once a month" while 29% never used this service in 2018. While 44% customers accessed digital library "once a week," 30% didn't use this service and 27% accessed it monthly. Sangeeta et al., (2012) reported that 33.3% respondents accessed digital library more than once daily while 38.9% users used it daily.

Majority of participants in our survey were satisfied with onsite facilities rendered by library prior to commencement of pandemic. Group study areas and computers were readily accessible. Services like printing, photocopy, internet, article express request, and interlibrary loan received a high mean score. Customers found library staff to be very helpful and cooperative. Opening hours of library were regarded as sufficient by the respondents. Digital resources like database, e-books, e-journals, Saudi Digital Library, library website, and OPAC offered before initiation of pandemic received relatively lower score compared to services provided during the pandemic. Victoria University of Wellington published a study on the attitude of stakeholders towards library services. They concluded that OPAC, online request forms, and database were the primary focus for modification and expansion. Financial support was deemed to be a significant obstacle in the implementation of digital resources (Xia, 2003).

The libraries in KSAU-HS resumed physical operations in September 2020 in a limited capacity and students were allowed to visit only with a prior appointment. Library staff was required to be present onsite and work from home was suspended. Group study areas still remain closed. Several safety precautions including masks, hand sanitization, disinfection, and social distancing with appropriate placement of signage was implemented in the library to prevent spread of corona virus. The returned books had to undergo quarantine for a predetermined timeframe before further processing. 58.3% of respondents in our survey were satisfied with the protective measures taken by the library during the outbreak. Likewise, American academic library survey revealed that around half of the libraries were opened with reduced hours and limited seat booking by commencement of Fall 2020 semester. Only about 10% of libraries recommended their librarians to work from a remote location. Similar safety precautions were executed along with isolation of the material returned to library (Hinchliffe & Wolff-Eisenberg, 2020a). King Abdullah University of Science and Technology (KAUST) in KSA released guidelines to customers for resumption of library facilities comprising of restricted entrance and prohibiting gatherings (International Federation of Library Associations and Institutions, 2020). Yuvaraj (2020) also reported implementation of safety measures to curb the spread of corona virus infection. University of Bergen Library also enforced reduced operational hours after reopening to avoid crowding of customers (Landoy & Færevaaag, 2020). Scoulas and De Groote (2021) described that 90% of survey participants were satisfied with the safety precautions measures undertaken at the library during Fall 2020. They observed that visitors had challenges in booking spaces in library at the start of the session, but their satisfaction enhanced as the course progressed. But library working hours were not considered appropriate during this period. They also reported closure of joint study areas.

Librarians have a substantial role in facilitating patrons to promote learning and research. Consumers' priorities should be evaluated before launching digital services by the library and appropriate guidance should be disseminated to the users for maximum exploitation of these services. Users' perceptions of acquaintance and significance of the services along with their contentment with the services, enhance their potential utilization in the future. Choudhury et al have highlighted the importance of consumer point of view and their feedback in improving the services offered by the library (Choudhury et al., 2002). Our library regularly arranged tutorials and workshops to familiarize students and faculty with information resources. Results of our survey revealed that librarians were supportive and brochures and guidelines were valuable in accessing information resources. Librarians conducted orientation, training sessions, and webinars virtually especially related to digital library during the pandemic and users in our survey were satisfied with these sessions. This finding is in comparison to KAUST that published tutorial videos and training materials on their website to support stakeholders in accessing information resources effectively to endorse learning and research (International Federation of Library Associations and Institutions, 2020). An online survey on digital library services revealed that around 39% students attended training and orientation sessions conducted by library (Dhamdhare, 2012). Respondents in survey conducted by Xia et al proposed to have training on information resources for all relevant stakeholders, particularly fresh students. They also documented that more awareness is intended to raise knowledge of digital library services and their utilization (Xia, 2003). Results of another survey documented that majority of participants attributed librarians to be supportive and cooperative (Scoulas & De Groote, 2021). Mehta and Wang (2020) encountered some difficulties in promoting usage of digital library facilities. They had to convert most of the print material into digital version by scanning. Most of the customers were not acquainted with using search engines to obtain required information so appropriate guidance was provided through website. There was an increasing tendency of usage of online reference services.

Our study showed reduced customers' satisfaction with the physical library services during the pandemic with a decline in mean rating of printing, scanning, and photocopy facilities. Interlibrary loan, computer workstations and group study areas also received a low average score. This could be attributed to closure of study areas, unavailability of printing and photocopy facility to curb the spread

of corona virus. Less computer workstations were operational to maintain social distancing. Likewise, De Groote et al also reported limited utilization of printed textbooks, book borrowing and inter-library loan due to the fact that libraries shut down during the pandemic (De Groote & Scoulas, 2021).

Our study demonstrated that the utilization of digital library services for learning and research increased substantially during the current outbreak. Around 63.5% study participants show satisfaction with virtual library resources. Virtual reference service, e-books, e-journals, Saudi Digital library and literature search support received higher rating as compared to their utilization during pre-pandemic era. Respondents were in high level of agreement that OPAC enabled them to locate relevant library resources quickly. University of Bergen Library in Norway also witnessed a rise in usage of e-journals and electronic books as the libraries shut down during this phase. They also noted a surge in chat and email requests from March to June 2020. They also mentioned a 137% increase in accessing website of the library by the customers to gain access to literature and information (Landoy & Færevaa, 2020). Anderson et al., (2021) reported that most of the libraries in the United States observed a transition to digital domain with main emphasis on online reference services. De Groote and Scoulas (2021) documented that the proportion of students using virtual library services (49.3%) in University of Illinois, Chicago during 2021 was substantially greater than in 2018 (8.8%), while fairly low number of students managed to visit the library physically in 2021 compared to 2018. They discovered an upsurge in customers accessing library website along with enhanced utilization of abstracting and indexing databases and journal articles by researchers. There was an increase in online training during the pandemic. A decline in article loan requests was observed during the pandemic compared to pre-pandemic period. Interestingly, they also identified that majority of students didn't utilize physical or virtual library services during 2021. Mi et al., (2020) noticed that switching to online teaching in health science universities prompted faculty and students to use digital library resources during COVID-19 crisis. Connell et al., (2021) also reported comparable findings in academic libraries at Louisiana State University, Northeastern Illinois University and Valparaiso University. The use of database, catalogue, discovery system and website were diminished in libraries at three campuses during the pandemic. Louisiana State University recognized 35% increase in borrowing articles from other libraries although Valparaiso University reported 32% decline. An increase in the virtual patron support system was observed. Librarians facilitated customers through email and satisfied them by ensuring electronic delivery of research articles and books via interlibrary loan in the course of pandemic. User satisfaction survey from Pakistani university libraries conducted in 2012 demonstrated that OPAC received high rating by consumers (Mean Z 3.55). Online databases, virtual reference facility, printing, CD-ROM Databases, and scanning facility were considered great. They acknowledged that promotion of digital facilities is crucial in maximum utilization of these services (Mirza & Mahmood, 2012).

Majority of the participants in our research regarded print and e-books as the major strength of library. Other learning resources such as electronic collections, CD, DVD, scientific journals and software such as SPSS, JMP, Endnote, and RefWorks were considered to be valuable for the patrons to conduct research. Some of the users suggested to upgrade Windows in the library computers, others suggested to grant more access to e journals.

Primary limitation of this research was self-administered survey, and the recorded observations might reflect personal perspectives and beliefs. Low response rate especially from male students was another constraint, and this could be associated with lack of enthusiasm to participate in the survey as the participants felt overburdened due to influx of a lot of questionnaires related to various aspects of COVID-19 during this time.

CONCLUSION

This article underscores the significance of valuable information resources in promoting learning and research. Results of our research suggested that patrons were generally satisfied with the library's resources and facilities before COVID-19 imposed closure while the satisfaction declined during the pandemic. It can be concluded that use of digital library surged during corona virus outbreak leading to quick transition from printed to electronic books and journals. Thus digital library provided comprehensive and convenient customer services around the clock, regardless of patron location. We observed that librarians' responsibilities have increased considerably in the existing calamity and they played an indispensable role in improving perception of e-resources by providing training sessions and information literacy programs. Though the digitization is challenging and demands hard work, but access to e-collection resources and enhanced digital capacity is not only beneficial immediately, but this will have a long-lasting impact in any future crisis when services cannot be provided physically.

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