DOI: 10.21088/cphn.2455.8621.11326.4

COMMUNITY AND PUBLIC HEALTH NURSING
VOLUME 11 NUMBER 3, SEPTEMBER - DECEMBER 2026

ORIGINAL ARTICLE

Knowledge and Utilization of E-Health Service Packages and Related Factors among Adults

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HOW TO CITE THIS ARTICLE:

Preethy Jawahar, Ancy Thomas, Anina Saji, et al. Knowledge and Utilization of E-Health Service Packages and Related Factors among Adults. Community Pub Health Nurs. 2026; 11(3): 129-135.

ABSTRACT

Background: The modern healthcare landscape is being rapidly transformed by the integration of digital health solutions, telemedicine, and mobile health platforms. Understanding public awareness and real-world adoption of these technologies is critical for optimizing digital healthcare systems.

Objective: To evaluate the knowledge levels and utilization patterns regarding e-health service packages and determine associated factors among community-dwelling adults in Ernakulam district, Kerala.

Methods: A descriptive cross-sectional survey was undertaken among 120 adults aged 18 years and above, selected via non-probability convenience sampling. Structured and validated assessment instruments were employed, including a socio-demographic proforma, a knowledge questionnaire on e-health platforms, and an empirical tool assessing digital device and service utilization. Data were analyzed using SPSS Version 16. Descriptive statistics (frequencies, percentages, mean, standard deviation) and inferential tests (Chi-square and Fisher's exact tests) were computed, with statistical significance set at $p < 0.05$.

Results: The study sample predominantly comprised individuals in the age bracket of 28 to 50 years, with a female majority (63.3%). Universal internet access (100%) was observed, primarily driven by mobile devices (66.7%).

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➢ **Received:** 30-07-2026 ➢ **Accepted:** 02-09-2026

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Overall, 73.3% of participants demonstrated an average knowledge level regarding e-health packages, while 26.7% possessed good knowledge. Active utilization of e-health services stood at 60.0%, with online appointment booking (34.5%) and accessing laboratory test results (10.8%) being the primary drivers. Among non-users (40.0%), deficient knowledge was identified as the primary barrier (34.2%).

Conclusion: Community adults exhibit widespread digital connectivity and moderate adoption of e-health services, yet a substantial gap remains in comprehensive knowledge and advanced service utilization (e.g., tele-consultations). Systematic community-based educational initiatives led by healthcare professionals are essential to optimize digital health literacy and adoption.

KEYWORDS:

• E-Health Service Packages • Knowledge • Utilization

INTRODUCTION

Technological evolution has fundamentally restructured human routines and operational frameworks across modern society. Within the biomedical sector, this digital transformation has given rise to multi-faceted digital platforms encompassing electronic health (e-health), mobile health (m-health), and telemedicine .[1] Broadly defined, e-health serves as an overarching domain of medical informatics that facilitates the seamless transfer of clinical information, diagnostic data, and therapeutic services between healthcare providers, clinical institutions, and health consumers.[2] Driven by global cellular network expansion, smartphone ownership has surged dramatically, exceeding 8.5 billion active connections worldwide. Given that mobile devices have become essential daily tools, digital health applications embedded in these platforms carry exceptionally high potential for user acceptance and clinical compliance.[3]

When systematically deployed, digital health frameworks offer end-to-end integration across diverse healthcare environments.[2] At its core, e-health encompasses the application of modern information and communication technology (ICT)—particularly web-based applications—to enhance health outcome delivery and optimize population health management.[5] Beyond technological infrastructure, e-health represents an evolving mindset for modern care delivery, promoting clinical efficiency, elevated care quality, consumer empowerment, and restructured patient-clinician dynamics.[1] These mechanisms expand medical services beyond traditional clinical boundaries, offering ease of operation and enhanced engagement.[1] Current evidence indicates that global e-health adoption stands at approximately 93.9%, with national adoption in India reaching 63%, state-level adoption in Kerala at 55%, and regional adoption in Ernakulam district at 41%.[3]

In conventional healthcare models, patients frequently encounter substantial logistical hurdles, including long-distance travel, severe traffic congestion, adverse weather conditions, and prolonged waiting room delays.[1] Furthermore, crowded healthcare environments carry inherent risks of hospital-acquired or communicable disease transmission. Digital health interventions mitigate these operational friction points by enabling patients to access diagnostic reviews and clinical guidance directly from home.[1] Modern e-health infrastructures streamline administrative workflows, minimize waiting times, optimize resource utilization, and facilitate affordable care delivery.[4] Despite these advancements, significant variations persist regarding public awareness, operational familiarity, and actual adoption. Consequently, this study was undertaken to quantitatively assess the knowledge, utilization patterns, and associated determinants of e-health service packages among community-dwelling adults in Ernakulam district, Kerala.

MATERIALS AND METHODS

Study Design and Setting: A descriptive cross-sectional survey design was implemented to evaluate e-health knowledge and utilization patterns among adults in a selected panchayat within Ernakulam District, Kerala.

Sample and Sampling Technique: The study sample comprised 120 adults aged above 18 years. Participants were selected using a non-probability convenience sampling technique based on pre-defined inclusion criteria, including age ≥18 years, residence in the selected geographic location, and willingness to participate.

Data Collection Instruments: Data were collected using three structured research instruments developed and validated specifically for this investigation:

1. **Tool 1:** Socio-Demographic Proforma — Capturing socio-demographic variables including age, gender, educational status, occupation, monthly family income, religion, and family structure.
2. **Tool 2:** Self-Structured Knowledge Questionnaire — Comprising 18 standardized items assessing awareness regarding e-health service packages, portals, and operational scope. Knowledge scores were categorized as Poor (0–6), Average (7–12), and Good (13–18).
3. **Tool 3:** E-Health Utilization Assessment Tool — Evaluating electronic device accessibility, internet connectivity parameters, usage frequency, specific service engagement (e.g., appointment booking, tele-consultation, lab report retrieval), perceived utility, and barriers to adoption.

Ethical Considerations and Pilot Study: Official permission was obtained from administrative authorities and local panchayat leadership prior to study initiation. Written informed consent was secured from all participants, ensuring strict confidentiality, data anonymity, and voluntary participation. A pilot study involving 30 adults was conducted to establish instrument feasibility, reliability, and procedural clarity.

Statistical Analysis: Data processing was performed using Statistical Package for the Social Sciences (SPSS) Version 16.0. Continuous variables were evaluated for normality and summarized using mean and standard deviation (SD), while categorical parameters were presented as absolute frequencies and percentages. Inferential associations between knowledge scores and demographic parameters were examined using Chi-square tests or Fisher's exact tests where applicable, with $p < 0.05$ considered statistically significant.

RESULTS

Section 1: Description of Sample Socio-Demographic Characteristics

The demographic profile of the 120 study participants is summarized in Table 1. The age distribution indicated that 39.2% were aged 36–50 years, 33.3% were aged 18–35 years, and 27.5% were aged 51–70 years. Females constituted the majority of the sample (63.3%, n=76). Regarding educational background, 35.0% held diploma or undergraduate degrees, 25.8% completed secondary schooling (SSLC), and 12.5% possessed postgraduate qualifications. Major occupational groups included homemakers (35.8%) and private sector employees (25.0%). A significant proportion earned a monthly income ≤ ₹10,000 (43.3%), and the vast majority resided in nuclear family structures (82.5%).

Table 1: Frequency and percentage distribution of the sample characteristics (n=120)

Sample Characteristics	Frequency (f)	Percentage (%)
Age (in years)		
18 – 35	40	33.3
36 – 50	47	39.2
51 – 70	33	27.5
Gender		
Male	44	36.7
Female	76	63.3
Educational Qualification		
Primary Education	02	01.7
Upper Primary (5^{th}–9^{th} Standard)	17	14.2
SSLC (10th Standard)	31	25.8
Plus Two (12^{th} Standard)	13	10.8
Diploma / Undergraduate	42	35.0
Post Graduate and Above	15	12.5
Occupation		
Government Employee	04	03.3
Private Sector Employee	30	25.0
Self Employed	23	19.2
Daily Wage / Coolie Worker	05	04.2
Retired	06	05.0
Homemaker	43	35.8
Unemployed	03	02.5
Student	06	05.0

table cont.....

Monthly Household Income (INR)		
≤ Rs.10,000	52	43.3
Rs.10,001 – Rs.15,000	43	35.8
Rs.15,001 – Rs.20,000	13	10.8
> Rs.20,000	12	10.0
Religion		
Hindu	66	55.0
Christian	48	40.0
Muslim	06	05.0
Type of Family		
Joint Family	21	17.5
Nuclear Family	99	82.5

Section 2: Digital Infrastructure and Device Usage Characteristics

All participants (100%) reported having active internet access. Mobile phones represented the primary access device for 66.7% of respondents, while 30.0% utilized both smartphones and laptops. The home was the predominant location for internet utilization (85.0%). Regarding digital competence, 59.2% felt capable of using a few smartphone applications, whereas only 5.0% had ever attended formal training on e-health platforms.

Table 2: Frequency and percentage distribution on usage of computer, internet and mobile phones among adults. (n=120)

Item Description	Frequency (f)	Percentage (%)
Accessibility to Internet (Yes)	120	100.0
Primary Devices Used		
Mobile Phones	80	66.7
Laptop	04	03.3
Both Mobile and Laptop	36	30.0
Primary Location of Internet Use		
Home	102	85.0
Office	16	13.3
Akshaya Telecentre	02	01.7
Primary Telecom Provider		
Jio Network	51	42.5
Broadband Connection	47	39.2
Airtel Network	22	18.3
Daily Data Limit Allowance		
1.5 GB / day	46	38.3
2.0 GB / day	32	26.7
1.0 GB / day	19	15.8
3.0 GB / day	08	06.7
Unaware / Not Specified	15	12.5
Proficiency in Application Usage		
Uses few basic applications	71	59.2
Uses all available applications	25	20.8
Uses most applications	24	20.0
Attended Formal Training on E-Health		
Yes	06	05.0
No	114	95.0

Section 3: Knowledge Levels Regarding E-Health Service Packages

Assessment of knowledge scores revealed that nearly three-quarters of the sample (73.3%, n=88) exhibited an average level of knowledge regarding e-health packages, while 26.7% (n=32) demonstrated good knowledge. None of the participants fell into the poor knowledge category. The mean overall knowledge score was 11.18 ± 1.97 out of 18.

Table 3: Frequency and percentage distribution of level of knowledge regarding e-health service packages (n=120)

Knowledge Level	Score Range	Mean ± SD	Frequency (f)	Percentage (%)
Poor Knowledge	0 – 6		0	0.0%
Average Knowledge	7 – 12	11.18 ± 1.97	88	73.3%
Good Knowledge	13 – 18		32	26.7%

Section 4: Utilization Patterns and Perceptions of E-Health Services

Overall, 60.0% (n=72) of respondents reported actively using e-health services, whereas 40.0% (n=48) had never utilized them. Public healthcare portals were utilized by 27.5%, while 19.2% used private healthcare platforms. The main primary purpose for e-health adoption was online appointment registration (34.5%), followed by laboratory report collection (10.8%). Peer and family recommendations represented the primary driver for adoption (29.2%). Among non-users, deficient awareness/knowledge was cited as the principal barrier (34.2%).

Table 4: Frequency and percentage distribution of utilization of e-health service packages (n=120)

Utilization Parameter	Frequency (f)	Percentage (%)
Ever Utilized E-Health Services		
Yes	72	60.0
No	48	40.0
Sector of Usage		
Government Sector	33	27.5
Private Sector	23	19.2
Both / Other Sectors	16	13.3
Primary Purpose for Usage		
Booking Appointments / Registration	41	34.5
Laboratory Test Results Retrieval	13	10.8
Treatment Information	10	08.3
Tele-consultation Services	05	03.3
Specialty Referral Services	03	02.5
Source of Recommendation		
Family Members	35	29.2
Friends	13	10.8
Colleagues	06	05.0
Other Sources	17	14.2
Primary Reason for Non-Utilization (n=48)		
Deficient Knowledge / Lack of Awareness	41	34.2
Unaware of Services	06	05.0
Internet / Technological Issues	01	00.8
Perceived Utility of E-Health Services		
Highly Useful	86	71.7
Somewhat Useful	28	23.3
Not Useful	06	05.0
Perceived Convenience / Ease of Use		
Easy to Use	69	57.5
Moderately Easy	34	28.3
Difficult to Use	10	08.3
Undecided	07	05.8
Perceived Overall Benefit in Healthcare		
Beneficial	81	67.5
Highly Beneficial	26	21.7
Not Beneficial	05	04.2
Unsure	08	06.7

DISCUSSION

This empirical investigation provides valuable insights into the baseline digital health literacy and adoption behaviors among community-dwelling adults in Ernakulam district, Kerala. Demographically, the sample was predominantly represented by individuals in their active productive age bracket (18–50 years) with a strong female involvement (63.3%). This reflects community dynamics where female family members frequently act as primary healthcare decision-makers. Furthermore, a substantial majority possessed secondary or higher education, establishing an advantageous baseline for digital health tool engagement. Similar demographic profiles have been reported by earlier researchers, confirming that young and middle-aged individuals with formal education exhibit greater readiness to adopt digital health innovations.[1,3]

A critical observation of this study is that while 100% of participants possessed internet connectivity and mobile access, 73.3% demonstrated only an average level of knowledge regarding comprehensive e-health service packages, with 26.7% achieving good knowledge. This indicates that widespread smartphone ownership does not automatically translate into comprehensive digital health literacy. Similar findings have been documented across national and regional surveys in developing economies, where public understanding remains largely restricted to basic mobile applications rather than structured health portals.[2,12]

Regarding service adoption, 60.0% of respondents had utilized e-health services, predominantly for operational conveniences such as booking hospital appointments (34.5%) and retrieving lab reports (10.8%). Conversely, clinical services such as tele-consultation remained substantially underutilized (3.3%). This imbalance underscores that community members currently view e-health primarily as an administrative scheduling tool rather than a therapeutic or diagnostic portal. These observations align with findings by Jabour[10] and Shiferaw et al.[11], who noted that patient preference for direct face-to-face physician interaction and uncertainty regarding clinical virtual consultations remain key barriers to tele-consultation adoption.

Significantly, deficient knowledge was cited as the primary barrier among the 40.0% non-users, despite a highly favorable general perception (71.7% perceiving e-health as useful). This clear divergence between positive attitude and actual utilization highlights an actionable window for community

health interventions. Structured, nurse-led educational programs and localized digital literacy workshops can effectively bridge this gap, converting passive public interest into active, informed engagement with comprehensive e-health services.

Implications for Nursing Practice and Healthcare

The findings from this research carry practical implications across multiple healthcare dimensions:

- **Nursing Practice:** Clinical and community health nurses can actively integrate digital health guidance into standard patient counseling, assisting patients with portal registration, tele-consultation scheduling, and digital record access.
- **Nursing Education:** Nursing curricula should incorporate dedicated modules on health informatics, equipping student nurses with pedagogical skills to lead community-based digital literacy workshops.
- **Nursing Administration:** Healthcare administrators should advocate for user-friendly hospital portal designs, staff training, and structured patient assistance desks within clinical and primary health settings.
- **Health Policy and Research:** Policymakers should design targeted public awareness initiatives, while future research should employ experimental methodologies to evaluate the effectiveness of structured teaching interventions on long-term digital health adoption.

CONCLUSION

This study demonstrates that adult residents in Ernakulam district possess moderate digital health service utilization (60.0%) and an overall average knowledge level (73.3%), supported by universal mobile device accessibility. However, significant gaps persist regarding advanced clinical e-health capabilities such as tele-consultation. Deficient knowledge remains the leading operational barrier to adoption among non-users. Implementing structured community educational campaigns and strengthening nurse-led health promotion initiatives will be instrumental in enhancing e-health literacy, empowering patients, and achieving efficient, technology-enabled healthcare delivery across the region.

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