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# A Study on the Establishment of Integrated Health Information Service Model of Public Libraries

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## ABSTRACT

Currently, it is not easy for most domestic public libraries to collect and provide reliable health information services on their own. Health information is distributed or professional, making it inconvenient for users to use. Based on the implications derived from the case study, the Library Health Information Integration Service Model was proposed as a specialized information service. The model consists of a composition shared by librarians, health and medical experts, and users, focusing on library websites that provide integrated health information integration services, and has the following features. First, it provides health and medical information on a specialized subject. Second, it provides integrated health and medical information services provided in various ways. Third, librarians and health and medical experts work together to provide information services. Fourth, users can freely use health information integration services online and offline. The model presented in this study means that libraries can play a leading role in health information integration services to increase the utilization rate of public libraries and further contribute to librarians serving as experts in health information services.

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## 1. Introduction

The perception or necessity of providing health information services in libraries is emerging from Korea's comprehensive Library Development Plan. Recently, there has been a growing demand and interest in using health information due to the development of the medical, bio industries and the spread of the COVID-19 epidemic. In addition to the need and interest in such health information, the environment for using health information is changing, and health information has become available in various ways: through general hospitals, university hospitals, commercial medical institutions, professional hospitals, sites operated by individuals, blogs and Q&A sites (Noh, 2011). As a result,

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primary research was carried out in the library community to provide health information services, mainly analyzing the current status of domestic and foreign countries, surveying awareness of users and librarians, and researching literature. However, since the number of libraries providing health information services in Korea is minimal, therefore, considering this, we need a specific system or model for libraries in Korea to provide health information services.

On the other hand, as the demand of users who want to obtain and use health-related information through the Internet; as the demand for users' health information through the web environment increases, it is important to provide information of government services on non-commercial and specialized information to promote public health. However, there are no services or related sites that provide reliable health information in Korea. In addition, the information provided by hospitals, medical institutions, and the national health and welfare level is distributed and so professional that it can be inconvenient for users to use. Therefore, it is necessary to develop a Library Health Information Service site that provides all health information before visiting hospitals or medical institutions. Furthermore, with the growing interest in library-specific information services provided by libraries by strengthening specific themes, the study sought to develop and propose an integrated health information service model in the direction of providing health information. In other words, we would like to design and propose a Health Information Integration Service Model that organizes the integrated health information provided by the library into contents online and offline and connects users, librarians, and health and medical experts.

## 2. Literature Review

### *2.1 Improvement of Library Health Information Services*

Studies conducted under the theme of public library health information services mainly focus on the general concept of library-specific information services. They suggest establishing library services for health information through the keyword 'Library Health Information Service.' In addition, we were able to recognize the need for health information services provided by libraries and examine studies suggesting related services and operation methods. Lee (2001) presented a model showing the composition of information integration services specializing in medical information. Song (2006) argued for the continued operation of sites that provide high-quality health information by analyzing the status of online DBs and websites in the domestic health and medical sectors. In order to integrate and systematically provide health-related information in the domestic library community, Noh (2019) proposed the integrated provision of health-related information in the library, such as the establishment of an integrated health information system, the establishment of a comprehensive DB of health-related information, the development and operation of health-specific library programs, the operation of a general support center for health information services, and the establishment of a cooperative network between ministries and institutions related to health information services. Regarding library health information services, there are also studies on Consumer Health Information (CHI) services and librarians' qualifications to enhance the use of health information in public libraries

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in Korea. Consumer health information refers to helping consumers make decisions about health by analyzing specific health requirements. "Research on Public Library Consumer Health Information (CHI) Service Derived through Document Analysis" (Noh and Oh, 2011), focused on the services of the U.S. and foreign countries. (1) Consumer Health Information (CHI) Service, (2) CHI Reference Service, (3) CHI User Education, (5) Development of CHI Out Search Program, (6) It presented the current status and related cases of each service development. In the "Survey and Analysis on the Provision of Consumer Health Information in Domestic Public Libraries" (Noh, 2011), as a result of deriving implications through prior research analysis and case analysis of CHI services in overseas public libraries, awareness of the provision of CHI services by domestic public libraries is very low. (2) It provides only three services: provision of CHI-related websites, education for users, and public relations and marketing. (3) There is no office in charge of CHI, and public library librarians do not receive CHI-related education. (4) There were no CHI services related to outreach, ILL services, and cooperative networks with related institutions, including medical institutions. Therefore, it was argued that research on how to provide CHI services in domestic public libraries should be activated. Meanwhile, Noh (2014) surveyed the current status of public and medical libraries providing health and medical services to explore ways to revitalize library services. Studies show that librarians in public libraries feel the limits of information resources very high compared to librarians in medical libraries. The data service mainly provided by public libraries was related to book loans. The rest used medical journals, reference information centers, and website information sources at a low rate. In addition, Noh (2013) studied the academic background, career, and duties that health information librarians should have based on job site analysis to determine the role of subject librarians in health information on the qualifications of librarians for library health information services. As a result, it was determined that the name of the medical librarian was appropriate for the public library, the hospital library, and the medical library.

## *2.2 Health Information Services of Libraries Outside Korea*

Since the previous studies are about the health information services of domestic libraries, we will investigate the contents of the health information services of overseas libraries and reflect them in the contents of the Health Information Integration Service Model proposed in this study. Lee (2010) looked at the trends and characteristics of mental health support services of public libraries in North America and found that public libraries in the region support the mental health problems of residents. In response, the library was supporting the mental health problems of residents as part of independent counseling and information services, including services to help overcome the shock, anxiety, and stress of residents in the event of a national tragedy or natural disaster. In particular, there was active support for various problems such as self-respect, emotions, and diseases that emerged in the growth process of children and adolescents. In addition, it has been investigated that it is guiding and connecting related information and specialized institutions. Lee (2019) investigated the health information services of overseas hospital libraries (general hospitals, professional hospitals, women's hospitals, children's hospitals, veterans' hospitals). It led to the need to establish domestic hospital libraries, change the perception of health information services, support

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the curriculum and the association to foster human resources and continuing education, and link with related institutions to mandate and diversify health information services in hospitals libraries.

But it is still possible to take a general look at the provision of health information services in specialized libraries related to medicine and health, rather than providing health and medical information needed in daily life in public libraries. According to the contents of the Medical Association (MLA) website, even the National Library of Medicine (NLM), the 'world's most extensive biomedical library, provides vast amounts of medical and health-related databases through open access. In other words, there is no living health information available in public libraries. The types of Health Sciences Libraries offered on the MLA website are as follows.

- Academic health science centers including schools of medicine, nursing, pharmacy, dentistry, chiropractic, veterinary medicine, public health
- Special libraries such as cancer treatment centers
- Hospital libraries
- Libraries serving large physician group practices
- Corporate libraries, including pharmaceutical and device manufacturing companies, insurance companies
- Community college libraries serving the associated health professions

However, public libraries are places where people often encounter them and are obliged to provide users with the helpful information in their daily lives. It is necessary to reduce the inconvenience of library users who have to use medical libraries to obtain information on living healthy. Therefore, this study aims to provide a solution for users to get information on healthy lifestyle formation in public libraries quickly.

### 3. Research Procedure

The purpose of this study is to design and propose a Health Information Integration Service System that connects users, librarians, and health and medical experts to develop library services that provide all information resources related to health information before finding medical institutions. The result can be illustrated as shown in **Fig. 1**.

### 4. Components of Health Information Integration Service in Public Libraries

In order to identify the factors necessary for understanding public Library Health Information Integration Services and establishing related service models, studies and cases related to the public library's specialized services and the library's health information services were investigated. Through this, we wanted to get implications for inventing a health information integration service for public libraries that can be provided to users online and offline.

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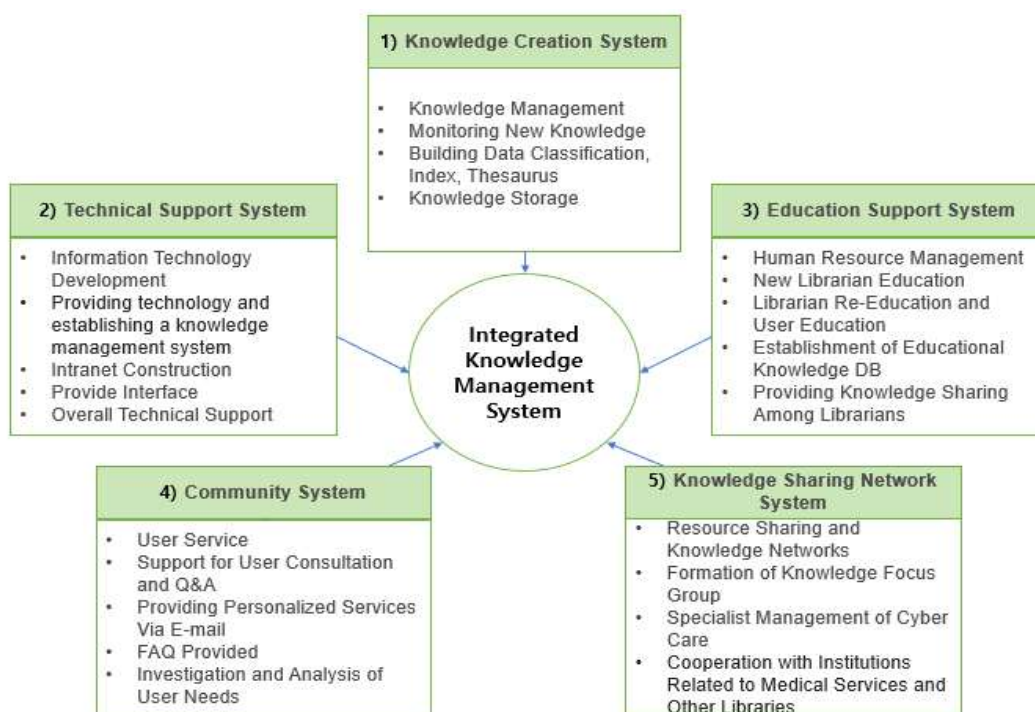
Step	Research Details	Research Method
Step 1 Pre- Research	<ul style="list-style-type: none"> <li>Research and analysis of research papers on the current status of distribution and use of specialized health information in the library</li> </ul>	Literature Review
↓		
Step 2 Case Review	<ul style="list-style-type: none"> <li>Case studies to construct a Health Information Integration Service Model</li> <li>Divide into two areas and derive implications after research                             <ol style="list-style-type: none"> <li>Specialized information services of public libraries</li> <li>Necessities of websites related to health and medical services in public libraries</li> </ol> </li> </ul>	Case Study
↓		
Step 3 Model Making	<ul style="list-style-type: none"> <li>Construction of 'Library Health Information Integration Service Model' based on prior research papers and case studies</li> <li>Construction of 'Role Composition by Subject of Library Health Information Integration Service' and 'Library Health Information Integration Website' to explain the contents of the main model, 'Library Health Information Integration Service Model.'</li> <li>Analysis of the contents of one major model and two auxiliary models</li> </ul>	Model Making
↓		
Step 4 Conclusion and Discussion	<ul style="list-style-type: none"> <li>Explaining and deriving tasks about library health integration services based on model analysis</li> </ul>	Derive Research Results

**Fig. 1.** Research Procedures and Research Contents

#### 4.1 Specialized Information Services of Public Libraries

The public library plays a role as an informal institution that provides various education and information resources to users and actively processes users' information needs. The specialized information service applied to this is a concept that maximizes users' needs and satisfaction by providing differentiated services by selecting specialized areas. In other words, it means introducing a customized information service concept that meets the needs of users. It also includes analyzing the community for each library and developing specialized programs for each subject. In some cases, it also develops a program that reflects the situation and concerns of each age group. Therefore, the specialized information service of a public library refers to the effective response to the diverse needs of users by selecting information in a specific field and providing professional services (Park, 2007). We can assume that the models can be referred to about specialized information services of public libraries through related papers. Noh et al., (2020) presented models on the composition of specialized themes for each library in Gimpo. It was pointed out that specialized materials were not organized with contents that residents would be interested in or that the utilization rate of the Gimpo-si Specialized Library was low. Accordingly, the study proposed reducing, expanding, and merging the contents of the existing specialized materials. In addition, Lee (2001) presented the composition of information integration services specializing in medical information in the same model like **Fig. 2**. A web-based information integration service model was presented under the name of the "Integrated Knowledge Management System" to use information sources from various media anytime, anywhere if they are connected to the Internet. The system proposed providing an information integration service

consisting of five sub-systems as a regional information center for public libraries. In other words, the knowledge creation system is in charge: knowledge resource management, the technical support system consists of information technology development, the education support system consists of human resource management, the community system consists of user services, and the knowledge sharing network system consists of resource sharing and knowledge networks.



**Fig. 2.** Health Information Integrated Management System Model

#### *4.2 Necessity of Websites Related to Health and Medical Services in Public Libraries*

As modern people have become accustomed to using the Internet and show high interest in health issues, they can check the Internet-based quick information search and the results themselves. The purchase of over-the-counter medicines or medical devices, which can be easily purchased without prescription by a specialist, is becoming more frequent, trusting the folk remedies shown on health information sites. It is now possible to request Internet counseling or search for medical information before visiting a hospital to act as a doctor on its own. Due to active self-diagnosis, more than 10,000 health and medical websites are currently registered among major portal sites in Korea. More than 3,000 questions are posted on health-related service bulletin boards. However, if we worry about health more than necessary and make an inaccurate self-diagnosis, there is a risk of interpreting it only as health knowledge on the Internet. Therefore, the data collected from the website and the management and operation thereof should consider the following matters: First of all, data collection shall be organized in consideration of the wide range of information used

in public libraries. For example, it is composed of information that is general and deemed necessary for users. It also selects and provides information that is easy for anyone to understand but of high quality and selects information considering the latest and accuracy. In addition, it consists of various types of information such as books, journals, papers, and web materials. In particular, data that is important or valuable among the collected web information sources will be stored as a database so that users can provide the information as soon as they want, even if the website disappears in the future.

Meanwhile, the operation of a health information website operated by public libraries makes it easier for users to use and allows users to exchange information among librarians freely, outsiders(authors, experts), and share information through bulletin boards or e-mail addresses the function of providing information. It also regularly analyzes users' information usage behavior, prepares questions that users in FAQ frequently ask, and collects health information categories that are frequently used separately to make recommendations by theme (Lee, 2001). Before proposing Library Health Information Integration Services, health, and medical-related websites were selected and surveyed by dividing them into 'specialized sites,' 'government sites,' 'public sites,' and 'overseas sites'(see Table 1). Based on the characteristics of the websites shown in 'Table 1,' it can be seen that they mainly perform three functions: 'Provision of Medical Information,' 'Medical Expert Counseling,' and 'Library Health Information Service.' First, librarians build and operate the library website to enable various health and medical information through convenient information search. Secondly, enable real-time one-on-one diagnosis or self-diagnosis with medical experts. Thirdly, provide information on medical facilities in the community, health courses and related events hosted by major medical institutions, links to medical-related search sites, and send the library's specialized health and medical service newsletter by e-mail to users. Suggesting the implications by revealing the main characteristics of each site area is as follows. In specialist-related sites, they can quickly provide professional medical information, provide medical counseling services and discuss medical issues, and provide self-diagnosis for health care. Government agency sites may organize and check the helpful information, online reservations, facility evaluation information, health courses, and events of public service institutions in the medical sector, such as hospitals, pharmacies. At a glance, and medical information may be obtained through counseling with overseas travel. Popular sites briefly provide health and medical information in daily life and mailing services that provide health information, medical dictionary, disease encyclopedias, and counseling with specialists. Unlike domestic sites, overseas sites focused on providing personalized services. For example, services such as health-related DDC classification methods, search and index services, building personalized files, selecting and recommending data they are interested in, and personal health scorecards were provided.

**Table 1.** Website Related to Health and Medical information

Category	Name of Website	URL	Contents
	Korean Medical Association	<a href="https://www.kma.or.kr">https://www.kma.or.kr</a>	• A medical-specialized portal site where can see the latest overseas medical news, medical terminology explanations, news briefings, medical news, and disease information on the internet (Medical

			Association Newspaper) at a glance.
<b>Websites Related to Specialists</b>	Korea Medicare	<a href="https://www.kormedi.com">https://www.kormedi.com</a>	<ul style="list-style-type: none"> <li>• A comprehensive medical information site that provides a variety of free medical information, including the latest health worldwide news, finding nearby hospitals, and essential health common sense.</li> <li>• It obtained 'HON Code,' the first accurate online Health Information Provision Certification Mark in Korea.</li> </ul>
	Korea Health Log	<a href="https://www.koreahealthlog.com">https://www.koreahealthlog.com</a>	<ul style="list-style-type: none"> <li>• A medical information blog where doctors, pharmacists, nurses, and medical biotechnology scientists can easily access complex medical information.</li> <li>• Able to set up a forum on medical issues so that visitors can freely leave their opinions.</li> </ul>
	Health Korea	<a href="https://www.healthkorea.net">https://www.healthkorea.net</a>	<ul style="list-style-type: none"> <li>• Provides 24-hour counseling services, personalized services, and membership-based lifelong healthcare services as a general internet hospital.</li> </ul>
	Dr4U	<a href="https://www.dr4u.co.kr">https://www.dr4u.co.kr</a>	<ul style="list-style-type: none"> <li>• Provides 1:1 video treatment services and helping with various insurance coverage.</li> <li>• The content composition of the website is classified into medical health, hospital guidance, and healthy life.</li> <li>• Provides medical counseling services through medical professionals, self-diagnosis.</li> </ul>
<b>Government websites</b>	Health Guide	<a href="https://www.health.go.kr">https://www.health.go.kr</a>	<ul style="list-style-type: none"> <li>• It is a health portal site operated by the Ministry of Health and Welfare.</li> <li>• Provides original texts, site maps, free membership, bulletin boards, proof lists, e-mails, etc.</li> </ul>
	Health Information Park	<a href="https://www.healthpark.or.kr">https://www.healthpark.or.kr</a>	<ul style="list-style-type: none"> <li>• An official website run by the Korea Institute for Health and Social Affairs.</li> <li>• Introducing health information by body part and age group in detail.</li> <li>• Information on the use of hospitals and pharmacies, online reservations, and evaluation of hospitals may be checked at a glance in cooperation with non-profit institutions and public service institutions of health and medical services.</li> <li>• Organizing news of health courses and related events hosted by major medical institutions in Korea by region and period.</li> </ul>
	Health IN	<a href="https://www.healthins.or.kr">https://www.healthins.or.kr</a>	<ul style="list-style-type: none"> <li>• A website specializing in health information operated by the National Health Insurance Service in Korea.</li> <li>• Provides information such as precautions for overseas travelers, prevention of chronic diseases, vaccination, etc.</li> <li>• Full-time doctors in the industrial complex consult on medical information or health questions on overseas trips in real-time.</li> <li>• Able to download various e-books for free.</li> </ul>
	MK Health	<a href="https://www.mkhealth.co.kr">https://www.mkhealth.co.kr</a>	<ul style="list-style-type: none"> <li>• A health information website that serves as a living health guide for cancer prevention.</li> <li>• Consists of helpful information such as names, specialized hospitals, and treatments in various fields related to cancer.</li> <li>• It also includes information on early screening for teenage cancer prevention from cancer to breast cancer, and interviews with people who overcame cancer.</li> </ul>
	Health	<a href="https://health.chosunilbo.com">https://health.chosunilbo.com</a>	<ul style="list-style-type: none"> <li>• Chosunilbo's health section's website.</li> </ul>



<b>Daily Health Information Websites</b>	Chosun	osun.com	<ul style="list-style-type: none"> <li>Provides a list of recommended health books, and an e-mailing service a 'medical newsletter' containing health information from media companies.</li> </ul>
	Joongangilbo Health Media	https://jhealthmedia.joins.com	<ul style="list-style-type: none"> <li>Joongangilbo's health section's website.</li> <li>Weekly series of beneficial food stories in daily life, and flash animations are also published.</li> </ul>
	Dr Crezio	https://www.drcrezio.co.kr	<ul style="list-style-type: none"> <li>It serves as a medical portal site, providing medical services for travelers.</li> </ul>
	Dream Doctor	https://www.dreamdoctor.pe.kr	<ul style="list-style-type: none"> <li>Provides health and medical information sites in a simple manner to the general public.</li> </ul>
	Humedic	https://www.humedic.com	<ul style="list-style-type: none"> <li>Provides health and medical information sites in a simple manner to the general public.</li> <li>Provides medical terminology dictionary, disease encyclopedia, and consultation with a specialist for free.</li> </ul>
	<b>Websites Outside of Korea</b>	WebMD	https://www.webmd.com
Everyday Health		https://www.everydayhealth.com	<ul style="list-style-type: none"> <li>Provides a virtual video service delivered by a doctor.</li> <li>Personalized prescription of specialists according to gender, age, symptoms, etc.</li> </ul>
Health Answers		https://www.healthanswers.com	<ul style="list-style-type: none"> <li>Educational health site.</li> <li>It features instant updates, convenient information retrieval using operators, and a unified web design.</li> </ul>
HCI (Health Central Indiana)		https://iuhealth.org	<ul style="list-style-type: none"> <li>A health information site and education site built by a librarian.</li> <li>Provides health-related DDC.</li> </ul>
Health Finder		https://health.gov/myhealthfinder	<ul style="list-style-type: none"> <li>A health portal site run by the US Department of Health</li> <li>It provides a variety of search services (provided with index), site maps, and operates a free membership system</li> </ul>
Inteli Health		https://www.intelihealth.co	<ul style="list-style-type: none"> <li>Provides Internet treatment charts based on personal files.</li> <li>Has much content that allows users to use free services without signing up and offers various services (medical dictionaries, personalized services, various professional medical information).</li> </ul>
Librarian's Index to the Internet		http://www.lii.org	<ul style="list-style-type: none"> <li>The librarian evaluates and selects Internet information while running the site.</li> <li>Provides personal health scorecard and health information by theme in one place.</li> </ul>
Mayo Clinic		https://www.mayoclinic.org	<ul style="list-style-type: none"> <li>Provides health information that is of relatively high public interest.</li> <li>Health information updated every day can be searched using various options.</li> </ul>

As reflecting on the information mentioned above, this research looked for the elements needed to organize the health information website, and the contents are as shown in **Table 2**.

**Table 2.** Major Items on Health Information Websites

Category	Contents
Introduction	<ul style="list-style-type: none"> <li>Introducing the purpose of operation and service contents of the website.</li> </ul>
News	<ul style="list-style-type: none"> <li>Providing health and medical news contents as DB.</li> </ul>
General Health Information	<ul style="list-style-type: none"> <li>Providing information on diseases by sector and adds descriptions of each field (definition, cause, symptoms, treatment and prevention)</li> <li>The criteria for selection of disease theme is with a high-interest degree or high frequency of questions.</li> </ul>
New books	<ul style="list-style-type: none"> <li>Simple introduction of folk therapy information that can be easily used in everyday life.</li> </ul>
Professional Counseling	<ul style="list-style-type: none"> <li>Selecting a recommendation among the medical books obtained in the library, and explaining the contents and simple characteristics of the book to help users understand.</li> </ul>
Related Websites	<ul style="list-style-type: none"> <li>Enabling specialists to consult with users by a one-on-one conversation or through a bulletin board.</li> <li>Note that obtaining consent from the relevant specialist before implementing counseling.</li> </ul>
This Week's Topic	<ul style="list-style-type: none"> <li>Link sites of the same attributes among health and medical websites.</li> <li>Organized that provide universal and high-quality information.</li> </ul>
Disease Information	<ul style="list-style-type: none"> <li>Consisting of information that users want to know among health and medical information that is of high interest or is becoming an issue.</li> </ul>
Self-Diagnosis	<ul style="list-style-type: none"> <li>The purpose is to easily provide information provided by the 'General Health Information' menu in shortcut form.</li> <li>Organized diseases provided by the 'General Health Information' menu in alphabetical order.</li> </ul>
Medical Terminology Dictionary	<ul style="list-style-type: none"> <li>It is configured for users to prevent diseases in advance.</li> <li>Contents of self-diagnosis reflect topic from 'This Week's Topic.'</li> </ul>
Bulletin Board	<ul style="list-style-type: none"> <li>Allowing users to freely express their suggestions.</li> </ul>
Site Map	<ul style="list-style-type: none"> <li>Linking all the menus on the website to know the structure and characteristics of all the information at once.</li> </ul>

#### *4.3 Implications on the Composition of Integrated Health Information Services in Public Libraries*

Implications derived from a comprehensive analysis of factors necessary for the composition of health information integration services in public libraries in case studies are as follows. First, librarians can see that they use various communication media with users online and offline to strengthen personalized information services further. Second, the library is building its specialized services and program contents into a web database in order to provide users with technical information as a whole. Third, it is becoming possible for health and medical professionals to consult with users in real-time remotely. It is being used to provide comprehensive information and specialized information services at libraries and websites. Fourth, the library is used to freely exchange information for various users, including librarians, users, authors, and experts, while providing quality technical information comprehensively. Therefore, this study proposes an integrated information service model

in which public libraries perform all the roles mentioned in the implications to present specific systems for operating and activating specialized information services.

## 5. Designing a Library Health Information Integration Service Model

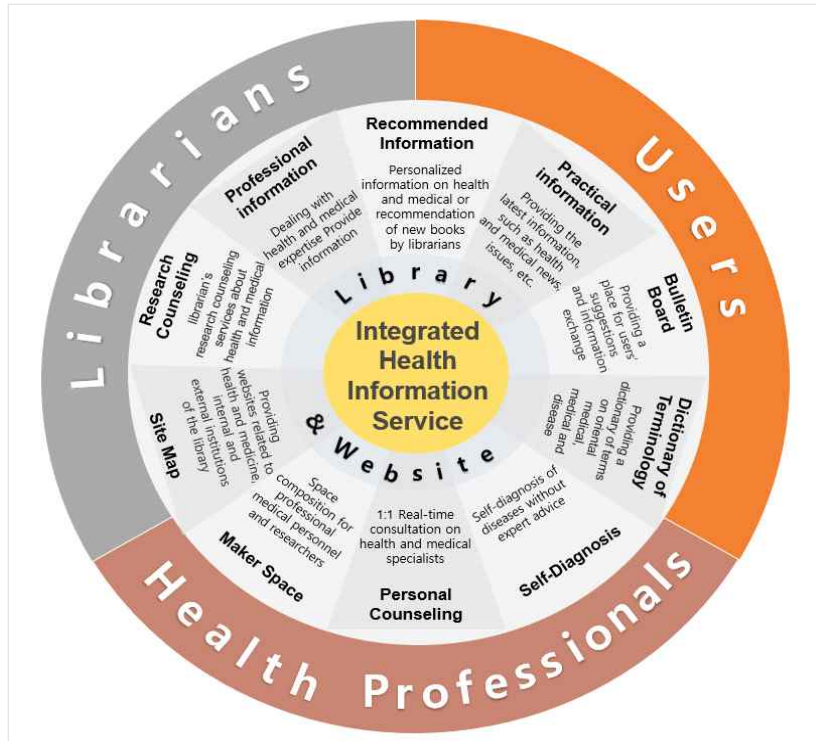
### *5.1 Overview of the Library Health Information Integration Service Model*

Based on the implications derived from the case study, the following library health information integration service model (see **Fig. 3**) was proposed. This model allows librarians, users, and health and medical experts to freely share health and medical information through libraries (offline) and websites (online). The model's characteristic first reflected the fact that information can be used in the library without restrictions on the type of information source. Second, it consists of a configuration that allows users and other libraries to freely use both information and external sources inside the library without time and space constraints. The website serves as a medium for connecting the elements. Third, thanks to the feature of sharing the library's internal and external information resources online and offline. Users can receive most Library Health Information Integration Services online and receive personalized information services directly from librarians and experts in the specialized information field. In other words, if users have access to a lot of non-electronic data related to health and medical information or want direct information counseling, they can use it offline. If they want to access more online information resources related to health and medicine outside the library, they can use them online.

#### *1) Building a Web Database for Providing Overall Information*

Since it is also essential to allow users to use accessible and verified information even with health information services, this study would like to propose a library-specific information service plan based on the results of the case survey. Examining the criteria for reliability of the information, related concepts, and considerations necessary for providing specialized information services shown in the case survey formed a service model in which health and disease information was integrated but without restrictions on time and space. The following are the considerations in the case study for the production of service models. First of all, it is necessary to consider the reliability of health information on indiscriminately shared websites. In particular, most of the health information provided by personal sites is often provided without being verified by experts, so it is necessary to distinguish and provide quality health information in the library.

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**Fig. 3.** Library Health Information Integration Service Model

*2) Construction of Database for Providing Aggregate Information*

Since it is also essential to allow users to use accessible and verified information even if information service is provided as a specialized practical theme, this study would like to propose a library-specific information service plan based on the case study results. Examining the criteria for reliability of the information, related concepts, and considerations necessary for providing specialized information services shown in the case survey formed a service model in which health and disease information was integrated but without restrictions on time and space. The following are the considerations in the case study for the production of service models. First of all, it is necessary to consider the reliability of health information on indiscriminately shared websites. In particular, most of the health information provided by personal sites is often provided without being verified by experts, so it is necessary to distinguish and provide quality health information in the library.

*3) Utilizing Real-Time Remote Counseling Services with Health and Medical Professionals*

Librarians who provide specialized information services for public libraries shall play the role of subject librarians. Suppose general librarians who are not theme librarians provide specialized theme services. Hwang (2011) mentioned that subject librarians must have self-development areas, such as research support and education to users about specific subjects, additional self-development areas, personalized information services, and diversifying communication channels with users. In

addition, it is necessary to form a venue for users' research support in the health and medical fields, providing personalized recommendation information, and sharing between users and experts in the health and medical fields. Such a place of sharing may be created through an online and offline environment where real-time online personal counseling, bulletin board management, maker space composition are performed.

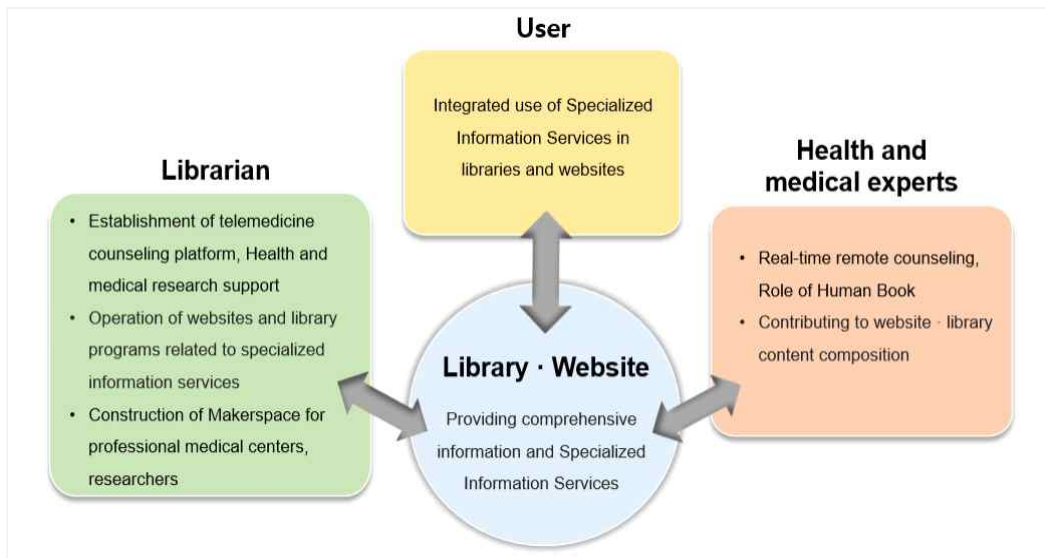
#### *4) Library: A Place to Exchange Quality Information with Many People*

According to case analysis of websites in related fields to devise the contents of specialized information services in the health and medical sectors, the services mainly provided by domestic health information websites were the provision of health information, online health counseling, medical reservation, advertising, link service, community, online product sales, and telemedicine. It also referred to the content composition through prior studies dealing with the library's integrated provision of health information. Song (2006) insisted on the continued operation of sites that provide quality health information by analyzing the current status of online DB and websites in the domestic health and medical sectors. At the same time, Noh (2019) proposed establishing an integrated health information system, establishing a comprehensive DB of health-related information, developing and operating health-specific library programs, and establishing a cooperative network between health information service-related ministries and institutions. In order to enhance the accessibility of technical information, it was intended to present the operation of health and medical websites linked to the public library. The website components reflected the medical information website components proposed by Lee (2001). In addition, it referred to the opinion that it is organized around general and vital information to select and provide accessible and high-quality information for users; allows users to freely exchange information among librarians, outsiders(authors, experts), and share information through the website. The specific details of the Library Health Information Integration Service Model proposed in this study are as follows. First, regarding the provision of health and medical information as specialized topics, there are "Recommended Information," in which a librarian recommends personalized information and new books, and "Practical Information," which provides the latest health and medical information such as "Professional Information," news and issue topics. Second, in terms of forming a network for sharing health and medical information, it is possible to form an external network in health and medicine. Forming a Site Map provides internal and external related institutions or health and medical websites, and Makerspace, which could be operated for professional medical workers and researchers. Third, the contents of services related to the use of health and medical information are as follows. When a user wants to seek advice on information sources for research activities related to health and medical information, he or she can have research counseling with a librarian and 1:1 real-time personal counseling with health and medical specialists. Moreover, the "Self-Diagnosis" tool allows users to diagnose a specific disease in a checklist. Furthermore, a "Bulletin Board," which allows users to share free exchange of information and suggestions among users whenever they are curious about disease, oriental medicine, and medical terms, they can freely access information without the help of librarians or experts.

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### 5.2 Roles of Users of Library Health Information Integration Services

The role of each subject, such as librarians, health and medical experts, and users, in libraries and websites, is as follows: First, librarians are experts in all kinds of information, but they also play a role in improving the quality of information services in health and medicine. By serving as a theme librarian in the field of health alternative medicine, the librarian operates internal websites and library programs on the library's website, which deals with research counseling and specialized topics related to health and medical information. It also forms a maker space dedicated to professional medical centers and researchers to form external health and medical information network. Second, health and medical experts serve as "Human Book" for one-on-one remote consultations with library users. Experts in the form of human books mentioned here are only for those who are registered as human books with volunteer applications. In addition, experts can work with librarians to improve the quality of library-specific information services by contributing to the composition of specialized information content related to health and medicine in the library. Third, users can use the comprehensive information provided by the library and reliable specialized information organized by librarians and experts in the health and medical fields diversely and conveniently. In offline, users can use information directly through librarians, experts, electronic and non-electronic information resources, or find real-time information counseling and various online information resources outside the library through the Internet and smartphone apps online.



**Fig. 4.** Role Composition by Subject of Library Health Information Integration Service

### *5.3 Organizing a Library Health Information Integration Website*

The composition of the Library Health Information Integration website proposed in this study is shown in **Fig. 5**. It is assumed to be operated as an internal website of the main website of the public library. Apart from the main website of the public library, it is to provide professional information on the subject by operating an internal website. The website's composition is divided mainly into three broad categories: e-Medical Information, e-Medical Experts, and e-Health Information Services. Each field consists of 12 subdivisions, four subdivisions, and details refer to the items proposed as the main menu of the medical information site in Table 2. It was classified according to the degree of information expertise required by the user, except for "e-Health Information Service," which focuses on the library contents or services. The "e-Medical Information" was divided when searching and using general health and medical information that can be easily accessed daily. The "e-Medical Expert" was divided based on cases where professional health and medical information are needed, or consultation with related specialists and librarians is needed. First, 'e-Medical Information can be seen as passive use of information. It obtains practical information just by searching and using it, and the detailed composition is as follows. "News" introduces health and medical news. The "Oriental Medical Dictionary" is a dictionary that introduces thought medicine and folk remedies that can be used in daily life, and the "Disease Dictionary" is a dictionary of definition, cause, symptoms, treatment, and prevention by types of diseases. In addition, "Related Sites" provide health and medical sites by type.

Second, the 'e-medical expert' can be regarded as an active form of information. It can obtain professional information by directly consulting with experts to use the information according to the user's situation, and the detailed composition of the menu is as follows. "Professionals Counseling" provides one-on-one consultation with specialists and counseling on bulletin boards. In contrast, "Self-Diagnosis" provides an in-depth disease diagnosis checklist to help users prevent diseases in advance. At the same time, the "Bulletin Board" can freely express users' suggestions or provide research consultations on health and medical information with librarians. The "Medical Terminology Dictionary" menu is also a dictionary that introduces professional medical terms. Third, the detailed composition of 'e-library health information service is as follows. "Introduction" introduces users who want to know about health information integration services, "New Books" provides medical books with guidance and release, and "Issue Topic" provides noteworthy health and medical information. Moreover, "Site Map" connects not only website menus but also websites of the library.

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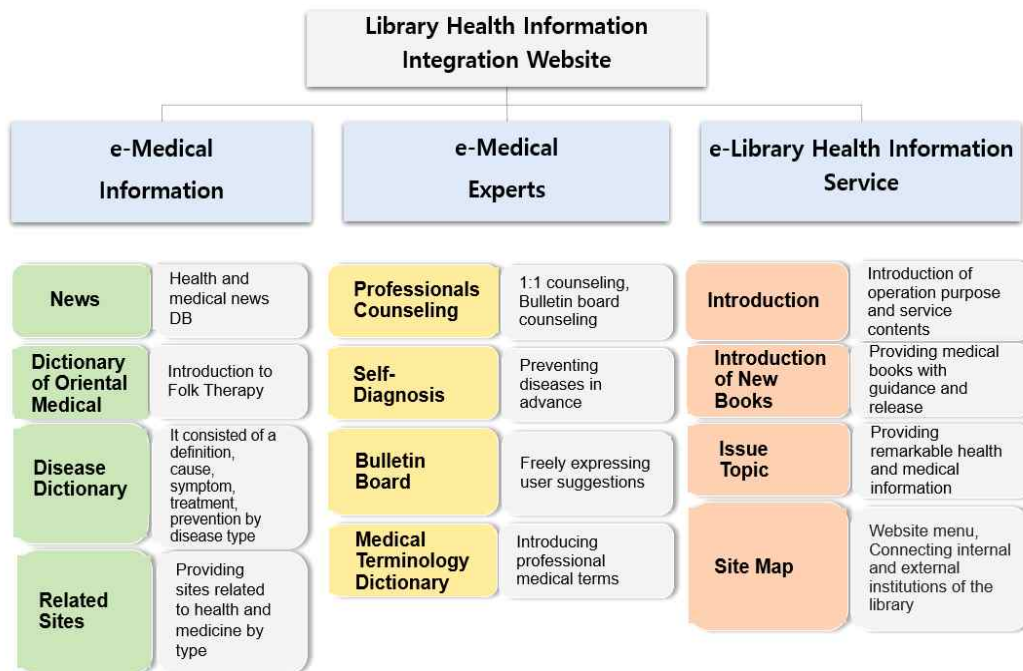


Fig. 5. Library Health Information Integration Website Composition Map

## 6. Conclusion and Discussion

In order to propose measures to allow users to access various and reliable specialized information among public library information services, the study intended to promote a library-specific information service plan by developing a Library Health Information Integration Service Model. The elements necessary for providing health information and specialized information services of public libraries were identified through prior research and related case studies. These elements were combined into the contents of the Library Health Information Integration Service Model. This model is meaningful in that libraries can play an independent role in information services to increase the utilization rate of public libraries and facilitate services focused on the role of librarians as information experts rather than as library managers. In particular, the library can serve as a truly integrated information institution by selecting topics that help users' daily lives, such as health information, and librarians and experts in related topics will be able to cooperate in providing quality information services to users. In addition, the primary users of the library's health information integration service were divided into health and medical experts and users, and the role of each subject was mentioned. The implications of this study are as follows. First, a librarian will faithfully play a role as an information expert in terms of the overall operation of web pages and library information services. Secondly, users will naturally increase information literacy by comparing, exploring, and autonomously using various technical information provided by the library. Third, it can not only increase library



utilization but also serve as a truly integrated intelligence agency. It is expected to help many public libraries provide information integration services in certain areas. However, there is a limit to the lack of an integrated provider of information in certain areas of public libraries, such as health information integration services proposed in this study. Therefore, first of all, research on providing library-specific information services in an integrated manner, namely specialized information integration services," is needed." For example, research on library-specific information integration services in areas other than health information, how to link theme librarians with specialized information integration services, and how to implement specialized information integration services provided by library websites or smartphone apps should be considered. If specialized information integration services are activated in libraries, further research on cases of specialized information integration services in domestic libraries will be possible.

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