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Digital Health in India: An Empirical Study on Awareness, Usage, and Trust in EHR and Health Wallet Systems

Umesh Kumar Singh[1], Deepak Sukheja[2], Shailesh I. Kundalwal[3], Kriti Ohri[4], Taniya Panwar[5], Kamal Bunkar[6]

[1]Vikram University – Ujjain. E-mail: umeshsingh@rediffmail.com
[2]VNR Vignana Jyothi Institute of Engineering &Technology- Hyderabad. E-mail: deepak_s@vnrvjiet.in
[3]Indian Institute of Technology- Indore. E-mail:kundalwal@iiti.ac.in
[4]VNR Vignana Jyothi Institute of Engineering &Technology- Hyderabad.E-mail: kriti.ohri@gmail.com
[5]Vikram University – Ujjain. E-mail: panwartaniya686@gmail.com
[6]Vikram University – Ujjain. E-mail: kamal.bunkar@gmail.com

Abstract
Digitizing patient records known as electronic health records (EHR) is the growing trend in healthcare industry. EHR includes data generation, storage and exchange in a digital way. In India, it is made possible by establishing the Ayushman Bharat Digital Mission (ABDM), which encourages interoperable, consent-based, and patient-centric health data interchange via Ayushman Bharat Health Account (ABHA). Digital Health Wallets (DHWs) are the latest invention and become an effective management of personal health information (PHI) in EHR. In this context, this article explores empirical survey-based examination of healthcare data gathered from various demographic groups and maps the characteristics of a DHW. By examining data on digital access to healthcare this article raises questions about DHW awareness, usage trends, perceived advantages, adoption hurdles, and trust-related issues. The survey results replicate the public's significant support for government-regulated and blockchain-enabled health wallets, the growing awareness of digital health efforts, and the ongoing difficulties with digital literacy, privacy, and interoperability. In order to promote the fair and long-term adoption of DHWs in India, the study ends with important insights and suggestions for legislators, tech companies, and healthcare providers.

Keywords: Digital Health Wallets (DHWs), Digital Health Services (DHSs), Universal Health Coverage (UHC), Electronic Health Records (EHR)

Abbreviations:

DHWs	*Digital Health Wallets*
DHSs	*Digital Health Services*
PHI	*Personal Health Information*
UHC	*Universal Health Coverage*
TAM	*Technology Acceptance Model*
HER	*Electronic Health Records*
NDHM	*National Digital Health Mission*
ABDM	*Ayushman Bharat Digital Mission*
ABHA	*Ayushman Bharat Health Account*

1. Introduction

Healthcare system of India is serving to 1.5 billion peoples, and its services serve through public and private sectors. This foundation is now being transformed by a digital health strategy that uses innovation to expand access to services [1][2]. The evolution of DHSs started in the 2000s called eHealth Services that is driven by desktop computers and the internet, with an emphasis on health rather than disease. In the 2010s, mHealth emerged through mobile phones i.e mobile application are designed and implemented to serve basic health services (initial level consultations). The key difference is user engagement, mobile devices enable continuous access to care and improved adherence, anytime and anywhere. This digitalization process of healthcare systems has changed the structure generation of health data, way to stored, and exchanged. With the increasing adoption of EHRs, telemedicine, and mobile health applications, there is a growing need for secure, interoperable, and patient-centric mechanisms to manage PHI i.e. Digital health refers to the integration of advanced technologies into healthcare to improve the delivery of services. It includes a wide range of tools and systems, including patient-facing technologies like wearable biosensors, telemedicine platforms, and mobile health (mHealth) applications, as well as data and infrastructure components. These promising methods ensure accurate disease diagnosis and to efficiently treat patients through DHW. In this way, DHWs was changed into a practicable digital solution that paves people more access over their health information while assuring security, privacy, and easy access for all parties intricate in healthcare.

1.1Digital Health Wallets (DHWs)

With the intention to securely broadcast the PHI of a patient in digital form, a patient-driven structure called a "health wallet" is created. These health wallets known as DHWs permits patients to partially access, withdraw or restrict access to their medical records for healthcare providers, insurers and researchers. A clinical encounters application, a digital patient-care wallet, and a consent platform are among the DHW's care-management and coordination components. A smartphone software called the "digital patient-care wallet" lets patients access their medical records, including vital signs and prescription information. Additionally, it enables patients to consent to the sharing of their medical records. Through an explicit consenting process, the consent platform employs blockchain technology to monitor and regulate the transfer of health data. Key issues in healthcare data management, including data fragmentation, mistrust, illegal access, and restricted medical record portability, are addressed by these elements. Health wallets facilitate data-driven healthcare delivery, improve clinical decision-making, and increase continuity of care by offering a single, secure interface.

1.2Health Wallets within the ABDM Ecosystem

An integrated digital health ecosystem is the goal of India's historic ABDM national program. DHSs are to be enabled via ABDM. Ayushman Bharat Health, a key element of ABDM, connects a patient's medical records across various platforms and healthcare providers while upholding the concepts of consent-based data sharing and privacy by design. Health wallets serve as a patient-facing digital interface inside the ABDM framework, operationalizing the idea of ABHA-enabled data mobility and governance. A health wallet may safely compile medical records linked to a person's ABHA ID by integrating with ABDM-compliant systems. Through crucial components of the nation's digital health infrastructure, this allows users to regulate consent for data sharing. Furthermore, integrating health wallets with ABHA IDs advances critical ABDM objectives like interoperability, transparency, and citizen participation. As in [3] the daily updated medical reports on ABHA explanations and health records incorporated into its digital ecosystem. Patients receive a longitudinal perspective of their medical history, policymakers benefit from anonymized, aggregated data for public health planning, and medical professionals have access to verified, up-to-date records with patient acceptance. As India approaches widespread use of digital health, health wallets located within the ABDM ecosystem offer a scalable and secure way to handle sensitive health data while maintaining trust and regulatory compliance.

2. Related work

India's digital health ecosystem has evolved from scattered pilot projects to a nationally coordinated framework under the National Digital Health Mission (NDHM), now known as ABDM, which creates a federated, interoperable, and patient-centric architecture through elements like ABHA, HFR, HPR, and consent-based data exchange [4]. The usage of DHW is increased exponentially in the past decades and several researchers shown great interest on it. In [5] the authors examined how users interact with a DHW system to solve care continuity issues in the treatment of chronic illnesses during a pandemic. Similarly in [6] the authors describes the Mobile Health Wallet (MHW), a mobile phone-based savings and payment mechanism for expert medical treatment during pregnancy, and its structural, contextual, and experiential features. The results of a scoping analysis indicate that while telemedicine, mHealth, EHRs, and decision-support systems are rapidly expanding, adoption is still uneven due to infrastructural shortages, disparities in digital literacy, and a lack of public health integration [7, 8]. If systems like the DHW platform don't offer a positive user experience or don't serve users' functional needs at the appropriate time and order, they could easily fall short of their objectives. Understanding how physicians, nurses, patients, and other end users see these technologies' usability and ease of use is crucial for their effective deployment [9]. EHR adoption runs the danger of compliance-oriented use rather than care-enabling use in the absence of adequate incentives and training because of persistent problems with cost, workflow disruption, and technological competence [5], [10]. Although AI and other cutting-edge technologies have potential for population health management and diagnostics, stringent regulation and dependable, interoperable data are still necessary [11]. Digital platforms have not only improved public health surveillance by facilitating timely data transmission, but they have also brought up ethical concerns regarding individual privacy and appropriate data use [8], [12].

The literature generally characterizes India's shift to digital health as policy-driven, technologically promising, and supported by a robust national infrastructure. There are still gaps that must be addressed, including the need for greater coordination and governance, the absence of knowledge on long-term health consequences, the lack of emphasis on trust and consent literacy, and the need for greater alignment between technology, law, and ethics. These issues need to be fixed for digital health outcomes to be equitable, safe, and long-lasting. This core objective of this article is to evaluate the following:

- Awareness about DHSs and DHWs on people.
- Relation between awareness and adoption by demographic patterns.
- User benefits and restrictions to use DHWs.
- Trust on government-supported digital health solutions.
- Gathering knowledge about health data ownership, sharing, and security

3. Mathematical Modelling

In this article, a hybrid statistical behavioral model known as logistic regression (LR) based Technology Acceptance Model (TAM) is utilized to inspect the awareness and adoption of DHW among people. The model captures both cognitive awareness factors and perceived functional benefits influencing user adoption behavior. This section describes the mathematical formulation of the proposed research model used to examine the relationship between awareness of DHSs, perceived functional benefits, and Digital Health Wallet awareness.

3.1 Preliminaries

In the proposed framework, the relationships between variables are expressed using a regression-based mathematical framework. Figure 1 shows the conceptual framework of the proposed model.

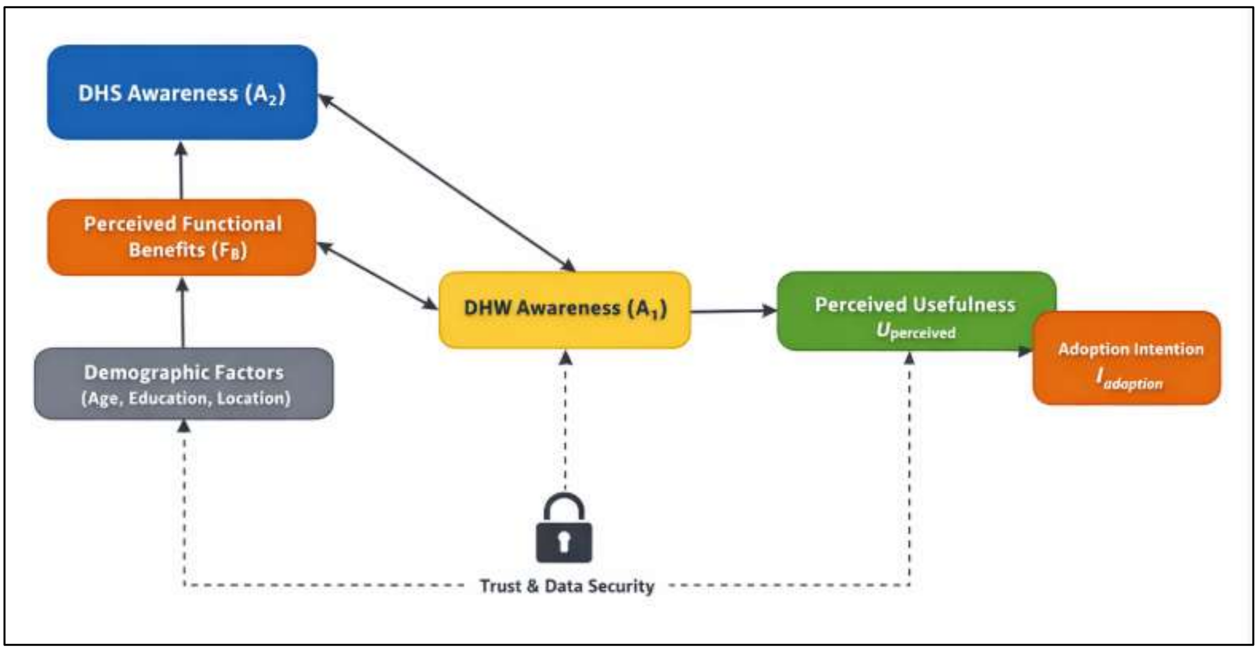


Figure 1: Conceptual Framework of the Proposed Model

Let us introduce some variables including its description and the type of measurement used to evaluate and validate the proposed model as in table 1.

Table 1: Variables and Measurement used in the proposed framework

Variables used	Description	Measurement type
A_1	Awareness of DHWs	Binary (0 or 1)
A_2	Awareness of DHSs	Binary (0 or 1)
F_B	Perceived Functional Benefits	Likert scale (1-5)

$U_{perceived}$	Perceived usefulness	Likert scale
$I_{adoption}$	Adoption intention	Likert scale

Usually the awareness function is estimated as the binary variable. So the output probability of the awareness function can be written as:

$$P(A_1) = \begin{cases} Aware, if\, A_1 = 1 \\ unaware,\ if\ A_1 = 0 \end{cases} \tag{1}$$

3.2 Logistic regression Model

Since the dependent variable is binary, a logistic regression model is used to find the probability of awareness. Which can be mathematically represented as:

$$ln\left(\frac{P}{1-P}\right) = w_0 + w_1A_2 + w_2F_B \tag{2}$$

Where w_0 is the intercept and w_1, w_2 are the regression coefficients.

3.3 Technology Acceptance Model (TAM)

According to the behavioral adoption theory, the perceived usefulness is defined as:

$$U_{perceived} = \alpha_0 + \alpha_1A_2 + \varepsilon \tag{3}$$

Where α_0 represents inherent perception without awareness, α_1 represents the effect of DHSs on perceived usefulness and ε represents the error or unknown variation captured in the perceived usefulness. This error ε also includes external factors and measurement errors. Similarly the adoption intention is defined as:

$$I_{adoption} = \beta_0U_{perceived} + \beta_1A_2 + \varepsilon \tag{4}$$

Where β_0 is the effect of perceived usefulness, β_1 represents the direct effect of awareness and ε represents the error or unknown variation captured in the adoption intention. This error ε includes trust issues, privacy concerns and technological barriers.

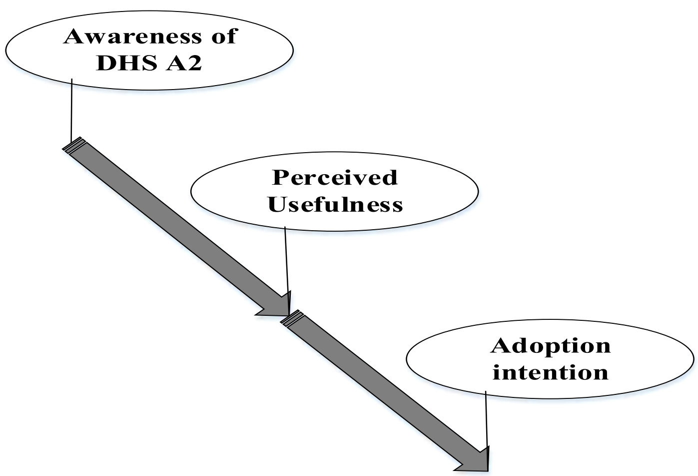


Figure 2: TAM path diagram

The figure 2 illustrates that **awareness of DHS** A_2 influences users' **perceived usefulness** $U_{perceived}$ of DHWs. When individuals are more aware of digital health services, they are more likely to recognize the practical benefits and usefulness of DHWs. This perceived usefulness then leads to a higher **adoption intention** $I_{adoption}$, meaning that users become more willing to use or adopt Digital Health Wallet technologies. Thus, the model highlights a **sequential relationship where awareness improves perceived usefulness** $U_{perceived}$**, which ultimately increases adoption intention** $I_{adoption}$.

3.4 Structural Equation Model (SEM)

For complex relationships, a Structural Equation Model is used to define the perceived usefulness and adoption intention as:

$$U_{perceived} = \alpha_1A_2 + \varepsilon \tag{5}$$

$$I_{adoption} = \beta_0U_{perceived} + \beta_1A_2 + \varepsilon \tag{6}$$

3.5 Data Collection

A total of 736 responses were collected through the online survey .After data screening and removal of incomplete responses, 704 responses were considered fully valid for the primary analysis. However, some statistical tests that required paired responses utilized 734 valid cases after excluding missing value. Descriptive statistical techniques and qualitative content analysis were applied to examine emerging patterns, relationships, and thematic interpretations within the data. However, the sample is mostly made up of urban dwellers, respondents with higher educational credentials (mostly graduates and postgraduates), and digitally connected people, especially Smartphone users with reliable internet connection. Although this demographic profile is suitable for evaluating DHW adoption in its early stages, it limits the findings' wider applicability to marginalized groups and rural regions. Overall, the findings point to a high level of digital connectivity among the participants. While there is a generally high level of knowledge about DHSs, there is still a relatively low level of recognition and comprehension of the particular idea of a DHW. The demographic distribution respondents of the collected data is offered in table 2.

Table 2: Demographic Distribution Respondents

Category	Subcategory	Percentage (%)
Age	18-25	38.2
	26-35	27.5
	36-50	21.1
	>50	13.2
Education	Undergraduate	41.6
	Postgraduate	36.8
	Others	21.6
Location	Urban	52.3
	Semi-urban	29.7
	Rural	18.0

By observing table 2, the awareness about DHW is high in young aged peoples and people in urban areas. More awareness is required for the peoples in rural areas with shows low participation level in the distribution.

3.6Research Hypotheses and Survey Question Modelling

Data on demographics, digital access, awareness of DHSs $\boldsymbol{A_2}$,, familiarity with DHWs, perceived utility $\boldsymbol{U_{perceived}}$,, security concerns, and willingness to embrace government-regulated solutions were all gathered using a structured questionnaire. Likert-scale and closed-ended items were both included in the poll. A five-point Likert scale ranging from 1 (strongly reject) to 5 (strongly accept) was used to gauge responses for perceived functional benefits ($\boldsymbol{U_{perceived}}$,) and adoption intention ($\boldsymbol{I_{adoption}}$).A Google form (link and QR code provided below) was used to conduct the online survey, and 704 valid responses were obtained. It was anonymous and optional to participate. We didn't gather any personally identifiable information. Standard ethical principles for social science research were followed in this study, and the replies were used only for scholarly research. The following research hypotheses were developed in light of the study's goals and previous research on the adoption of digital health. Using certain questions from the survey tool listed in table 3, each hypothesis is empirically tested. Data on demographics (age, gender, education, occupation, location, and digital access), awareness of DHSs and DHWs, usage behavior and information sources, perceived barriers and motivators, attitudes toward data ownership, sharing, and security, and policy-related opinions (such as government-backed wallets and child health wallets) were all gathered through a bilingual (English/Hindi) online questionnaire. The multilingual design improves accessibility and inclusivity.

Table 3: Research Hypothesis

Hypothesis	Hypothesis Description	Survey Question(s) Used
H_1	A_2has a positive impact on A_1.	1. Are you aware of DHSs in India (e.g., telemedicine, online health records)? 2. Before this survey, were you aware of the concept of a Digital Health Wallet?
H_2	A_2significantly predicts A_1.	1. I would use a Health Wallet if it is officially supported by the Government of India.

H_3	A_2 is significantly higher than A_1.	1. DHWs can improve access to healthcare services. 2. DHWs reduce the need to carry physical medical records. 3. I would be willing to use a DHW if it is easy to use. 4. I will recommend a DHW if it proves useful.
H_4	F_B positively influence A_1 .	1. Health Wallets can improve coordination between doctors, patients, pathology labs, hospitals, and academic institutions. 2. DHWs can help doctors analyze patients' past medical history.
H_5	A_1 Significantly varies across demographic factors such as age, education level, and area of residence.	1. Before this survey, were you aware of the concept of a Digital Health Wallet? 2. Your Age Group 3. Educational Qualifications 4. Residential Area
H_6	If the government implements a national awareness campaign and standardization framework for DHWs, then public awareness and utilization of these tools will increase significantly compared to current levels	1. Are you aware of DHSs in India (e.g., telemedicine, online health records)? 2. Before this survey, were you aware of the concept of a Digital Health Wallet? 3. I would use a Health Wallet if it is officially supported by the Government of India. 4. What would motivate you to use a Digital Health Wallet?
H_7	A_2 and F_B jointly predict A_1	1. Are you aware of DHSs in India (e.g., telemedicine, online health records)? 2. Before this survey, were you aware of the concept of a Digital Health Wallet? 3. DHWs can improve access to healthcare services. 4. DHWs reduce the need to carry physical medical records. 5. DHWs can help doctors analyze patients' past medical history.

3.7Data Pre-processing

Prior to analysis, the collected data were pre-processed to ensure quality and consistency. Let the collected dataset is mathematically represented as $X = \{x_i\}_{i=1}^{N}$. where$x_i = (A_1, A_2, F_B, U_{perceived}, I_{adoption})$ and $N$is the total collected responses. Figure 3 shows the simple steps of the data pre-processing procedure.

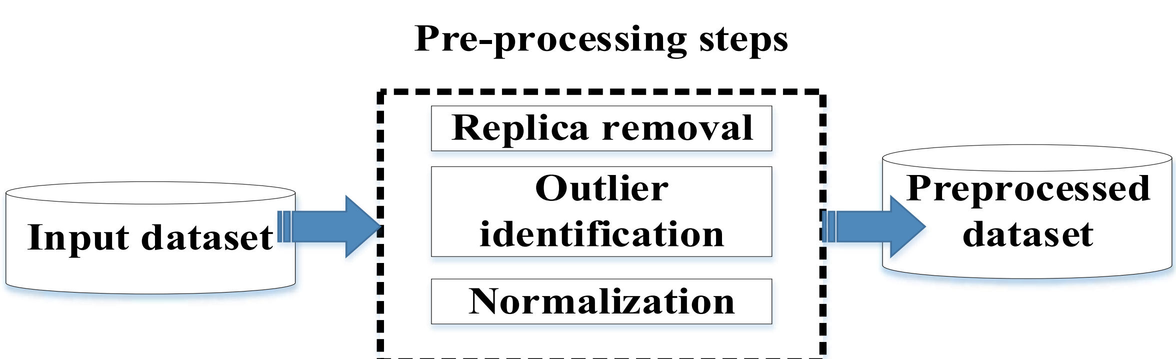


Figure 3: Pre-processing steps

Replica removal: Initially incomplete replies and redundant replies were eliminated and after that the collected data was examined for missing values. The inconsistent responses was removed using a validity function defined as:

$$V(x_i) = \begin{cases} 1, if\ all\ fields\ are\ complete \\ 0, otherwise \end{cases} \quad (7)$$

So that the cleaned data X_{clean} after replica removal is defined as:

$$X_{clean} = \{x_i \in X | V(x_i) = 1\} \quad (8)$$

Outlier Identification: Finding anomalous observations was the goal of outlier detection which is done by Z-score method as:

$$Z_i = \frac{x_i - \mu}{\sigma} \quad (9)$$

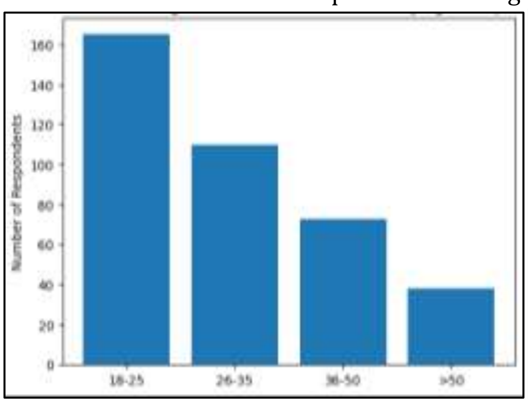
Normalization: Lastly, responses are normalized to the Likert scale range from 1(strongly reject) to 5(strongly accept).

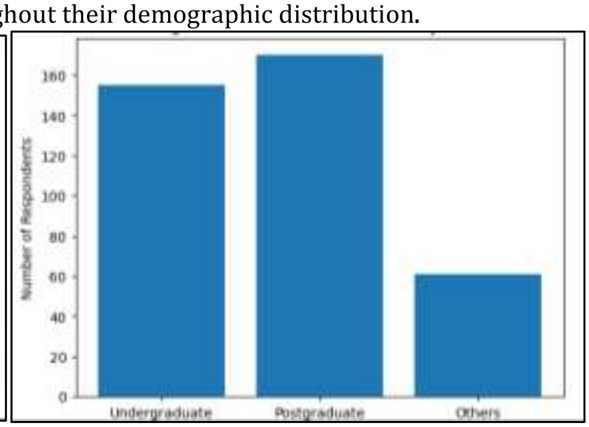
4. Results and Analysis

The statistical results of the collected data is presented in this section. In addition to that to access the correlations between the study variables and test the written hypothesis, descriptive statistics analysis, reliability analysis, multicollinearity testing, and regression analysis were carried out.

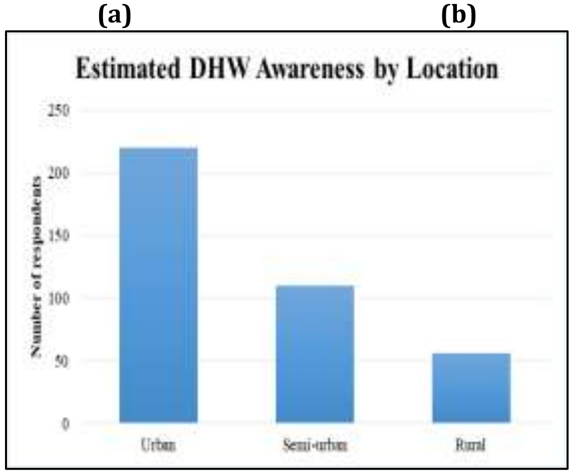
4.1Awareness Approximation

The DHW awareness among the demographic distribution respondents are calculated for proportional. Figure 4 shows the estimated DHW for respondents throughout their demographic distribution.





(a) (b)



(c)

Figure 4: Accessed Awareness of DHW (a) Age group (b) Education level (c) Location

The estimated distributions in figure 4 indicate that participants who are younger, better educated, and live in cities have higher levels of awareness, which is consistent with the chi-square analysis's observed statistical significance. The overall awareness levels of respondents regarding both DHWs and DHSs is presented in table 4.

Table 4: Awareness Statistics

Parameter	**Aware (%)**	**Unaware (%)**
DHWs(A_1)	54.8	45.2

DHSs(A_2)	72.4	27.6

From table 4, the DHS awareness is relatively high, DHW awareness remains moderate**,** indicating a knowledge gap between general DHS**s** and specific wallet-based implementations**.**

4.2Logistic Regression Evaluation

The logistic regression model defined in Equation (2) is used to evaluate predictors of DHW awareness.

Table 5: Logistic Regression Output

Parameter	Regression Coefficient	Standard error	p-value	Odds Ratio
Intercept (w_o)	-1.28	0.21	<0.001	-
DHSs awareness(A_2)	1.74	0.18	<0.001	5.7
Functional Benefits (F_B)	1.21	0.15	<0.001	3.3

From table 5, it is observed that A_2 increases the likelihood of A_1 by 5.7 times, which strongly supports the hypothesis H_1 and H_2. Also Functional Benefits (F_B) influence the likelihood of A_1 by 3.3 times which supports the hypothesis H7.

4.3Evaluation of TAM

The relationship between A_2 , $U_{perceived}$and$I_{adoption}$is evaluated using TAM. The results of TAM is presented in table 6.

Table 6: TAM Output

Parameter Relationship	Regression Coefficient	p-value	Implication
$A_2 \rightarrow U_{perceived}$	0.68	<0.001	Significant
$U_{perceived} \rightarrow I_{adoption}$	0.72	<0.001	Significant
$A_2 \rightarrow I_{adoption}$	0.31	<0.01	Significant

The TAM results in table 6 indicates that perceived usefulness $U_{perceived}$ acts as a strong mediator between adoption intention$I_{adoption}$ and awareness of DHWsA_2. Also the values in table 5 supports the hypothesis H_3 confirming that usefulness drives adoption intention.

4.4Evaluation of SEM

To evaluate the adequacy of the proposed structural model, **SEM fit indices** were examined and the results are presented in table 7.

Table 7: SEM Output

Parameter	SEM value	Threshold	Implication
CFI	0.94	>0.90	Good fit
RMSEA	0.052	<0.08	Acceptable
Chi-Square/df	2.31	<3	Good

The SEM output in table 7 indicates awareness indirectly affects adoption intention through perceived usefulness. Also the fit indices strongly support and validate the theoretical assumptions.

4.5Chi-Square Evaluation

The results presented in the table 8 indicates the significance of the relationship between demographic variables and the study outcomes.

Table 8: Chi square test Outputs

Parameter	Chi square value	p-value	Implication
Age	18.72	<0.01	Significant
Education	21.45	<0.001	Significant

Location	16.38	<0.05	Significant

Table 8 ensures, that there is an increased awareness among younger, educated and urban individuals. Which strongly supports the hypothesis H_5, highlighting digital inequality.

4.6Reliability Analysis

To evaluate the internal consistency of the measurement scale, **Cronbach's Alpha reliability coefficient** was calculated.

Table 9: Reliability Statistics for Perceived Functional Benefits

Parameter	**Value**
Cronbach's Alpha	0.632
Number of items	4

A Cronbach's alpha value above **0.60** is considered acceptable, thereby supporting the hypothesis H_4.

4.7Statistical Analysis and Hypothesis Testing

This section describes the statistical methods used to analyze the survey data and test the proposed hypotheses. Techniques such as Chi-square tests, McNemar test, and logistic regression were applied to evaluate the relationships between the study variables.

A) Testing Hypothesis1 H_1: A_2 has a positive impact on A_1.

A Chi-square (X^2) test of independence was conducted to examine the association between DHS awareness and DHW awareness among 736 valid respondents. The results indicate a statistically significant association between the variables ($p < 0.001$).The strength of association measured using Cramer's v was 0.361,indicating a moderate relationship. Row percentage analysis further showed that 90.7% of respondents aware of DHSs were also aware of DHWs, compared to only 40.9% among those not aware of DHSs.

Table 10: Hypothesis Testing Results Using Chi-Square Analysis

Hypothesis	**N**	**p-value**	**Effect size(Cramer's V)**	**Result**
H_1	736	< 0.001	0.361	Supported

C) Testing Hypothesis2 H_2: A_2significantly predicts A_1

To test this hypothesis, a binary logistic regression analysis was performed to examine whether awareness of DHSs predict awareness of DHWs .The overall regression model was statistically significant, $X^2(1) = 102.23$, $p < .001$, indicating that the model reliably distinguishes between respondents who are aware and not aware of DHWs.

The model explained approximately 19% of the variance in DHW awareness, as indicated by the Nagelkerke R^2value of .191, suggesting moderate explanatory power for a single predictor model in social research. Awareness of DHSs emerged as a significant predictor ($B= 1.911$, $p < .001$).The odds ratio ($Exp(B)=6.76$) indicates that individuals aware of DHSs are approximately 6.76 times more likely to be aware of DHWs compared to those not aware. The statistical significance and strength of the link are further supported by the fact that the 95% confidence interval [4.46, 10.25] excludes 1.

Table 11: Logistic Regression Results for Hypothesis H_2

Hypothesis	**Variable**	**B**	**Exp(B)**	**95%CI**	**Result**
H_2	A_2	1.91	6.76	4.460-10.25	Supported

D) Testing Hypothesis3 H_3: A_2 is significantly higher than A_1.

The McNemar test was used to compare the awareness levels of DHWs and DHSs. A statistically significant difference (Exact $p < .001$) was found based on 734 verified matched replies. From table 12, it is observed that only 32 respondents were familiar of DHWs but lacked awareness of DHSs, whereas 230 respondents were familiar of DHSs but lacked awareness DHWs, indicating clear disparity in the awareness level of DHWs and DHSs

Table 12: **Contingency Table Showing Awareness of DHS and DHW Used for McNemar Test**

	DHW unaware	**DHW aware**
DHS unaware	313	32

DHS aware	230	159

A significant knowledge gap in the digital health ecosystem is highlighted by this research. As a result, Hypothesis $H_3$is validated, suggesting that public knowledge of DHWs is substantially lower than that of DHSs.

E) Testing Hypothesis4 H_4: $\boldsymbol{F_B}$ positively influence $\boldsymbol{A_1}$.

A binary logistic regression analysis was conducted to examine whether perceived functional benefits predict awareness of DHW. The overall model was statistically significant, $X^2(1)=19.41$, $p < .001$, indicating that perceived functional benefits reliably predict wallet awareness. The model explained approximately 3.8% of the variance in wallet awareness, as indicated by the Nagelkerke R^2 value of .038, suggesting modest explanatory power for a psychological predictor.

Table 13: Logistic Regression Results for Hypothesis H4

Hypothesis	Variable	B	Exp(B)	95%CI	Result
H4	$\boldsymbol{F_B}$	0.151	1.163	1.087-1.244	Supported

Perceived functional benefits emerged as a significantly predictor ($B=0.151$, $p < .001$). The odds ratio (Exp(B)=1.163) indicates that for each one unit increase in perceived functional benefits, the likelihood of being aware of DHWs increases by approximately 16.3%.The 95% confidence interval [1.087,1.244] does not include 1, confirming statistical significance. The Hosmer-Lemeshow test was non-significant (p=.272), indicating acceptable model fit.

The figure 5 shows the **distribution of perceived functional benefit scores among respondents**.

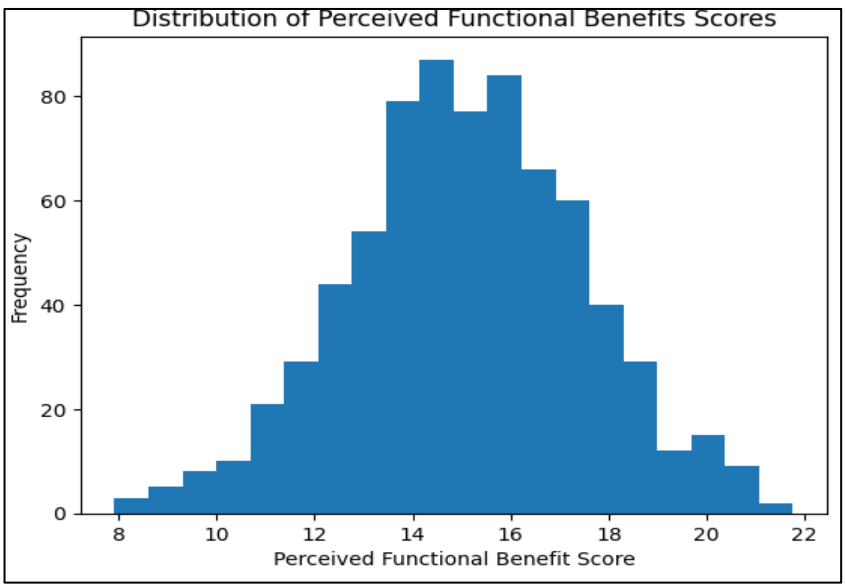


Figure 5: Distribution of Perceived functional benefit score

Figure 5 shows that the majority of the responses fall between 13 and 17, and reaches its maximum at 15. This trend suggests that individuals believe DHWs provide moderate to high levels of functional advantages. Additionally, the distribution has a roughly normal shape and no obvious skewness, indicating that the replies are dispersed reasonably evenly throughout the sample.

F) Testing Hypothesis5 H_5: $\boldsymbol{A_1}$report significantly higher perceived functional benefits of DHWs than those not aware.

An independent samples t-test was conducted to compare perceived functional benefits between individuals aware and not aware of DHSs Respondents aware of DHSs (M = 15.60, SD= 2.36) reported significantly higher perceived benefits than those not aware (M= 14.88, SD=2.42), $t(732)= -4.08$, $p <.001$.

Table 14: Descriptive Statistics for Perceived Functional Benefits by DHS Awareness

	N	Mean	Standard deviation
DHS Unaware	345	14.88	2.42
DHS Aware	389	15.6	2.36

The mean difference was 0.72 points, with a **95% confidence interval of [-1.067, -0.374]** indicating that awareness of DHSs is associated with more positive perceptions of wallet functionality.Therefore, H_5 is supported.

G) Testing Hypothesis6 H_6: Respondents exhibit significantly positive perceptions toward the functional benefits of DHW.

A one-sample t-test was conducted to examine whether respondents held positive perceptions toward DHW functionality. The mean perceived benefit score (M= 15.26, SD= 2.41) was significantly higher than the neutral midpoint value of 12, t(733) = 36.56, p < .001.

Table 15: One-Sample t-Test Results

Hypothesis	Test value	t	df	Mean	95%CI
H_6	12	36.56	733	3.26	[3.08,3.43]

The effect size was large (Cohen's d ≈ 1.35), indicating strong positive perceptions among respondents. Therefore, H_6 is strongly supported

H) Testing Hypothesis7 H_7: $\boldsymbol{A_2}$ and $\boldsymbol{F_B}$ jointly predict $\boldsymbol{A_1}$

A binary logistic regression analysis was conducted to examine whether awareness of DHSs and perceived functional benefits jointly predict awareness of DHWs. The overall model was statistically significant, $X^2(2)$ = 112.808, p < .001.The model explained approximately 21% of the variance in wallet awareness (Nagelkerke R^2 .209).

Awareness of DHSs remained a strong predictor (B=1.854, p < .001, OR=6.38) while perceived functional benefits also significantly predicted wallet awareness (B = 0.122, p = .001, OR = 1.13**).** The model demonstrated good fit (Hosmer Lemeshow p = .639).

Table 16: Multivariate Logistic Regression Predicting Digital Health Wallet Awareness

Parameter	B	P	Exp(B)	Interpretation
$\boldsymbol{A_2}$	1.854	0.000	6.382	Very strong
$\boldsymbol{F_B}$	0.122	0.001	1.13	moderate

These findings indicate that while awareness of DHSs is the dominant predictor, perceived functional benefits add independent explanatory value. This strongly supports H_7.

4.8 Discussion

The study's findings provide important new information about the public's perceptions, understanding, and adoption factors about DHWs in India's emerging digital health ecosystems. The results show that public awareness of DHSs A_1 has a considerable impact on DHW

A_2 acceptability and familiarity. The results of H_1 show a statistically significant link between knowledge of DHSs and knowledge of DHWs. The research revealed a moderate connection (Cramer's V=0.361), suggesting that those who are familiar with DHSs are substantially more likely to be aware of DHWs A_2. Specifically, just 40.9% of respondents who were unaware of these programs knew about DHWs, compared to 90.7% of respondents who were aware of DHSs

A_1. These findings highlight the vital role that more exposure to digital health plays in promoting awareness of novel digital health solutions. The results of H_2bolster the importance of understanding challenges related to digital health. The logistic regression study's findings demonstrated that knowledge of DHWs is significantly predicted by knowledge of DHSs. People who were aware of DHSsA_1 were nearly 6.76 times more aware of DHWs than those who were not. The model explains around 19% of the variance in wallet awareness, which indicates a substantial predictive relationship in the context of social and behavioural studies. The results of H_3 demonstrated a significant awareness gap between DHWs A_2 and DHSs A_1. Although many individuals are familiar with digital health initiatives like telemedicine and electronic health records, the concept of DHWs is still not as well known, according to the McNemar test, which showed that knowledge of DHSs was significantly greater than awareness of DHWsA_2. This suggests that in order to bridge this knowledge gap, targeted awareness campaigns may be required. As demonstrated by H_4, perceived functional benefits significantly influence DHW awarenessA_2. Logistic regression study showed that greater perceived functional benefits F_B increased the likelihood of DHW awareness A_2. The likelihood of awareness improves somewhat with each increase in perceived benefits $U_{perceived}$, according to the odds ratio of 1.163. This outcome aligns with theories of technology adoption that emphasize perceived utility as a critical determinant of acceptance. The results of H_5 further demonstrate that those who are aware of DHSs A_1 believed that DHWs offered greater functional benefits F_B. Respondents who were aware of DHSs A_1 reported significantly better perceived benefits scores than those who were not, suggesting that familiarity with digital health infrastructure enhances users' understanding of the potential value supplied by DHWs. The results of H_6show that respondents' opinions of DHWs' functional benefits $F_B$are frequently quite positive. The one sample t-test revealed that the mean perceived benefits score was significantly higher than the neutral midpoint, indicating that the public firmly believes that DHWs are beneficial. Furthermore, the significant effect size suggests that these opinions are important rather than coincidental. Finally, the results of H_7 indicate that knowledge of DHWs is predicted by both perceived functional benefits $F_B$and awareness of DHSs A_1. The combined logistic regression model explained around 21% of the variance in wallet awareness with a significant explanatory power. While awareness of DHSs A_1 remained the greatest predictor, perceived functional advantages $F_B$had significant explanatory value. These results show how the adoption of new digital health technologies is influenced by awareness and perceived value. Overall, the findings suggest that increasing public knowledge of DHSs, communicating their practical benefits, and fostering trust in digital health systems will be necessary to promote the wider implementation of DHWs in India.

Conclusion

The adoption and awareness of DHW in India is significantly influenced by Ayushman Bharat Digital Mission. The research findings demonstrate that the public's positive perception of the DHW ecosystem's security and applications will improve the adoption of DHW. People who are familiar with DHSs are much more likely to perceive and value the potential benefits of DHWs. The analysis also reveals a clear understanding gap between the specific concept of DHWs and broader DHSs. Increasing digital literacy, promoting public awareness campaigns, and improving communication about the advantages of DHWs could significantly boost adoption. Policymakers should concentrate on bolstering digital infrastructure, improving data privacy safeguards, and growing digital health literacy initiatives in order to guarantee equitable and sustainable implementation. Healthcare professionals should get the necessary training to incorporate DHWs systems into clinical practice, and technology developers should give priority to safe, compatible, and user-friendly platforms. DHWs have the ability to empower individuals, enhance healthcare data management, and help India achieve universal health coverage through concerted efforts by legislators, healthcare organizations, and technology developers.

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