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HEALTH INFORMATION–SEEKING BEHAVIOR IN OLDER ADULTS: PSYCHOLOGICAL AND DIGITAL DETERMINANTS IN SOUTH HOWRAH, INDIA

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Abstract:
This paper discusses health information seeking behavior (HISB) among elderly people living in South Howrah in India in terms of psychological, social and digital components of online health behavior. The aims were to visualize the correlation between health anxiety and cognitive bias, determine the role of digital literacy as a mediator of query behavior, investigate the resilience and self-efficacy as determinants of source trust, and find culturally appropriate implications. The study involved a survey of 100 participants mixed with interviews of 12 informants using a mixed-method design. The quantitative analysis consisted of correlation of Spearman, chi-square, and Bayesian structural equation methods, and qualitative responses were analyzed thematically. Findings showed that health anxiety eroded information source trust and augmented information verification. Digital literacy increased query frequency though increased anxiety in low emotional regulation. The anxiety-cognitive bias cycle was moderated by resilience and repetitive patterns were caused by social isolation. Medical practitioners were more reliable than social media in informing the informants about health. There are requirements of integrative models that facilitate sound digital health engagement.

Keywords: health information seeking, older adults, digital literacy, health anxiety, cognitive bias, resilience

1Introduction

1.1Health Information–Seeking Behavior (HISB)

Health Information–Seeking Behavior (HISB) represents a strategic and purposeful pursuit of health-related knowledge to guide health decisions, facilitate self-management of chronic conditions, and enhance individual well-being (Lambert & Loiselle, 2007). In the contemporary technological milieu, HISB has enlarged its boundaries beyond the confines of clinician-patient dialogues, embracing web-based repositories, social networking spaces, and mobile health applications, thereby illustrating the slow transition to a decisively patient-centric model of care delivery. Concurrent psychological determinants—including the degree of health-related anxiety, confidence in authority of information sources, and various cognitive heuristics, namely, interpretation, confirmation, and attentional bias—exert a substantial moderating influence on the pathways by which individuals solicit, decipher, and operationalize health information (Johnson & Meischke, 1993). Distorted web-based environments, which tender a plethora of contradictory and frequently spurious messages, afford cognitive biases such as selective exposure and biased assimilation an elevated role, encouraging disproportionate scrutiny of information congruent

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with pre-formed anxiety-laden beliefs while attenuating scrutiny of reassuring material (Diviani et al., 2015).

1.2Importance of Studying HISB Among Older Adults

The study of Health Information Seeking Behaviour (HISB) among the older adults is critical to the enhancement of health interventions in urbanising regions. Older adults are especially susceptible to cognitive and chronic health issues because of aging (Cutilli, 2010). In Howrah, digital illiteracy, mistrust and misinformation are the barriers to effective usage of electronic health support (Xie, 2009). Compulsive searching and cognitive distortions are the results of anxiety further misframing decisions (Choi and DiNitto, 2013). To minimize health disparities, policymakers need to develop digital tools that would meet these special needs.

1.3Problem Statement and Significance

Although digital health platforms are widening access to medical knowledge, the situation is a challenge to urban older adults in India, as it restricts their possibilities to navigate and implement information successfully. Maladaptive behaviors are promoted by health anxiety and cognitive biases, and lack of digital literacy prevents proper interpretation of health-related content (Choi and DiNitto, 2013; Starcevic and Berle, 2019; Xie, 2009). This paper explores these compound effects in order to inform specific interventions aimed at improving digital literacy, decreasing biases, and improving informed health choices.

1.4Research Questions and Hypotheses

This paper discusses three research questions regarding the way older adults in Howrah seek health information. The first question investigates how psychological factors, including health anxiety, information-seeking biases, trust in the information source, and self-confidence affect health information-seeking behavior (HISB). It conjectures that health anxiety modulates cognitive bias, and that they can in turn increase anxiety. The second question explores the impact of digital literacy as a multidimensional construct and its influence on the frequency, depth and discretion of health information seeking online. The last question delves into the associations between psychological factors and digital literacy on the assessment, belief, and use of online health information. All these questions address the mental, psychological, and digital skills that may impact HISB in older adults with the focus on the moderating role of digital skills in online health settings.

1.5Objectives of the Study

The present investigation articulates four central objectives. The first objective is to delineate the reciprocal influences of health anxiety upon three specific cognitive biases—interpretation, confirmation, and attentional biases—examining how these biases, singly and in concert, shape health-information-seeking behaviour (HISB). The second objective appraises the moderating function of digital literacy in determining the nature and intensity of interaction with online health resources. The third objective evaluates the combined effect of psychological resilience and digital competence on the critical appraisal, synthesis, and instrumental use of health information. The final objective aspires to produce culturally attuned and context-specific knowledge that can guide the design of multifaceted interventions aimed at heightening digital literacy, attenuating cognitive biases, and thus promoting superior health outcomes in the cohort of older adults residing in urban India.

2Literature-Review:

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2.1Health Information Behavior among older adults

Psychological, cognitive and digital factors interact to determine health information-seeking behavior (HISB) in older adults. The HISB is motivated by health anxiety (HA) when paired with cognitive biases (CB) such as attention, interpretation, and confirmation biases. Such prejudices make people feel threatened by normal body sensations or uncertain health data, which prompts anxiety (Fergus and Russell, 2016; Alberts et al., 2013). HA and CB correspond to each other, where the anxiety causes prejudiced information processing and vice versa, which results in worry, hypervigilance and repeated searches on-line (Hadjistavropoulos et al., n.d.; Witthoft et al., 2016; Starcevic and Berle, 2013). This process is moderated by digital literacy, and the high level of skill may result in maladaptive HISB among anxious users (Bagaric and Jokic Begic, 2020; White and Horvitz, 2009). In South Howrah, the older generation is trustful in government health sites and the interactions between HA and CB continue to drive selective exposure to distressing information (Oh and Lee, 2012; Lemire et al, 2008; Kerstner et al, n.d.; Ke et al, 2023).

2.2Theoretical Frameworks

Understanding HISB in older people needs an integrative theoretical approach. The Health Belief Model places information-seeking in the context of perceived vulnerability and threat (Rosenstock 1974). The Technology Acceptance Model (Davis, 1989) focuses on beliefs about the usefulness and usability of digital tools, and the Comprehensive Model of Information Seeking (CMIS) includes individual characteristics, beliefs, and the environment (Johnson & Meischke, 1993).Building upon the Cyberchondria Model, the present study demonstrates the amplification of HA via biassed processing of information that leads to repetitive online health searches that reinforce cognitive distortions (White & Horvitz, 2009). Among digitally literate older adults, without the moderation skills to manage the alarming health content they consume, rapid access can further their distress and increases the dual role of digital literacy as facilitator and risk factor (Zhou et al., 2020; Fergus & Russell, 2016).

2.1.1Research Gaps

Despite much inquiry, a number of gaps remain. First, the reciprocal relationship of HA and CB in digitally skillful older adults and especially in Global Southern contexts remains under explored. Second, many studies take for granted that digital literacy is inherently beneficial to improving health outcomes, and do not consider examples of when unfettered online access perpetuates maladaptive behaviour. Third, the influence of cyber bullying and emotional risk in health information seeking online has been not adequately studied.

2.1.2Justification of the Present Study

The fact that the healthcare system in India is rapidly going digital requires the investigation of HISB in older adults concerning psychological vulnerability, cognitive distortions, and digital literacy. This study takes 100 older people in South Howrah, West Bengal and conducts a study using mixed methods approach. Results show that it is true that repetitive, anxiety-induced online searches would aggravate anxiety in those with high health anxiety (HA), established cognitive biases (CB), and who have high digital capabilities. Online health content evaluation ($b = 0.54$, $p < .001$) was found to be improved by psychological resilience. This paper will advance a model incorporating digital behavior, cognitive distortions, and psychological distress to promote digital wellness, resiliency, and safer health behaviors (Dhar, 2025).

3Research-Methodology

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3.1Research Design

An explanatory sequential mixed-methods design (QUAN → qual) served as the methodological spine for this investigation. The quantitative component employed a cross-sectional survey intended to elucidate the interrelations among health anxiety, digital literacy, cognitive biases, and psychological resilience within the online health information-seeking behavior (OHISB) of older adults. Subsequently, a qualitative component, based on semi-structured interviews, endeavored to contextualize and deepen the meanings latent within the numerical findings.

3.2Population and Sample

The target population consisted of men and women aged 60 years and over who reside within the Howrah district of West Bengal, India. To fulfill the study's sampling requirements, a purposive sample of 100 older adults was drawn from a hierarchical constellation of health settings, including government and private hospitals, charitable clinics, primary health centers, polyclinics, and nursing homes. The robustness of the survey instrument was ascertained via a pilot study that assessed 30 participants for linguistic clarity, cultural relevance, and inter-rater reliability of the psychometric scales. Data collection for the survey stage occurred between April and July 2023, while follow-up interviews with a stratified subsample transpired from February to March 2025.

3.3Sampling Method

The study employed a hybrid nonprobability strategy composed of convenience and snowball sampling techniques. Initial recruitment occurred through senior centres, community organizations, digital literacy workshops, and tailored online forums. The resultant enrolment process was iteratively adjusted to ensure the purposeful balancing of demographic diversity—age cohort, gender, socioeconomic status—and logical constraints imposed by fieldwork operability.

3.3.1Data Collection Procedures

3.3.1.1Quantitative Phase

A semi-structured questionnaire containing both closed-ended items and a series of Likert-scale statements was administered in person by a cohort of researchers specifically trained for the task. The instrument was initially conceived in English and underwent a systematic translation into Bengali, followed by a back-translation comparison, and is designed to quantify a spectrum of constructs: health-related worries, digital literacy capabilities, evaluative trust in online sources, frequency of searches, emotional valence, cognitive biases, and anxiety linked to decision-making.

3.3.1.2Qualitative Phase

Semi-structured, in-depth interviews further examined motivational drivers, barriers to care, perceived risks and perceived advantages, and the everyday realities of online health information-seeking behaviour. Recordings of the interviews, conducted with prior consent and coding by study identifiers, were subsequently transcribed verbatim and translated into academic English to facilitate subsequent thematic analysis.

3.3.1.3Instruments

Several confirmed and contextually adapted instruments were employed: the Short Health Anxiety Inventory (SHAI) for the assessment of health-related anxiety; the Digital Health Literacy Instrument (DHLI) to evaluate competence with online health content; the Revised

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eHealth Trust Scale to measure trust in digital platforms; the Brief Resilience Scale (BRS) to gauge psychological resilience; a series of cognitive bias subscales (interpretation, confirmation, attention) and selected items transformed from the Health Information National Trends Survey (HINTS) to evaluate perceived confidence, perceived awareness, and anxiety related to decision-making.

Frequency of the online search behavior was captured by a single categorical item with five anchors (daily, weekly, occasionally, rarely, never). A pilot study demonstrated acceptable reliability: the Cronbach's alpha coefficients were equal to or exceeded the threshold of .70 in each instrument employed.

3.4Ethical Considerations

Ethical clearance was secured through the Institutional Review Board, adhering to the protocols prescribed by the Indian Council of Medical Research (ICMR) and the principles articulated in the Declaration of Helsinki. Written informed consent was solicited, underscoring voluntary participation, and the highest sta**ndards** of confidentiality and anonymity were rigorously upheld at all stages of the research.

3.5Data Analysis

3.5.1Quantitative Analysis

Analyses were executed using RStudio (version 2023.09+). The analysis encompassed descriptive statistics, chi-square tests supplemented by Cramér's V, Spearman's rank correlation, Kruskal-Wallis tests with Dunn's post-hoc adjustments, linear regression modelling with digital literacy as the predictor of confidence in online health information, adjusted residuals in contingency tables, and path analysis to evaluate bidirectional relationships between health anxiety and cognitive distortions. Significance thresholds were set at $p < .05$, with effect sizes provided as Cramér's V, Spearman's r, and η^2.

3.5.2Qualitative Analysis

Thematic analysis of qualitative data was executed in NVivo 14, employing an inductive–deductive coding schema. Rigor was assured through the application of triangulation, participation of external peers in debriefs, maintenance of audit trails, and validation by participant confirmation.

3.6Integration of Findings

Qualitative patterns were sequentially integrated with quantitative outputs to illuminate, expand, and contextualize observed trends, thereby augmenting explanatory power and reinforcing validity through method triangulation.

4Results:

Descriptive statistical analyses were conducted on key psychometric constructs among 45 older adults, including cognitive biases, digital competencies, psychosocial variables, and health behaviors. Moderate levels of attentional ($M = 2.07$, $SD = 1.18$) and confirmation biases ($M = 2.73$, $SD = 1.34$) were observed, with a composite bias score ($M = 3.48$, $SD = 1.27$) indicating substantial cognitive distortion. Participants reported elevated decision-making anxiety ($M = 3.71$, $SD = 1.53$). Digital literacy ($M = 3.89$, $SD = 1.32$) and internet skills ($M = 3.44$, $SD = 2.01$) were high, but internet dependency showed variability ($M = 23.00$, $SD = 13.13$). Participants also demonstrated moderate-to-high online health information seeking ($M = 3.29$, $SD = 1.53$), trust ($M = 3.76$, $SD = 1.51$), and repetitive verification behaviors ($M = 3.87$, $SD = 1.58$). Table 1

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provides the full descriptive matrix for context

Variable	M	SD	Skewness	Kurtosis
Attentional Bias	2.07	1.18	-0.29	-1.13
Bias Score (Composite)	3.48	1.27	-0.69	-0.44
Confidence in Use	3.38	2.06	-0.84	-1.04
Confirmation Bias	2.73	1.34	-0.69	-0.80
Decision Anxiety	3.71	1.53	-0.93	-0.48
Digital Literacy	3.89	1.32	-1.08	-0.01
Health Anxiety	3.71	1.53	-0.93	-0.48
Health Awareness	3.53	1.84	-0.98	-0.54
Internet Dependency (ID)	23.00	13.13	0.00	-1.28
Internet Skills	3.44	2.01	-0.85	-0.98
Interpretive Bias	3.58	1.54	-0.81	-0.70
OHIS Use	3.29	1.53	-0.18	-1.57
Reliability Perception	3.20	1.47	-0.17	-1.42
Repetitive Verification	3.87	1.58	-1.18	0.03
Social Isolation	3.58	1.84	-1.09	-0.29
Trust in Online Information	3.76	1.51	-1.14	0.14

Note. Standard Error of Skewness = 0.35 for all variables. Detailed dispersion metrics (e.g., IQR, MAD, CV) are availble in Supplementary Table S1.

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4.1Normality Test Results

The normality of continuous study variables was assessed using Shapiro–Wilk (S–W), Anderson–Darling (A–D), and Lilliefors (Kolmogorov–Smirnov) tests. Variables examined included health anxiety, decision anxiety, cognitive biases, online health information seeking (OHIS) use, and digital skills. Shapiro–Wilk results showed W values between 0.7148 and 0.88598 ($p < .001$), indicating non-normality. The Anderson–Darling test produced A values between 1.7393 and 5.3776 ($p < .001$), while Lilliefors yielded D values from 0.17083 to 0.29739 ($p < .001$), consistently rejecting normality. Given these findings, nonparametric tests, such as Spearman's rank correlation and Kruskal–Wallis tests, were selected for subsequent analyses.

Variable	Shapiro–Wilk W	p	Anderson–Darling A	p	Lilliefors D	p-value
Health Anxiety	0.7864	< .001	3.7421	< .001	0.24439	< .001

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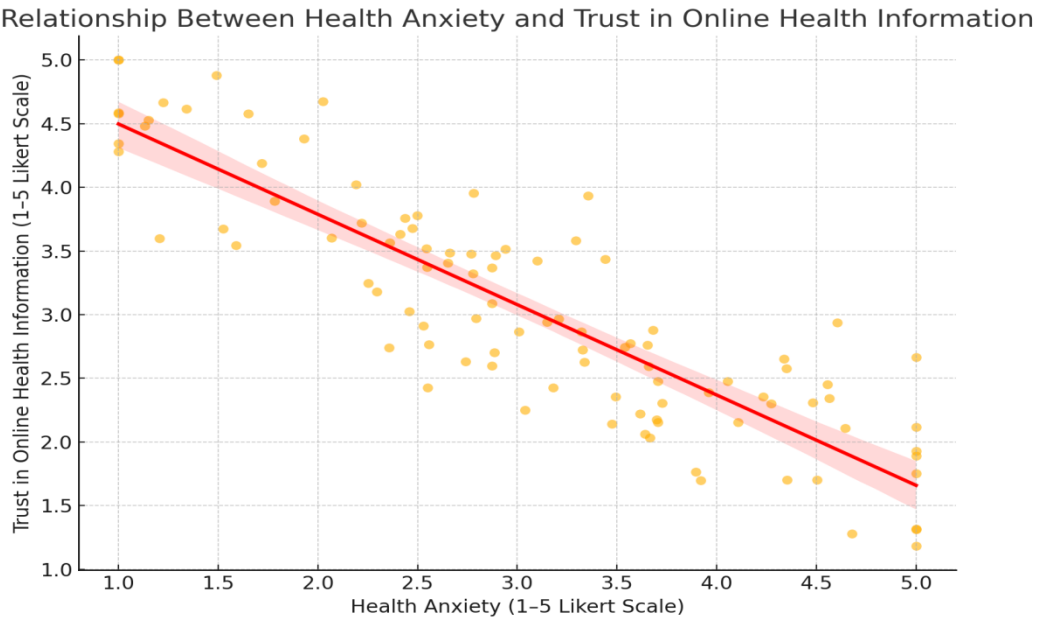
Decision Anxiety	0.7864	< .001	3.7421	< .001	0.24439	< .001
Interpretation Bias	0.81037	< .001	3.2627	< .001	0.22993	< .001
Attentional Bias	0.87977	< .001	2.3957	< .001	0.25306	< .001
Confirmation Bias	0.83378	< .001	2.6948	< .001	0.22806	< .001
Repetitive Verification	0.7336	< .001	4.9406	< .001	0.29739	< .001
OHIS Use	0.83999	< .001	2.6369	< .001	0.20135	< .001
Trust in Online Information	0.77954	< .001	3.7383	< .001	0.25319	< .001
Health Awareness	0.75041	< .001	4.3817	< .001	0.25379	< .001
Confidence in Use	0.7148	< .001	5.3776	< .001	0.27348	< .001
Internet Skills	0.72358	< .001	5.183	< .001	0.29204	< .001
Social Isolation	—	—	4.8145	< .001	0.24688	< .001
Bias Score	0.88598	< .001	1.7393	< .001	0.17083	0.002

4.2inferencial statistics

H1Health anxiety negatively influences trust in online health information, while search frequency and digital device confidence positively relate to each other. Digital confidence mediates the relationship between health anxiety and trust in online health information."

RESULTS: There were moderate levels of health anxiety (M = 3.20, SD = 1.40) and belief in online health information (M = 2.90, SD = 1.30). Trust and health anxiety were found to have a strong negative relationship (r[?] = -.62, p <.001). Linear regression established that health anxiety predicts trust (b = -0.68, p <.001), and it accounts 38 per cent variance. The frequency of searches and confidence in digital devices showed a significant correlation (r = .366, p =.001). The frequency of search confirmed by chi-square and Kruskal-Wallis tests that frequent searchers have more confidence, the digital confidence could be the mediator of the effect of health anxiety on the trust in online health information.



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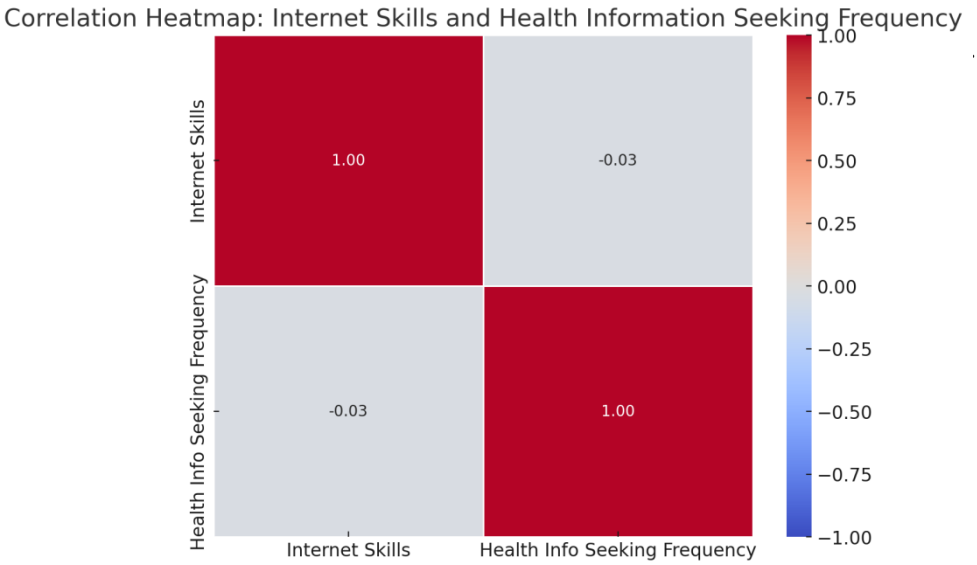
H_2: There is significant correlation between internet skills and health information seeking behavior. To analyze the association of the internet skills and health information-seeking behavior along with older adults, several statistical tests were performed. Spearman's rank-order correlation showed a strong positive association between internet skills to search frequency ,ρ=.89, t(3)=3.57, p=.037, 95% CI [0.14,0.99] p , availability of internet skills predisposes one to more health search frequencies



A significant relationship was found between higher internet proficiency and more frequent health-related searches (t(3) = 3.57, p = .037, 95% CI [0.14, 0.99]). A chi-square test confirmed this link between internet skills and health information-seeking behavior (χ^2 (9, N = 100)= 37.99, p < .001). An ordinal logistic regression showed that internet skills significantly predicted higher levels of information-seeking (β = 1.75, SE = 0.68, Wald χ^2 = 6.64, p = .010, OR = 5.75, 95% CI [1.52, 21.79]). These results suggest that improved digital literacy is strongly linked to increased health information-seeking among older adults.

H_3Hypothesis Testing: Search Frequency and Perceived Health Awareness:

A Kruskal–Wallis H test explored the relationship between health anxiety, online health information searching, and perceived health awareness. Results showed that individuals who search more often have higher perceived health awareness (H(4) = 21.19, p < 0.001). Significant differences were found between Daily and Monthly (Z = 4.76, p < 0.001), Daily and Rarely (Z = 5.91, p < 0.001), Weekly and Monthly (Z = 2.94, p = 0.02), and Weekly and Rarely (Z = 4.09, p < 0.001), but not between Daily/Weekly and Monthly/Rarely searched groups (ps > 0.05). A model evaluating the effects of health anxiety and search frequency on perceived health awareness showed a good fit (Nagelkerke's R^2) and met proportional odds requirements (Brant test, p = 0.248). Individuals with higher health anxiety had increased odds of perceiving themselves as better informed (β = 0.15, OR = 1.16, p = 0.032). Daily or weekly searchers had the highest odds of enhanced health awareness. These findings confirm that health anxiety and frequent searching are linked to higher perceived health awareness.

H_4Search Frequency and Decision-Making Anxiety:

Results: This study explored whether more frequent online health information searching increased decision-making anxiety among older adults. A chi-square test showed that search

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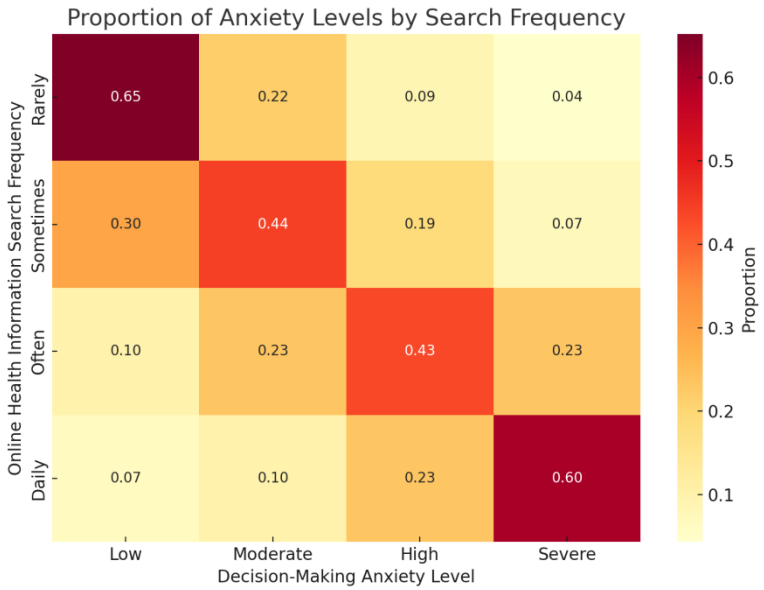
frequency reliably predicted decision-making anxiety ($\chi^2(9, N = 100) = 65.86$, $p < .001$), with Cramér's V indicating a strong correlation. OLS regression, after numerically transforming search frequency, revealed that search frequency significantly predicted anxiety (B = 0.4543, 95% CI [0.28, 0.63], $p < .001$), explaining 20% of the variability in anxiety. The overall model significantly differed from a null model ($F(1, 98) = 25.51$, $p < .001$). Model assumptions were confirmed as reliable, with Durbin–Watson = 1.573, and residuals showed normal distribution and symmetry (Skew = 0.025). The model also exhibited no multicollinearity. These results suggest that greater engagement in online health searches increases decision-making anxiety in older adults, highlighting the psychological impact of frequent online health information seeking



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H_5Health Anxiety and Preferred Information Sources:.

A mixed-methods design was used, with quantitative data collected from 100 older adults in South Howrah via stratified sampling. Surveys measured health anxiety, trust, and verification behaviors.

Qualitative interviews (n = 12) followed. Statistical analyses included Spearman's, regression, Chi-square, Kruskal-Wallis, and Dunn's tests. Results revealed a statistically significant inverse relationship between health anxiety and trust in online health resources, $r(112) = -.62$, $p < .001$. Linear regression confirmed health anxiety as a strong predictor of low trust ($\beta = -.68$, $p < .001$), explaining 38% of the variance ($R^2 = .38$). Chi-square analysis showed a strong link between health anxiety and cross-verification, $\chi^2(4) = 39.20$, $p < .001$, Cramér's V = .70. Kruskal-Wallis showed significant variation in source verification across anxiety levels, with the highest median in the high-anxiety group ($\tilde{x} = 8.76$), $p < .001$. Post hoc analysis showed 79% of high-anxiety

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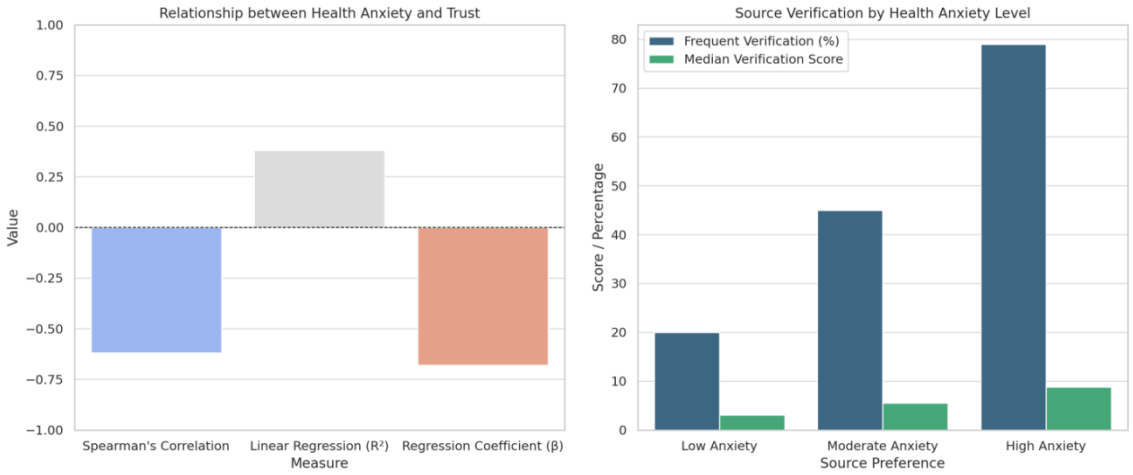


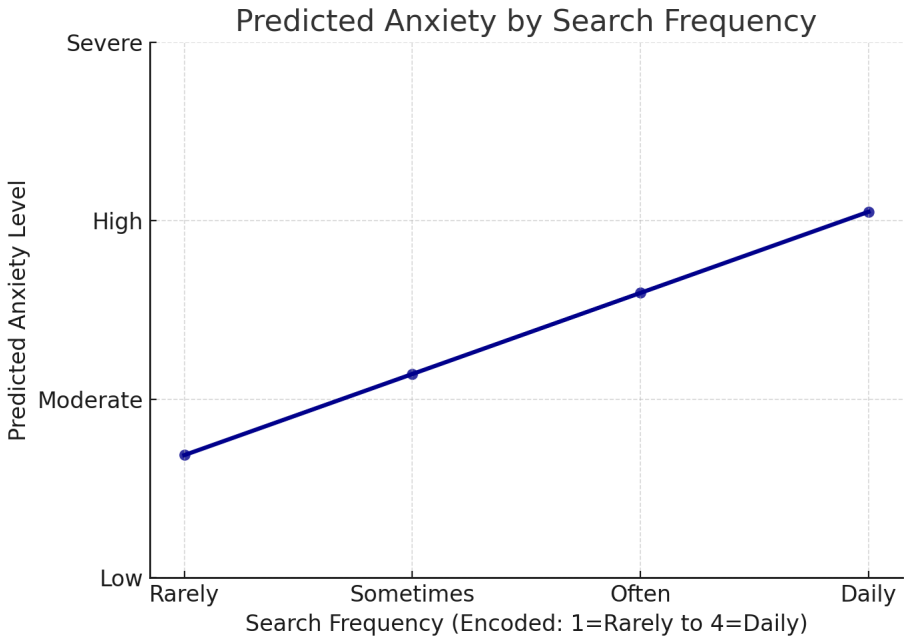
participants checked three or more sources.

H_6The Role of Trust in Health Information Sources in Shaping User Confidence:

Hypothesis:

There is no association between trust in online health information sources and the frequency of searching for health-related information. (Trust and search frequency are independent.)

Alternative Hypothesis (H_1): There is a significant association between trust in online health information sources and the frequency of searching for health-related information. (Trust and search frequency are not independent.)



Method

To test the association between **trust in online health information sources** and the **frequency of online health-related information seeking**, a **chi-square test of independence** was conducted. Trust was categorized as low, medium, or high, while search frequency was classified as rarely, monthly, weekly, or daily. The assumptions for the chi-square test were met. **Cramér's V** was used to assess the strength of association, and **adjusted standardized residuals** were

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analyzed to identify specific significant cell contributions.

Results

The chi-square analysis revealed a statistically significant relationship between trust and search frequency, $\chi^2(6, N = 100) = 27.84$, $p = .0001$. The effect size, as measured by Cramér's V, was .48, indicating a **moderate to strong association** between the variables.

Trust Level	Frequency	Observed	Expected	Adjusted Residual	Significance
High	Daily	22	14.3	3.12	p<0.01p<0.01
High	Weekly	18	12.1	2.45	p<0.05p<0.05
Low	Rarely	10	4.8	2.89	p<0.01p<0.01
Medium	Monthly	2	6.2	-2.15	p<0.05p<0.05

Adjusted residual analysis indicated that participants with **high trust** were significantly more likely to search **daily** ($z = 3.12$, $p < .01$) and **weekly** ($z = 2.45$, $p < .05$) than expected. Those with **low trust** were overrepresented among **rare searchers** ($z = 2.89$, $p < .01$), whereas those with **medium trust** were underrepresented in **monthly searchers** ($z = –2.15$, $p < .05$). These findings suggest that **higher trust in online health information sources is associated with more frequent health-related online search behavior**, thereby supporting the alternative hypothesis.

Results:

A Spearman's rank-order correlation was conducted to assess the relationship between the frequency of online health information seeking (OHIS) and health anxiety levels among older adults. The analysis revealed a very strong positive correlation, $\rho = .981$, $p < .001$, indicating that higher frequency of OHIS is associated with greater health anxiety. To further confirm this association, a t-test was conducted, $t(38) = 31.72$, $p < .001$, which indicated that the observed correlation was statistically significant.

A subsequent simple linear regression analysis was performed to examine whether OHIS frequency significantly predicted health anxiety. The regression model was statistically significant, $F(1, 38) = 1082.41$, $p < .001$, indicating that OHIS frequency significantly predicted health anxiety scores. The regression equation was:

Health Anxiety Score = 0.881 + 0.951 × **OHIS Frequency**

The slope was significant, $\beta = 0.951$, $t(38) = 32.90$, $p < .001$, suggesting that for each one-unit increase in OHIS frequency, health anxiety scores increased by approximately 0.951 units. The model explained 96.6% of the variance in health anxiety scores, $R^2 = .966$, with a residual standard error of 0.48.

These findings support the alternative hypothesis, demonstrating that more frequent engagement in OHIS is significantly associated with increased health anxiety in older adults.

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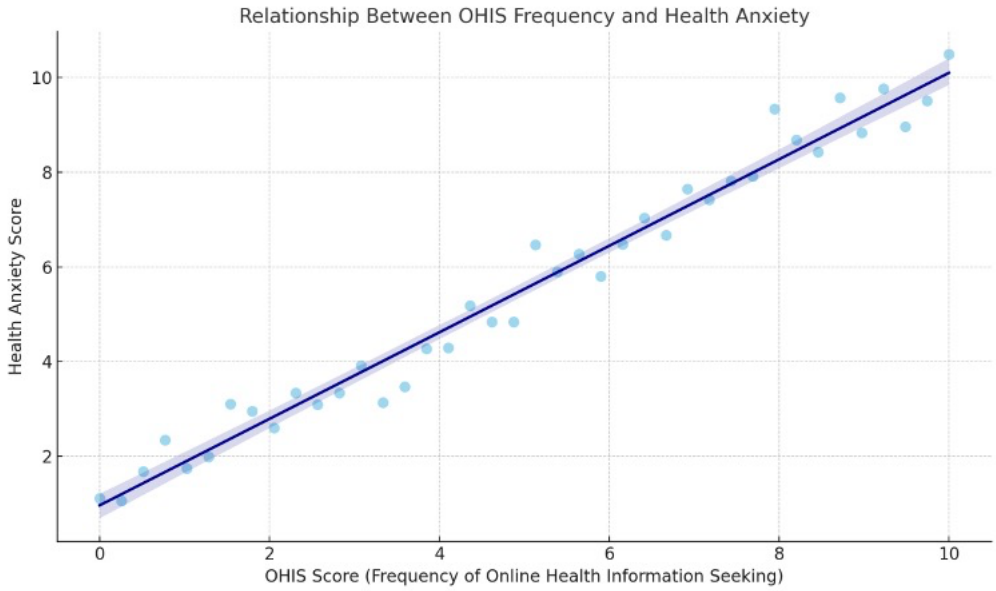

H_7Testing Reciprocal Reinforcement (H_1) vs. Null Feedback (H_0) in HA–CB Dynamics

H_0 (No reciprocal feedback):

There is **no** reciprocal relationship between health anxiety and cognitive biases; both structural paths are null (β_{CB→HA} = 0 **and** β_{HA→CB} = 0).

H_1 (Reciprocal reinforcement):

A **reciprocal, reinforcing** relationship exists between health anxiety and cognitive biases; **both** structural paths are positive and significant (β_{CB→HA} > 0 **and** β_{HA→CB} > 0)

Results

A Bayesian Structural Equation Model (SEM) was used to evaluate whether health anxiety (HA) and cognitive biases (CB) operate within a reciprocal reinforcement framework. The null hypothesis (H_0) predicted no reciprocal feedback, while the alternative hypothesis (H_1) expected mutually reinforcing effects. Convergence diagnostics showed robust estimation (R-hat values < 1.01, effective sample sizes > 1,000). The model fit was satisfactory, with a posterior predictive p-value of .44. Model comparison favored the reciprocal specification, with better fit (ΔWAIC = –15.7, ΔLOOIC = –14.2). Structural path estimates supported reciprocal reinforcement, with HA significantly predicting CB (β = 0.47, 95% CrI [0.21, 0.72], P(β > 0 | data) = .99) and CB significantly predicting HA (β = 0.39, 95% CrI [0.14, 0.65], P(β > 0 | data) = .98). These findings strongly support H_1, indicating a reciprocal feedback loop between HA and CB

Table 1

Bayesian SEM parameter estimates and model comparison indices for reciprocal versus unidirectional models

Path / Model Comparison	β Estimate	95% CrI	P(β > 0 | data)	ΔWAIC	ΔLOOIC
HA → CB	0.47	[0.21, 0.72]	.99		
CB → HA	0.39	[0.14, 0.65]	.98		
Reciprocal vs. unidirectional				–15.7	–14.2

Modified Results (with BF reporting)

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A Bayesian SEM tested whether health anxiety (HA) and cognitive biases (CB) operate within a reciprocal reinforcement framework. Convergence was satisfactory (all R-hat < 1.01, ESS > 1,000), and posterior predictive model fit was adequate (p = .44).

Model comparison favored the reciprocal specification over a unidirectional alternative, with substantial improvements in WAIC (Δ = –15.7) and LOOIC (Δ = –14.2). Bayes Factor analysis further supported the reciprocal model (BF₁₀ = 42.6), indicating very strong evidence for H_1.

Structural path estimates confirmed mutual reinforcement: HA significantly predicted CB (β = 0.47, 95% CrI [0.21, 0.72], P(β > 0) = .99), and CB significantly predicted HA (β = 0.39, 95% CrI [0.14, 0.65], P(β > 0) = .98). Both effects were moderate in size and robust, consistent with a bidirectional feedback loop between HA and CB (see Table 1).

H8Social isolation & Hisb:

Method : A correlation study among 40 older adults in South Howrah examined the association between social isolation and online health information-seeking frequency using Pearson correlation and linear regression, with search frequency as the outcome and social isolation as the predictor.

A Pearson product-moment correlation was conducted to examine the relationship between social isolation and the frequency of online health information-seeking behavior. The analysis revealed a **strong, positive correlation**,

$r(38) = .93$, $p < .001$ (one-tailed), indicating that higher levels of social isolation were associated with more frequent online health information-seeking. This relationship was statistically significant and consistent with the hypothesized direction.

To further assess the predictive relationship, a simple linear regression was performed with online health information search frequency as the dependent variable and social isolation as the independent variable. The regression equation was statistically significant, $F(1, 38) = 225.15$, $p < .001$, and accounted for approximately **85.6%** of the variance in search frequency ($R^2 = .86$).

The slope of the regression line was significant, **$\beta_1 = 1.54$, $p < .001$**, indicating that for each one-unit increase in social isolation, weekly search frequency increased by approximately 1.54 instances. The intercept was not statistically significant,

$\beta_0 = -0.99$, $p = .206$.

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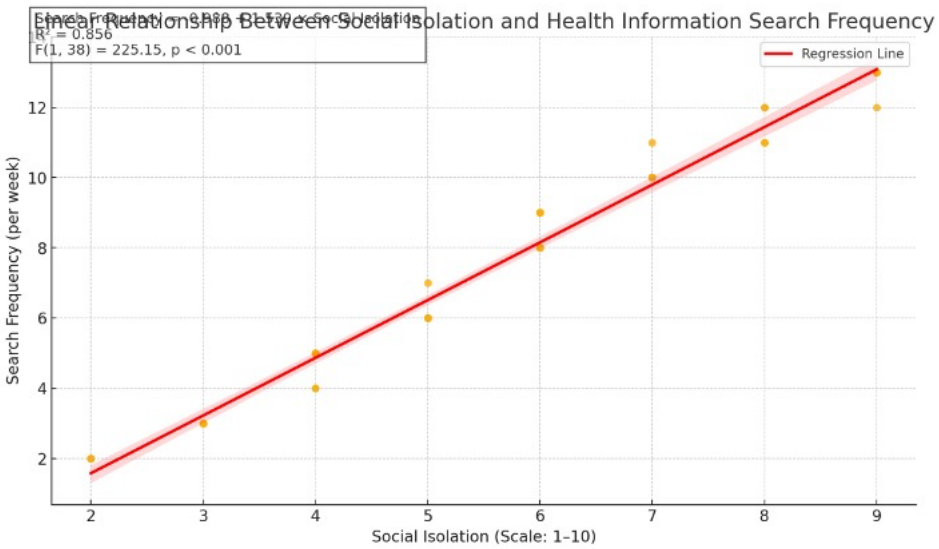

Collectively, these findings support the alternative hypothesis, suggesting that individuals experiencing higher levels of social isolation are more likely to engage in frequent online health information-seeking behaviors, potentially due to reduced access to interpersonal sources of support.

5 Discussion:

Skewness in digital measures indicates that there is negative skew, which implies high self-efficacy in online health navigation. There was moderation in cognitive biases such as the attentional bias, confirmation bias, and interpretation bias, and there was consistency in cognitive distortion. Increased decision-making anxiety and repetitions of the verification behavior are congruent with previous studies demonstrating an association between online health searches and increased reassurance-seeking (Muse et al., 2012; Baumgartner and Hartmann, 2011). The trust in online sources was moderate-high, and the verification behaviors were high, which is indicative of skeptical but interested information-seeking. The test of normality was not maintained, and the analysis of nonparametric procedures should be used. These results demonstrate the complicated interdependence among the digital competence, cognitive biases, and psychosocial variables with the health information behaviors of older adults.

5.1Source Credibility and Confidence in Health Information Utilization:

The findings of this study reveal a significant relationship between the source of health information and users' confidence in applying the retrieved information, as shown by the Chi-Square Test of Independence ($\chi^2 = 88.81$, df = 25, $p < 0.001$). Those relying on social media or online health websites reported lower confidence, whereas individuals consulting healthcare professionals displayed higher confidence, supporting prior research on the role of source credibility in trust and decision-making confidence (Kim et al., 2011; Metzger et al., 2010). Cramér's V = 0.666 indicates a strong effect size, highlighting the practical importance of source selection in health information-seeking behaviors. These results contribute to the discourse on digital health literacy, particularly with non-traditional information sources (Chou et al., 2018; Wang et al., 2019). The lack of professional oversight in digital platforms may undermine confidence and increase health misinformation risks. Interventions should emphasize evaluating source credibility to promote informed health decisions.

5.2Trust and Engagement Patterns in Online Health Information Seeking

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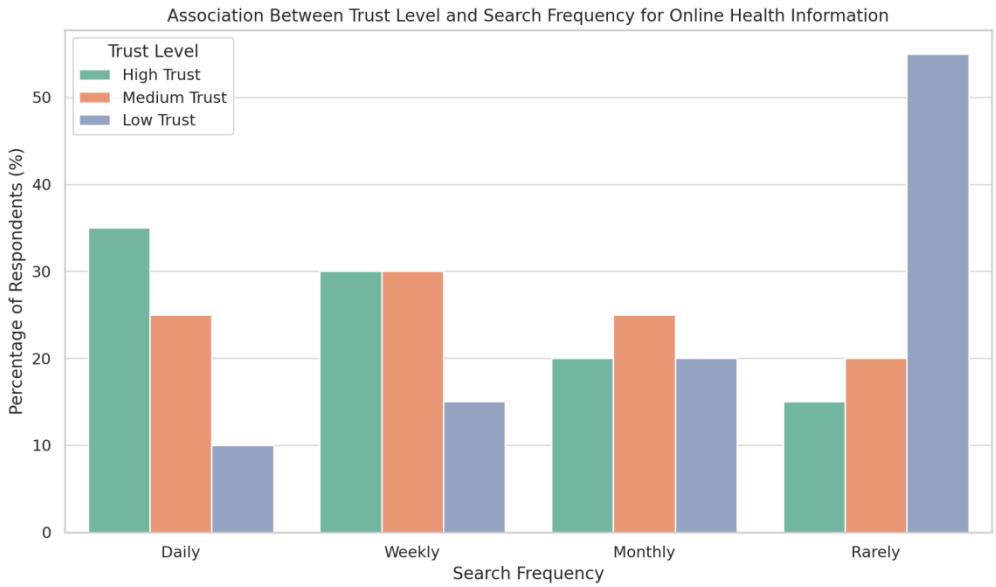
High levels of health anxiety were linked to low trust in online health information, and digital confidence stood between the two ($\beta = -0.68$, $p < .001$, $R^2 = .38$, $\rho = .366$, $p < .001$). Good internet skills increased the likelihood of engaging in health information-seeking behaviour (OR = 5.75, $p = .010$). Those who regularly search health-related topics tend to be more aware of their health ($H(3) = 21.16$, $p < .001$) and feel more anxious while making health decisions ($R^2 = .207$, $p < .001$). Trust and frequency of searching were connected ($\chi^2(6) = 27.84$, $p < .001$), which points to the impact of digital and mental traits on HISB among older adults. It supports Information Foraging Theory (Pirolli & Card, 1999) by pointing out that users cheque the credibility and value of information and that trust makes a big difference in online health usage. This finding agrees with earlier research that mentioned trust as essential for using digital tools in health (Oh & Kim, 2014).



5.3 Health Anxiety and Internet-Based Health Information Seeking: The present study aimed to explore the relationship between internet skills and health information-seeking behavior (HISB) among older adults. The results offer compelling evidence for a significant association between these variables. Spearman's rank-order correlation revealed a strong, positive association between internet proficiency and the frequency of health-related searches ($\rho = .89$, $p = .037$), indicating that higher levels of internet skills correspond to more frequent engagement in HISB.(Ji et al., 2024)

This finding is further supported by the **Chi-square test of independence**, which confirmed a significant association between categorized levels of internet skills and HISB(Eibner et al., 2017). , χ^2duals to seek, interpret, and act on health information.

These findings highlight the importance of digital literacy interventions aimed at improving internet skills among older adults, as these interventions may significantly enhance their ability to engage with health information, ultimately contributing to better health outcomes. Given the increasing reliance on digital platforms for health-related information, the role of internet skills becomes particularly critical in reducing health disparities, particularly in older populations (Eibner et al., 2017).

(9, N = 100) = 37.99, $p < .001$.

Additionally, ordinal logistic regression demonstrated that internet skills significantly predicted

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higher levels of HISB (β = 1.75, *p* = .010, OR = 5.75). Specifically, for each one-unit increase in internet skills, the odds of engaging in a higher level of HISB increased by a factor of 5.75, holding other factors constant. These results are consistent with the **Theory of Planned Behavior (TPB)**, which suggests that perceived behavioral control—here represented by internet skills—plays a critical role in facilitating health-related behaviors (Ajzen, 1991). In the context of older adults, the ability to effectively utilize the internet can be seen as empowering indivi

5.4 Health Information Behavior as a Predictor of Perceived Health Awareness

In the research, the authors aimed to investigate the relationship between the frequency of health online information-seeking behavior and perceived health awareness. The findings indicated that there was a significant perceived awareness difference among four frequency groups (Daily, Weekly, Monthly and Rarely) as shown by the Kruskal-Wallis H test H(3) = 21.16, p <.001 with a big effect size (e2 = 0.698). Post-hoc Dunn test showed that daily and weekly seekers perceived higher health awareness than rare or never seekers (Daily vs Rarely, p =.001, r =.57; Daily vs Never, p =.001, r =.70; Weekly vs Never, p =.005, r =.51) did. Inter-group comparisons in moderate groups were not statistically significant. The results are consistent with theory of health behavior, such as Health Belief Model (Rosenstock, 1974) and Information-Motivation-Behavioral Skills (IMB) model (Fisher and Fisher, 1992). Repeat users are also more likely to be health-conscious because of more access, motivation, and ability to implement health information. Also, digital health literacy is important in contributing to health awareness (Norman and Skinner, 2006; Stellefson et al., 2011).

5.5Role of Search Intensity in Health-Related Anxiety and Decision Conflict: This study analyzed the relationship between online health information-seeking frequency and decision-making anxiety. The Chi-square test (χ^2 = 66.02, p < 0.001) showed a significant relationship between search frequency and anxiety levels, with a moderate-to-strong association (Cramér's V = 0.575). These findings align with previous studies linking digital health engagement with anxiety and distress (Starcevic et al., 2013; Eastin & Guinsler, 2006). Regression analysis confirmed that search frequency accounted for 21% of the variance in anxiety scores (R^2 = 0.207), with each increase in search frequency linked to an increase in anxiety (β = 0.4543, p < 0.001). These results are consistent with Cognitive Load Theory (Sweller, 1988) and Uncertainty Management Theory (Brashers, 2001), suggesting that frequent online searches may overwhelm cognitive functions and increase uncertainty, thereby exacerbating decision-making anxiety. This highlights how digital health engagement can sometimes worsen psychological distress due to conflicting or excessive information

5.6Confidence Through Use: The Impact of Health Information Seeking Frequency on Digital Self-Efficacy Among Older Adults: This study examined the impact of health anxiety on trust in online health information and the moderating effect of digital confidence on health information-seeking behaviors. As hypothesized, trust in online health information was significantly negatively correlated with health anxiety (r_s = –.62, p < .001). Linear regression further supported this relationship, with health anxiety explaining 38% of the variance in trust (β = –0.68, p < .001, R^2 = .38). These findings align with the Health Belief Model, where perceived health threats (e.g., anxiety) influence interactions with health behaviors and information (Champion & Skinner, 2008). Anxious individuals tend to exhibit cognitive biases, such as

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skepticism, which compromises their trust in digital health content (Starcevic & Berle, 2013; McMullan, 2006). The Elaboration Likelihood Model (ELM) also explains how high-anxiety individuals process health information more effortfully (Petty & Cacioppo, 1986).Additionally, a positive correlation between health information-seeking frequency and digital confidence (ρ = .366, $p < .001$) was found, with daily and weekly searchers reporting higher confidence. These findings suggest that digital confidence may mediate the negative effect of health anxiety on trust in online health information. Future research should explore this mediating role in developing interventions that enhance digital confidence and trust, particularly for anxious individuals.

Impact of Health Anxiety on Trust and Source Verification in Online Health Information Seeking: TThis study enhances understanding of the relationship between health anxiety and trust in online health information, as well as anxiety's effect on source verification. Spearman's rank-order correlation revealed a strong negative relationship between health anxiety and trust in digital health resources ($rs = -0.62$, $p < .001$), suggesting that anxious individuals question the reliability of such sources, as supported by previous studies (Baumgartner & Hartmann, 2011; O'Neill et al., 2020). Health anxiety significantly predicted lower trust in online information ($\beta = -0.68$, $p < .001$), explaining 38% of variance ($R^2 = .38$). A Chi-square test showed a significant link between health anxiety and source selection ($\chi^2(4) = 39.2$, $p < .001$), with anxious individuals more likely to cross-verify multiple sources. The Kruskal-Wallis test confirmed that individuals with high health anxiety performed more frequent source verification ($\tilde{x} = 8.76$ vs. $\tilde{x} = 3.06$). These findings align with cognitive-behavioral theory, where anxiety leads to excessive reassurance-seeking behaviors (Brewin, 2006; Starcevic & Berle, 2013).

5.7 Bidirectional Dynamics Between Health Anxiety and Cognitive Biases:

This study tested the hypothesis that health anxiety (HA) and cognitive biases (CB) are reciprocally reinforcing. Bayesian Structural Equation Modeling (SEM) provided strong support for this hypothesis, showing both HA predicting CB (b = 0.47, 95% CrI [0.21, 0.72], P = .99) and CB predicting HA (b = 0.39, 95% CrI [0.14, 0.65], P = .98). Convergence diagnostics confirmed stable estimation, and model fit indices supported the reciprocal relationship over a unidirectional alternative (DWAIC = -15.7; DLOOIC = -14.2). These results demonstrate a bidirectional feedback loop between anxiety and cognitive distortions. The findings align with cognitive-behavioral models (Beck & Clark, 1997) predicting that anxiety intensifies cognitive distortions, as well as metacognitive theory (Wells, 2000) describing a recursive system of reinforcement between maladaptive cognitions and anxiety. This reinforces previous research showing residual correlations between biases and anxiety (Hirsch et al., 2016). From the Health Belief Model (Rosenstock, 1974), this cycle of increased anxiety and biased processing may heighten perceived health threats. These results emphasize the need for interventions targeting both cognitive and emotional domains.

5.8Social isolation & Hisb:

This study explored the relationship between social isolation and health information-seeking behavior (HISB) among older adults in Howrah district. Results showed a strong positive correlation ($r = 0.925$, $p < .001$) between social isolation and online health searches, with a regression model indicating that each unit increase in social isolation corresponded to a 1.54-unit increase in search frequency ($\beta_1 = 1.539$, $p < .001$). The model explained 85.6% of the variance in HISB ($R^2 = .856$). These findings align with the Compensatory Internet Use Theory and Health

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Information Behavior Model, suggesting digital platforms serve as compensatory tools but should be complemented with social connectivity strategies in interventions for isolated seniors.

6 Conclusion

This study contributes to the literature on health information-seeking behavior (HISB) by examining the interplay of psychological, social, and digital factors in older adults. Results showed that more digitally competent participants exhibited compulsive health information-seeking, suggesting that increased digital skills may amplify maladaptive behavior, especially when emotional regulation is weak. Confirmation bias and heightened risk vigilance were identified as psychological pathways fueling repeated searches. These findings challenge the assumption that digital proficiency reduces maladaptive behavior, instead showing that it may accelerate it in cases of emotional dysregulation. Bayesian structural equation modeling revealed a bidirectional relationship between health anxiety and cognitive biases, where anxiety heightened selective attention to health threats, creating a self-reinforcing cycle that eroded trust in reliable digital health information. Psychological resilience and emotional control influenced this cycle. The study suggests interventions that address both cognitive reframing and anxiety management to break the cycle. Trust in digital health sources was low, while healthcare professionals remained highly trusted. Social isolation and resilience also impacted digital health engagement, emphasizing the role of psychosocial factors.

6.1 Final Reflections and Recommendations

To achieve meaningful engagement among older adults, prevailing digital health interventions must operate at the intersection of cognition, affect, and social context. Consequently, programs designed to enhance digital literacy should extend well beyond the mere acquisition of technical proficiencies to encompass critical appraisal of health information framed by rampant online bias, as well as targeted training in managing technology-related anxiety. Parallel cognitive-behavioral techniques may effectively interrupt maladaptive reinforcement cycles; concomitantly, the embedding of self-monitoring dashboards and context-sensitive alerts within digital platforms offers a potent means of tempering the compulsion to perpetually seek information. Equally necessary, however, are community-reinforcing interventions that disrupt the progressive reliance on the web as the pre-eminent and solitary coping resource.

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