

## Demographics Based Digital Literacy Level of National Hospital Employees as Digitizing Health Services Factor

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### Abstract

One of the government's efforts to reduce the spread of COVID-19 is by imposing community activity restrictions. This impacts health services, especially queues for routine control of chronic disease patients. Health services digitization is one of the solutions. In its implementation, human resources who have good digital literacy are needed. This study aims to determine the relationship between the profile of hospital employees and health workers and the level of digital literacy at the National Hospital (NH). The theory used is digital literacy and health services. Digital literacy is necessary for public health service units in the new media era. Increasing digital literacy for employees and paramedics in hospitals is a challenge of this era. This research method uses descriptive quantitative, with a cross-sectional design. Google form questionnaires were used to obtain the employees' demographic data and digital literacy levels. Based on the relationship significance test and correlation and comparison test show that the literacy level of National Hospital employees is dimension 2 with a proficiency level of 8 based on Digicomp 2.1. Productive age, female, bachelor's degree, nursing profession have high digital literacy. In summary, the success of digitizing health services at the National Hospital is due to the high level of employee digital literacy, and the employee profile is related to the level of digital literacy. This study provides an overview of employee profiles that can be considered in recruitment.

**Keywords:** Demography; Digital Literacy; Employees

### Abstrak

Salah satu upaya pemerintah dalam menurunkan tingkat penyebaran COVID-19 adalah dengan memberlakukan pembatasan kegiatan masyarakat. Hal ini berdampak pada pelayanan kesehatan, terutama antrian kontrol rutin pasien penyakit kronis. Digitalisasi pelayanan kesehatan menjadi salah satu solusi. Dalam implementasinya, perlu didukung sumber daya manusia yang memiliki literasi digital yang baik. Penelitian ini bertujuan untuk mengetahui hubungan antara profil pegawai dan tenaga kesehatan rumah sakit dengan tingkat literasi digital pada National Hospital (NH). Teori yang digunakan adalah tentang literasi digital dan pelayanan kesehatan. Di era media baru seperti sekarang ini, literasi digital adalah sebuah kebutuhan bagi unit pelayanan kesehatan publik. Peningkatan literasi digital pada karyawan maupun paramedis di rumah sakit merupakan sebuah tantangan zaman. Metode penelitian ini menggunakan kuantitatif deskriptif, dengan desain cross sectional. Data demografi serta tingkat literasi digital pegawai National Hospital didapatkan menggunakan kuesioner dalam bentuk google form. Analisis korelasi menggunakan uji signifikansi hubungan dua variabel, secara korelasi dan komparasi digunakan sebagai analisis pengukuran dalam penelitian ini. Hasilnya menunjukkan bahwa tingkat literasi pegawai National Hospital adalah dimensi dua (2) dengan tingkat kecakapan 8 berdasarkan Digicomp 2.1. Usia produktif, wanita, pendidikan S1, profesi perawat memiliki literasi digital yang tinggi. Kesimpulan penelitian ini adalah keberhasilan digitalisasi pelayanan kesehatan di National Hospital dikarenakan tingginya tingkat literasi digital pegawai dan profil pegawai di atas berkaitan dengan tingkat literasi digital. Penelitian ini memberikan gambaran profil pegawai yang dapat menjadi pertimbangan dalam perekrutan pegawai.

**Kata kunci:** Demografi; Literasi Digital; Pegawai

## Introduction

The COVID-19 outbreak has changed many things in human life, including in the health sector. Based on Satuan Tugas (Satgas) COVID-19 data on June 22, 2021, there were 2,093,962 confirmed cases and 194,776 active cases with a mortality rate of 2.7% (source: <https://covid19.go.id/peta-sebaran>, accessed on June 27, 2021). The data showed the importance of implementing health protocols and tightening restrictions on micro-scale community activities to reduce the transmission rate. However, the dilemma occurs in patients with chronic diseases, such as Diabetes Mellitus (DM) or diabetes, high blood pressure, and other chronic diseases, who must maintain regular treatment so that there will be a crowd that is counterproductive to government programs in controlling the spread of COVID-19. These patients are vulnerable to infection and worsening conditions to death. For example, Diabetes Mellitus causes an increased risk of complications, extended hospital stays, and mortality (Nassar et al., 2021). In contrast, hypertension is a comorbidity that is associated with the severity of COVID-19 (Li et al., 2020), presumably involving the renin-angiotensin system (RAS) in the pathogenesis of the disease (Shi et al., 2020).

In 2019, Indonesia ranked 7<sup>th</sup> in the highest prevalence of Diabetes Mellitus in the world (Safitri et al., 2021). In addition, the age-adjusted prevalence (20-79 years) between 2011 and 2021 increased from 5.1% to

10.6% (International Diabetes Federation, 2021). As for hypertension in 2018, the prevalence of this non-communicable disease was 34.1% (Indonesia Ministry of Health, 2018). Moreover, in a cross-sectional study in Palembang, South Sumatera, Indonesia in 2019 using the new American Academy of Pediatrics clinical practice guideline found that the prevalence of hypertension among Indonesian adolescents was high (8%) (Kurnianto et al., 2020), even though it was lower than the prevalence of hypertension in

Jakarta, namely 9% (Pardede et al., 2017). This needs attention, especially during this pandemic, as high numbers of diabetes and hypertension patients are productive age. Decreasing the number of healthy productive age adults will affect labor productivity and economic activities, resulting in reduced economic growth (Ridhwan et al., 2022). To prevent increasing spread and mortality rate, as well as decreasing ill productive age adults, a preventive solution is needed, and digitization of health services is considered an effective and efficient one. In this case, Indonesia has quickly adapted by issuing regulations that support digitization of health services. The most prominent form of digitizing health services is telemedicine. Based on Ministry of Health regulation number 20 of 2019 article 1, telemedicine is the provision of remote health services by health professionals using information and communication technology, including the exchange of information on diagnosis, treatment, prevention of disease and injury, research and evaluation, and continuing education of health service providers for the benefit of improving individual and community health (Indonesia Ministry Of Health, 2019). The same regulation stated that to provide telemedicine services, hospitals, and other health services facilities must have employees who are competent in the field of information technology in addition to facilities and infrastructure.

In recent years, industries have chosen to adopt a digital system, which is called digital transformation. It is defined as a transformation that replaces the traditional approach with a digital one; even for products or services that are not easily digitized (Li, 2020), it is usually digitally extended or distributed. The digital approach is considered prospective. Based on the survey in 2020, there were 175.4 million internet users, increased by 17% from 2019 to 2020, with 64% penetration. There were 338.2 million mobile phone connections, increased by 4.6% from 2019 to 2020. Based on device ownership, most Of

internet users aged 16-64 years using smartphones (94%) with 7 hours 59 minutes of internet usage daily (Hootsuite, 2020). During the pandemic, there was a significant increase in the trend towards using social media, especially among homemakers (Harahap & Adeni, 2020). Digital transformation ultimately changes consumer behavior in seeking information on a product or service and making transactions (Santoso et al., 2020). Several media, such as websites and social media, become the source of information for customers regarding a product or service. Ease of obtaining information and transactions, time efficiency, and several payment options are why this shifting behavior occurs. One other factor that changes consumer behavior related to the digitalized approach is electronic word of mouth (eWOM), defined as a statement from a potential or actual customer about a product or a company that is shared with others using the internet (Liu et al., 2022), eWOM is an efficient promotion tool in bringing a product or service of a company to the customers (Le-Hoang, 2020).

The healthcare industry is experiencing this transformation as well. Hospitals and other healthcare facilities need to assess the digital literacy of their staff and health workers to accommodate the need for preventive solutions and address the challenges of digital transformation. It is important so that human resources are ready to implement it. Digitization in health services becomes essential because it simplifies and accelerates service and reduces crowds. In addition, with the massive development of information and communication technologies (ICTs), patients can immediately access various health-related information and services (Gordon et al., 2020). Digitization in health services also improved cost saving and greater health care engagement of the patients (Buntin et al., 2011). Health services emphasize the safety of the patients since medical intervention errors are a leading cause of death. Hospitals need to adopt information technology to reduce the rate of

errors and provide more effective communication and medical records management (Ajami & Bagheri-Tadi, 2013). As mentioned above, to survive in the health industry competition, hospitals and other healthcare facilities need to be "digitalized." Promoting a product or service will be faster by using the internet. In addition, by using the internet, the scope and penetration of promotions will be farther and deeper as a result of the worldwide connection through the internet, although offline promotions are still needed in a smaller proportion. Digitization will also reduce the number of employees because it has been replaced by digital media, thereby easing the payroll burden. With fast, accurate, and modern service, consumers will feel satisfied to share their experiences with those around them. It will indirectly help promote the health care facilities, increasing the number of patients and ultimately increasing the revenue. Therefore, digitization in health services become a prospective solution. To match these phenomena, employees in health facilities should have the right level of digital literacy. The level of digital literacy, namely the ability to access, organize, understand, integrate, convey, evaluate, and create information safely and appropriately through digital technology, including other competencies such as computer literacy, information and communication literacy, information literacy, and media literacy (Akhirfiarta, 2017; Kristiyono, 2015; Law et al., 2018; Sakti et al., 2020). Based on Digicomp 2.1, digital literacy is divided into five dimensions:

- Dimension 1: information and data literacy
- Dimension 2: communication and collaboration
- Dimension 3: digital content creation
- Dimension 4: Security
- Dimension 5: problem-solving

Each dimension has 8 levels of the literacy, ranging from level 1 (foundation) or simple operation up to level 8 (highly specialized) or very complex operation (Carretero, Vuorikari, & Punie, 2017).

Employees in health facilities have a major contribution to succeeding digitization of health services (Priscilla & Lestari, 2020). Singapore is developing services via telehealth to lower the number of visits to the emergency rooms (ER) and hospitalizations because patients can be monitored and treated at home. In addition, health workers will be able to be allocated more effectively and efficiently (Akhirfiarta, 2017). NH has implemented the latest technology from non-medical services to medical treatment (Husnika, 2021), signature room (Sari, 2021) and the first Electronic Unit Daily Dose (e-UDD) in Indonesia using barcode system to distribute drugs for inpatients.

Research on digital literacy of hospital employees has been carried out several times. Based on the results of interviews with nursing department at a hospital in Jakarta, the use of digital media in health services is not optimal. This is caused by digital media usage is not yet cultivated (Zaharany, Hariyati, & Anisah, 2021). Another research that use COBIT (Control Objective for Information and Related Technology) 4.1 at regional public hospital in Banyumas shows the digital media utilization is at defined process level, meaning that all of the health services are well documented and communicated based on good computerized system development. However, there is no evaluation of the system that allows for deviations (Zulkarnaen et al., 2017). Based on the research that evaluates the information system at Bunda Arif Mother and Child Hospital Purwokerto using MEA (Monitor, Evaluate, Assess) domain of COBIT 5 framework shows the level of digital literacy is currently at level 2 (managed process). This is still far from the set target. There are several factors found, namely the absence of monitoring and evaluation procedure of the system and the system is not fully functioning (Muryanti et al., 2018).

There is a gap from all of the studies aforementioned, that is demographic profile of the hospital employees is very little discussed.

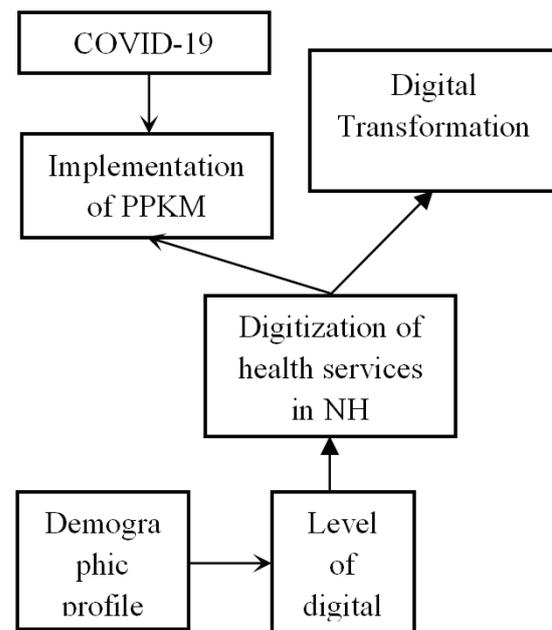


Figure 1. Conceptual Framework of Research  
Source: Researcher Processed Data (2021)

Facilities and infrastructure are indeed important, nevertheless without competent operator, the employees, digital transformation will not perfectly realized. In order to achieve this transformation, organizations, including hospitals and other health care facilities, need to invest to the people as well (Marsh, 2018) and digital literacy level of the employee significantly contribute (Mohammadyari & Singh, 2015). Employees that are resistance to digital transformation will contribute to limited organizational transformation (Karen Osmundsen & Jon Iden, 2018). Another research addresses the need to hire talent that able to integrate digital technology expertise with business know-how (Piccinini et al., 2015). This study aims to illustrate the relationship between the demographic profile of National Hospital employees and digital literacy.

Figure 1 shows the identification of problem raised in this study. COVID-19 pandemic forced the Indonesian government to implement restrictions on community activities (PPKM) to reduce the rate of transmission. To support this program, digitizing health services,

from registration to drug-taking, is needed to reduce crowds that occur, especially patients with chronic diseases who seek regular treatment as this group possess high risk of morbidity and mortality due to COVID-19 infection (Prasanti & Indriani, 2022). Digitizing health services is also the answer to the challenges of digital transformation in health industry. Demographic profile, such as education level and income, is one of the factors that determine the level of digital literacy (see table 4 and table 6).

The novelty of this study is to illustrate the relationship between demographic data and the level of digital literacy of employees at National Hospital. There are two (2) problem formulations within the boundaries of this study, namely “How is the demographic profile of National Hospital employees?” and “How is the level of digital literacy of employees at National Hospital?”. While the purpose of this study is to identify the relationship between demographic profile and the level of digital literacy of National Hospital employees as the supporting factor for the digitization of health services.

## Research Methods

This study uses a quantitative study approach to map the demographic level of digital standards of NH employees and examines the factors supporting the digitization of health services based on the level of digital literacy with health services. This approach was chosen because this study examines the relationship among variables. Figure 2 shows the research operational framework. The population in this study is all employees of the National Hospital with inclusion criteria, namely all employees of the National Hospital. This study used purposive sampling, namely choosing subjects selectively that are expected to produce appropriate and useful information as well as a

way to effectively identify and select limited resources. The criteria of the subjects are

based on specific characteristics or traits, namely the employees of NH assigned to use technology for work. The population is 564 people, with a sample size of 346 people. Employees of the National Hospital as a population will be selected using the purposive sample technique, inclusion criteria, and exclusion criteria. A Questionnaire is used to obtain data that will be entered into the data collection table. The identity of the sample is stated by code, A for men, B for women, and the sorting starts from number 1.

The Spearman Test test will be conducted before the chi-square test. The Spearman Rank test is conducted to find out and investigate the absence of association (relationship) between the observed variables. The data analyzed is ordinal, so if the data is in the form of intervals or ratios should be changed first to the ordinal form. Spearman correlation does not require the assumption of a linear relationship in the variables measured and does not need to use interval-scale data but is sufficient to use ordinal-scale data. The assumption used in this correlation is that the next rank must indicate the position of the same distance on the variables measured. Using the Likert scale, the scale used must be the same. In addition, the data does not have to be normally distributed. There are two relationships that are tested using Spearman Test:

### 1. Age-Digital Literacy Level

The hypotheses being:

$H_0$ : There is no relationship between literacy levels and the age of National Hospital employees.

$H_1$ : There is a relationship between literacy levels and the age of National Hospital employees.

### 2. Income-Digital Literacy Level

The hypotheses being:

$H_0$ : There is no relationship between literacy levels and National Hospital employee income.

$H_1$ : There is a relationship between literacy levels and National Hospital employees' income.

The *Chi Square* test or also called *Kai Square* is one of the non-parametric statistical tests used in research to examine the relationship between variables where both variables use a nominal or ordinal scale. The *Chi Square* test can be performed without requiring the requirements of assuming data normality. There are six relationships that are tested using Chi Square Test:

1. Gender-Digital Literacy Level

The hypotheses being:

H0: There is no relationship between literacy levels and the gender of National Hospital employees.

H1: There is a relationship between literacy levels and the gender of National Hospital employees.

2. Race-Digital Literacy Level

The hypotheses being:

H0: There is no relationship between literacy levels and National Hospital employee’s race.

H1: There is a relationship between literacy levels and National Hospital employee’s race.

3. Education-Digital Literacy Level

The hypotheses being:

H0: There is no relationship between literacy levels and education of National Hospital employees.

H1: There is a relationship between literacy levels and the education of National Hospital employees.

4. Profession-Digital Literacy Level

The hypotheses being:

H0: There is no relationship between literacy level and the profession of National Hospital employee.

H1: There is a relationship between literacy levels and the profession of National Hospital employees.

5. Income-Digital Literacy Level

The hypotheses being:

H0: There is no relationship between literacy level and income of National Hospital employee.

H1: There is a relationship between literacy level and income of National Hospital employee.

**Conceptual Definition**

This study uses a questionnaire to examine demographic data and National Hospital employees’ digital literacy levels. They were asked to explain their skills in using digital devices to see the level of digital literacy concerning health services. After the data was obtained, a correlation analysis using a significance test between the relationship of the two variables (demography and digital literacy), was carried out in correlation and comparison.

**Operational Definition**

1. Employees of National Hospital Surabaya

A group of workers from various professions who are under contract with National Hospital Surabaya

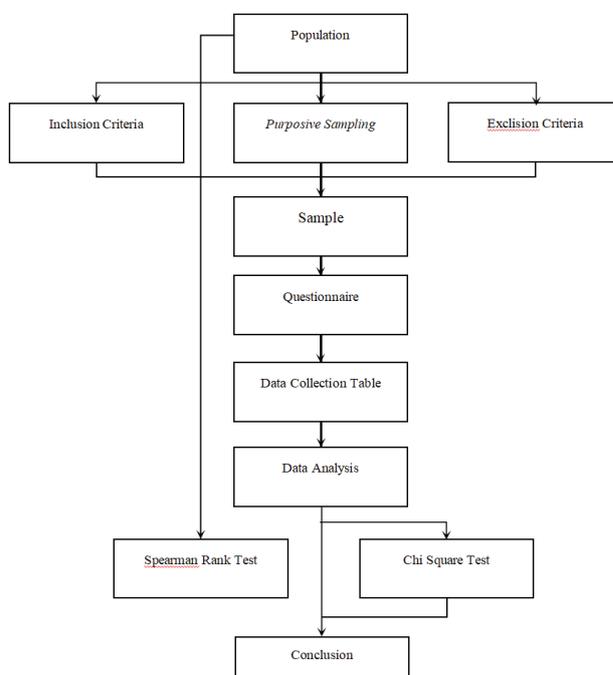


Figure 2. Operational Framework of Research  
Source: author (2021)

## 2. Demographic Profile

The complete picture of Employees of National Hospital Surabaya includes gender, age, level of education, profession, income, and positions.

## 3. Digital Literacy Level

The level of ability to operate and utilize digital technology following the Digicomp 2.1 framework.

The research instruments used in this study were informed consent sheets, questionnaires, and data collection tables. The location of this study is National Hospital.

The data is taken primarily through questionnaire filling (Kristiyono & Suprihatin, 2019). The following steps in the data collection procedure are through how to share informed consent sheets and questionnaires through a google form. Samples that do not fill out the knowledgeable consent sheet will be excluded. The data will be organized systematically in the data collection table.

The data will be carried out a reliability test to determine the index that indicates the extent to which a measuring instrument can be trusted or reliable. Based the data that has been collected as a whole, it is quite reliable, it means that the factors used to measure the digital literacy rate of National Hospital employees are relatively consistent.

## Results and Discussion

Digital literacy, namely the ability to access, organize, understand, integrate, convey, evaluate, and create information safely and precisely through digital technology, includes other competencies such as computer literacy, information and communication literacy, information literacy, and media literacy. Based on research that has been carried out, National Hospital employees have a high level of literacy in terms of age and recent education. Of the 346 employees sampled by the study, 183 employees had high literacy rates and 159 employees

had very high literacy rates. The level of employee literacy is known from the employee's understanding of the use of digital devices and can solve programming problems well. The existence of 98% of employees who have a high level of literacy, can be a reference for the existence of better digital-based health services at National Hospital. The findings support studies regarding eHealth literacy, that defined as the ability to use health-related information gained from electronic sources to solve a health problem (Magsamen-Conrad et al., 2020; Stellefson et al., 2018). Hospital staffs, especially health-care professionals, need to have the capacity to use whatever means of technology available to treat patients and develop health information systems (Kokol, Saranto, & Blažun Vošner, 2018). A study at teaching hospital in Ethiopia shows nurses and doctors have higher eHealth literacy that improve patient-health care communication (Tesfa et al., 2022). A study in patients with dental diseases shows patients with high eHealth literacy lead to a better understanding of their problem, thus have a better decision-making (Valizadeh-Haghi & Rahmatizadeh, 2018). Health workers that adopt electronic health (e-health) have higher job satisfaction than those who do not (Atinga et al., 2020).

## Characteristics of Respondents

The characteristics or overview of research respondents with the title "Demographics Based Digital Literacy Level of National Hospital Employees as Digitizing Health Services Factor" are described as follows.

National Hospital employees aged 25-45 years have a high level of literacy. However, this relationship is not proven using the spearman test (table 1).

It might be due to the age range of the population that mostly <50 years. Staffs >50 years tend to resist the adoption of technology. This group expressing lower level of confidence and a plausible reason behind this is due to the

Table 1. Spearman Rank Tests The Literacy and Age of National Hospital Employees

Variable	N	Correlation(R)	P-Value	$\alpha$
Literacy Level	34 6	-0,070	0,19 6	0,0 1

Source: obtained from primary data (2021)

low level of digital literacy (Kuek & Hakkennes, 2020). The use of digital media requires many new skills, thus requires time to invest in developing these skills (Heponiemi et al., 2022). But when tested using Chi square test, there is a relationship between literacy levels and the age of National Hospital employees (table 2). That is because younger age adults tend to use digital media more frequently (Kontos, Blake, Chou, & Prestin, 2014).

Female employees in National Hospital have a higher level of literacy. This is because the majority of the sample are women. When tested using a chi-square, there is no relationship between literacy levels and the gender of National Hospital employees (Table 3).

This study supports the results of research from Xesfingi & Vozikis (2016) that there is no relationship between gender and digital literacy. There are differences in the results of several literatures. A study in Yogyakarta found that, although women in Indonesia are active internet users, their digital literacy is low or lack of capacity to use it wisely (Novianti & Fatonah, 2018), this is due to several things: educational

Table 2. Chi Square Testing of Literacy and Age of National Hospital Employees

<i>chi square</i>	<i>df</i>	<i>p-value</i>	$\alpha$	<i>chi square</i> ( $\alpha, df$ )
21.238	4	0,000	0,01	13.277

Source: obtained from primary data (2021)

Table 3. Chi Square Testing of National Hospital Employees' Literacy and Gender Levels

<i>chi square</i>	<i>df</i>	<i>p-value</i>	$\alpha$	<i>chi square</i> ( $\alpha, df$ )
1.484	2	0,476	0,01	9.210

Source: obtained from primary data (2021)

background, lack of facilities, lack of training and cultural influences (Suwana & Lily, 2017).

On the other hand, a study in middle-aged population found that females have higher literacy levels (Lee & Tak, 2022), whereas other studies found. These differences might be because of different demographic profiles.

Employees from Malayan- mongoloid races (Sumatra, Java, Kalimantan, Bali, West Nusa Tenggara, Sulawesi) have a high literacy level. However, based on the chi-square test (Table 4), there is no relationship between literacy levels and the race of National Hospital employees. It is because this race inhabits Sumatra, Java, Kalimantan, Bali, West Nusa Tenggara, and Sulawesi, and those are the highest gross regional domestic product (Badan Pusat Statistik, 2022), which means it has good economic stability and access to digital media.

Most employees in National Hospital with the last education undergraduate (S1) have a high literacy level. It aligns with the chi-square test that shows a relationship between education level and digital literacy level (Table 5). This is in line with a study that stated that the higher the educational level, the higher the digital literacy level (Shiferaw et al., 2020).

Table 4. Chi Square Testing of National Hospital Employees' Literacy and Race Levels

<i>chi square</i>	<i>df</i>	<i>p-value</i>	$\alpha$	<i>chi square</i> ( $\alpha, df$ )
1.796	6	0,937	0,01	16.812

Source: obtained from primary data (2021)

Table 5. Chi Square Testing of National Hospital Employees' Literacy and Education Levels

<i>chi square</i>	<i>df</i>	<i>p-value</i>	<i>α</i>	<i>chi square(α, df)</i>
29.211	8	0,000	0,01	20.090

Source: obtained from primary data (2021)

Nurses have the highest level of digital literacy. However, when the data is tested using chi square, we found that there is no relationship between literacy levels and the profession of national hospital employees (table 6).

This study's result does not align with the Tegegne et al. (2023). This might be because nurses are the majority sample in this study, and their education level (diploma, bachelor, master, or doctoral) is unrecorded.

Employees with incomes between Rp 2,500,000 - Rp 4,500,000 have a very high literacy level, as this range has the highest number of samples. When tested using the Spearman test, these two variables have a strong relationship (R=0.145, P-value 0,007, A 0,01).

This study supports the finding in another paper stating that the digital divide is associated with low-income people (Mulyaningsih, Wahyunengseh, & Hastjarjo, 2020). For people with low income, technology adoption needs financial resources that are already very limited. Technology adoption needs time, which might also be limited to low-income people (Neumeyer, Santos, & Morris, 2021).

Based on several studies, healthcare facilities should adopt quality technical support, applications, and online content to encourage patients' self-sufficiency, participation, collaboration, and access to digital literacy training for their staff to improve and maintain their digital literacy. Furthermore, managing growing numbers of patients with chronic non-communicable diseases requires health staff to be aware of digital health skills to effectively

Table 6. Chi Square Testing of Digital Literacy and Profession of National Hospital Employees

<i>chi square</i>	<i>df</i>	<i>p-value</i>	<i>α</i>	<i>chi square(α, df)</i>
15.394	18	0,635	0,01	34.805

Source: obtained from primary data (2021)

teach related concepts. Digitization of health services benefits hospitals and other health service facilities in terms of service to patients and businesses. In terms of service, health services digitization provides higher patient safety compared to conventional services. In addition, service digitization also speeds up services, thereby reducing traffic in hospitals and other healthcare facilities. This is important and related to implementing restrictions on community activities (PPKM). Digitalization of health services also provides benefits from a business perspective in cost efficiency. First, promoting a product or service will be faster with farther and deeper scope and penetration due to the worldwide connection through the internet. Moreover, Indonesia has an extensive digital market based on the population and internet users. Most Indonesians have their own devices and internet access with a long-time daily usage. That means they spend most of their day surfing the internet. Social media will be an excellent tool for promotion because most internet use in Indonesian society is spent on social media. Creating exciting and informative content will also be very important. Not to mention if the use of social media influencers supports it because social media influencers are considered opinion leaders, and the public will criticize them less. Digital services will create a different feeling of satisfaction and experience compared to using conventional services. The community will spread the sense of satisfaction and experience to those around them to further enlarge the promotion's scope. So, in the end, it will increase

the number of consumers who will use the products or services of these healthcare facilities, the increase in the number of consumers will be directly proportional to income. Digitization will also reduce the number of employees because digital media has replaced it, easing the payroll burden. That said, the healthcare workers' digital literacy level was determined as a crucial factor in promoting digital health literacy.

Our findings help inform public or state-owned healthcare institutions who want to implement healthcare digitization. We suggest that improving the digital literacy of the employees is as important as fulfilling the requirement to execute it. Without the "man behind the gun" skills, digital media will not be helpful and inflict financial loss instead. Proper training is needed to improve digital literacy, and adequate monitoring and evaluation are needed to ensure literacy development, especially in older employees who resist adopting technology. It can hinder the effectiveness and efficiency of the institutions themselves. Adding a digital literacy level is recommended as one of the requirements for applying for a job. A high level of digital literacy increases the chances of an individual getting a job. Using digicomp 2.1 or other tools to determine the digital literacy level of the employees is crucial because the training material needed varies depending on the level. By improving and maintaining the digital literacy level of the employees, digital healthcare services can be realized.

Despite the merit of digitization in health services, hospitals and other health care facilities, namely clinics or private practice clinics, must be careful in deciding whether to adopt a digital approach in their health services. Digitizing health services is not a cheap and risk-free investment. Hospitals and healthcare facilities need to manage their cash flow carefully. Keeping all the digital infrastructures in good condition and updating the digital literacy of the staff also play an important role and must be considered as it will require high cost. Hospitals and healthcare facilities need to

keep their number of patients as it is the primary source of income for most of these healthcare facilities. Digitization of health services might be a burden if the number of patients is low. Capital budgeting in hospitals is a problem that is increasingly being taken seriously, especially in this pandemic period. Much of hospital spending is diverted to the budget for personal protective equipment. In addition, treating COVID-19 patients requires many human resources, such as medical staff and other resources for building new isolation rooms. This will affect other service aspects of the hospitals and other healthcare facilities. Not to be forgotten, cyber security must also be a concern. The leakage of identity and patient information is one of the risks of digitizing health services. If a leak occurs, the credibility of the healthcare facility will suffer, resulting in a decrease in consumer trust. The decline in the number of consumers is also directly proportional to the decline in income. Not to mention, the health service facility will face lawsuits. Nevertheless, digital transformation is a phenomenon that hospitals and other healthcare facilities must adapt to; otherwise, they will not survive this competition.

## **Conclusion**

This study aims to determine National Hospital Surabaya employees' literacy level using media equipment and digital-based health services based on demographic characteristics. In addition, the vision of hospitals that provide the best services internationally sets a high level of digital literacy for health workers who aim to provide optimal services. Based on this research, National Hospital employees have a high level of digital literacy, known from the employee's understanding of the use of digital devices, and can solve programming problems well so that digital-based health services can be provided properly. This can be used as one of the references for other healthcare providers to prepare their human resources for digital-based health services.

The suggestion for further research is the development of digital literacy in professional health workers related to the rise of application-based health media and communication as the needs and patterns of health communication that occur in the community as these aspects continue to grow and the effectiveness of digitizing health services in health facilities, especially in remote and underdeveloped areas. Many phenomena on social problems, especially about health, are also increasingly diverse. Digital literacy in Indonesia still focuses on technical computer and internet operation skills, such as using a computer, accessing the internet, creating an online blog, using search engines, and so on. In advance, employees are sometimes reluctant to learn new technology because it is uncomfortable and unfamiliar. Digital literacy also improves employability and is demanded by many employers. Studies of analysis on health media communication, especially those that place the public as the subject of research, are still insufficient. Indonesia is one of the largest archipelagic countries with various tribes and cultures. In addition, education level and development are not evenly distributed. These factors give rise to many challenges. To effectively implement digital health care, the digital literacy of the public needs to meet a certain level; thus, studies regarding the digital literacy of Indonesian people are also critical because communication is a two-way process of delivering information between the sender and receiver of information. Effective communication is when there is a change in the behavior of the recipient after receiving the information. Conducting the research with more extensive and diverse subjects is also suggested. This becomes important how the academic community and health workers that are capable in the field of information technology and communication media can continue to develop these studies into research that directly benefits the community

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