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Analysis of Factors Influencing Interest in Using Digital Preconception Counseling Services among Prospective Brides and Grooms in Medan City

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Abstract

Preconception counseling helps prospective couples identify and reduce health risks before pregnancy, yet its use among engaged couples in Indonesia remains limited. Digital counseling services may widen access, but their adoption depends on user perceptions and the surrounding context. This study analyzes the factors that influence the interest of prospective brides and grooms in using digital preconception counseling services in Medan City. A quantitative cross-sectional design was applied to prospective couples recruited from community health centers and religious affairs offices, using a structured online questionnaire. The research model extends the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) with trust and privacy, electronic health literacy, and perceived health benefit. Performance expectancy, effort expectancy, social influence, facilitating conditions, price value, trust and privacy, electronic health literacy, and perceived health benefit were tested as predictors of interest in service use with partial least squares structural equation modeling. Data from 109 respondents indicated that performance expectancy, social influence, and price value significantly influenced interest in use, and the model explained 47.0 percent of its variance. The findings are expected to guide midwives, public health practitioners, and service managers in designing digital preconception counseling that is useful, easy to use, affordable, trustworthy, and socially supported. This collaboration among midwifery, public health, and management perspectives strengthens the practical relevance of the study.

Keywords:
Preconception counseling; Digital health; Prospective couples; UTAUT2; Interest in use.

1. INTRODUCTION

Preconception care is the provision of biomedical, behavioral, and social health interventions to women and couples before conception occurs, with the aim of improving health outcomes for mothers and children (World Health Organization, 2013). Evidence indicates that the months before pregnancy are a critical window in which nutrition, lifestyle, vaccination status, chronic conditions, and exposure to harmful substances can still be modified, and that interventions delivered in this period can improve reproductive and perinatal outcomes (Barker et al., 2018; Dean et al., 2014; Stephenson et al., 2018). Preconception health is therefore recognized as an important component of the continuum of care for maternal, newborn, and child health (Dean et al., 2014; Johnson et al., 2006).

Despite these benefits, the uptake of preconception care remains low in many settings. A systematic review identified limited awareness, the perception that care is unnecessary before a pregnancy is confirmed, cost, and difficulties in accessing services as recurring barriers (Poels et al., 2016). In Indonesia, health services before pregnancy are formally regulated under the Minister of Health Regulation No. 21 of 2021 (Ministry of

Health of the Republic of Indonesia, 2021), and the National Population and Family Planning Board has introduced an electronic application, Elsimil, to prepare prospective couples for marriage and pregnancy (National Population and Family Planning Board [BKKBN], n.d.). Prospective brides and grooms are a strategic target group because they have a clearly defined time frame, share a common intention to start a family, and are already in contact with religious and administrative institutions during marriage preparation. The legal minimum age for marriage in Indonesia is 19 years for both sexes (Republic of Indonesia, 2019), which defines the adult population targeted by this study.

Digital health, broadly defined as the use of information and communication technologies to deliver or enhance health services (Eysenbach, 2001), offers a way to extend counseling beyond the clinic. Online or application-based counseling can be accessed at flexible times, may feel more private for sensitive reproductive topics, and can reach couples who are busy with wedding preparations. However, the availability of a digital service does not guarantee its use. Technology acceptance theories, including the Technology Acceptance Model, the Unified Theory of Acceptance and Use of Technology (UTAUT), and its consumer-oriented extension UTAUT2, explain that adoption depends on perceived usefulness, ease of use, social influence, enabling conditions, and cost perceptions (Davis, 1989; Venkatesh et al., 2003, 2012). In health contexts, additional factors such as trust, privacy concerns, health literacy, and health beliefs are expected to play a significant role (Kim & Park, 2012; Tamilmani et al., 2021).

Medan, the capital of North Sumatra Province, is one of the largest cities outside Java and is characterized by high ethnic, cultural, and religious diversity. Such diversity may shape how couples perceive counseling about reproductive health and how strongly family and community opinions affect their decisions. To the best of the authors' knowledge, empirical evidence on the determinants of interest in digital preconception counseling among prospective couples in this setting is still scarce, and existing studies rarely combine health, behavioral, and service-management perspectives in a single model.

1.1. Preconception Counseling and Its Digital Delivery

Systematic evidence suggests that preconception interventions delivered in primary care can improve knowledge, health behaviors, and some pregnancy outcomes (Hussein et al., 2016). Reviews of intervention strategies highlight that effective approaches often combine education, risk assessment, and behavioral support (Barker et al., 2018). At the same time, studies on service use show that people rarely seek preconception care on their own initiative, which makes outreach and acceptable delivery formats essential (Poels et al., 2016). Digital delivery through websites, mobile applications, and tele-counseling may help overcome some barriers of time and distance, yet its adoption must be understood from the user's perspective.

1.2. Theoretical Foundations

The Technology Acceptance Model proposes that perceived usefulness and perceived ease of use determine intention to use a technology (Davis, 1989). UTAUT integrated several earlier models and identified performance expectancy, effort expectancy, social influence, and facilitating conditions as key determinants (Venkatesh et al., 2003). UTAUT2 added hedonic motivation, price value, and habit to better explain consumer use (Venkatesh et al., 2012), and a recent systematic review confirmed its wide application across domains, including health (Tamilmani et al., 2021). For health services specifically, Kim and Park (2012) proposed a health information technology acceptance model that integrates health behavior constructs with technology acceptance. The Theory of Planned Behavior contributes the role of subjective norms (Ajzen, 1991), while the Health Belief Model contributes perceived susceptibility, severity, and benefits as drivers of preventive behavior (Janz & Becker, 1984; Rosenstock, 1974). Because preconception counseling is a preventive service delivered through technology, this study integrates these perspectives.

1.3. Research Objectives and Structure of the Paper

This study therefore analyzes the factors that influence the interest of prospective brides and grooms in Medan City in using digital preconception counseling services. It extends UTAUT2 with trust and privacy, electronic health literacy, and perceived health benefit, and is a collaboration among midwifery, public health, and management scholars. The results are intended to support the design of digital counseling services that are acceptable, accessible, and sustainable.

This paper is structured as follows. The research method section presents the conceptual framework and hypotheses, the research design, and the analytical methods. The results and discussion section reports the measurement and structural model results, interprets them in light of the existing literature, and outlines implications for practice and theory. The conclusion summarizes the main findings, limitations, and directions for future research.

2. RESEARCH METHOD

2.1. Conceptual Framework and Hypothesis Development

Building on the theoretical foundations above, eight predictors of interest in using digital preconception counseling were hypothesized, as shown in Figure 1.

Performance expectancy (H1). Performance expectancy is the degree to which a person believes that using a service will help attain gains in performance (Venkatesh et al., 2003). For prospective couples, this means believing that digital counseling will provide reliable information and personal risk assessment before pregnancy. Performance expectancy has been among the strongest predictors of intention in acceptance research (Tamilmani et al., 2021; Venkatesh et al., 2003). H1: Performance expectancy positively influences interest in using digital preconception counseling.

Effort expectancy (H2). Effort expectancy refers to the ease associated with using the service (Venkatesh et al., 2003). Couples facing a demanding schedule before the wedding are likely to prefer services that are simple to access and navigate (Davis, 1989). H2: Effort expectancy positively influences interest.

Social influence (H3). Social influence is the extent to which important others, such as parents, partners, peers, religious leaders, and health workers, are perceived to believe that one should use the service (Venkatesh et al., 2003). In collectivist and family-oriented societies, subjective norms are expected to be especially influential (Ajzen, 1991). H3: Social influence positively influences interest.

Facilitating conditions (H4). Facilitating conditions reflect the perceived availability of resources and support, such as a compatible smartphone, stable internet access, and assistance from staff (Venkatesh et al., 2003, 2012). H4: Facilitating conditions positively influence interest.

Price value (H5). Price value is the consumer's cognitive trade-off between the perceived benefits of a service and the monetary cost of using it (Venkatesh et al., 2012). Cost has been reported as a barrier to preconception care (Poels et al., 2016), and service managers need to know whether couples consider digital counseling worth its price, including data costs and consultation fees. H5: Price value positively influences interest.

Trust and privacy (H6). Preconception counseling involves sensitive reproductive, family, and sexual health information. Trust in the provider and platform is a central driver of online engagement (Gefen et al., 2003), and privacy concerns affect willingness to disclose health information online (Bansal et al., 2010). H6: Trust and privacy positively influence interest.

Electronic health literacy (H7). Electronic health literacy is the ability to seek, find, understand, and appraise health information from electronic sources and apply it to health problems (Norman & Skinner, 2006). Couples with higher literacy are expected to feel more capable of using and benefiting from digital counseling. H7: Electronic health literacy positively influences interest.

Perceived health benefit (H8). According to the Health Belief Model, people are more likely to adopt preventive actions when they perceive susceptibility to a health problem and believe that the action brings benefits (Janz & Becker, 1984; Rosenstock, 1974). The perception that preconception care is unnecessary has been documented as a barrier (Poels et al., 2016). H8: Perceived health benefit positively influences interest.

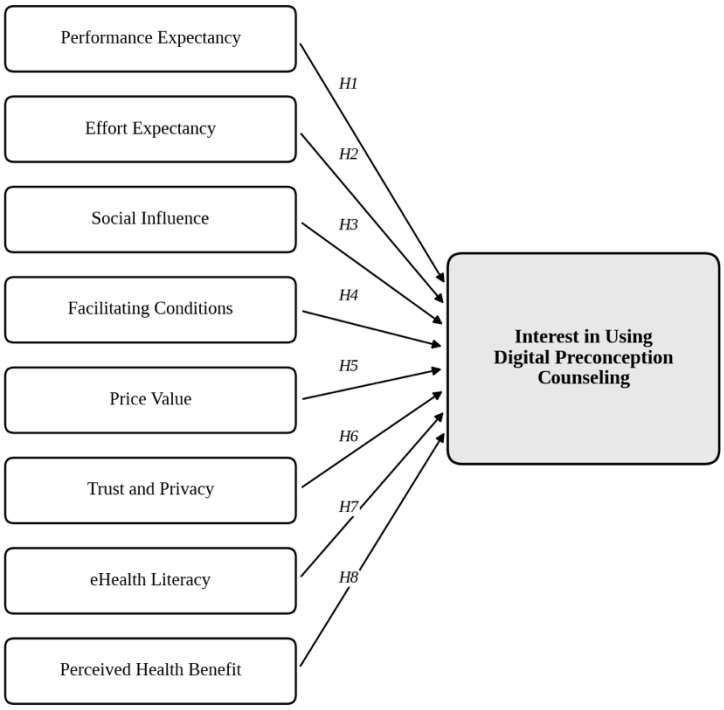


Figure 1. Conceptual Framework of the Study

2.2. Research Design and Setting

This study used a quantitative, analytic, cross-sectional design with a self-administered online questionnaire. The research was conducted in Medan City, North Sumatra, Indonesia, in March to May 2026. Reporting follows the STROBE recommendations for cross-sectional studies.

2.3. Population, Sample, and Sampling Technique

The target population was prospective brides and grooms residing in Medan City who planned to marry within the next 12 months. Respondents were recruited at community health centers, religious affairs offices, and pre-marital guidance classes in Medan using consecutive (purposive) sampling. Inclusion criteria were: (1) age of at least 19 years (Republic of Indonesia, 2019); (2) planning to marry within 12 months; (3) owning a smartphone with internet access; and (4) willingness to provide informed consent. Respondents who were already married or who submitted incomplete questionnaires were excluded.

The minimum sample size was estimated using G*Power (Faul et al., 2007) for a multiple regression framework with eight predictors, a medium effect size ($f^2 = 0.15$) (Cohen, 1988), a significance level of 0.05, and a power of 0.80, yielding a minimum of approximately 109 respondents. Because of limited resources, the target sample was set at this minimum, 109 respondents, which should be considered when interpreting statistical power.

2.4. Instruments and Variable Measurement

Data were collected with a structured questionnaire consisting of demographic items and 9 constructs measured with multiple items on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Items for performance expectancy, effort expectancy, social influence, facilitating conditions, price value, and interest in use (behavioral intention) were adapted from Venkatesh et al. (2003, 2012). Trust and privacy items were adapted from Gefen et al. (2003) and Bansal et al. (2010). Electronic health literacy was measured with items adapted from the eHealth Literacy Scale (Norman & Skinner, 2006), and perceived health benefit with items adapted from the Health Belief Model literature (Janz & Becker, 1984). All items were translated into Indonesian using forward and backward translation, reviewed by experts in midwifery, public health, and management, and pilot tested on 30 prospective couples outside the study sample. Table 1 summarizes the constructs and their sources.

Table 1. Study Constructs, Hypotheses, and Measurement Sources

Construct	Hypothesis	Adapted from
Performance expectancy	H1	Venkatesh et al., 2003; Venkatesh et al., 2012
Effort expectancy	H2	Venkatesh et al., 2003; Venkatesh et al., 2012
Social influence	H3	Venkatesh et al., 2003; Venkatesh et al., 2012
Facilitating conditions	H4	Venkatesh et al., 2003; Venkatesh et al., 2012
Price value	H5	Venkatesh et al., 2012
Trust and privacy	H6	Bansal et al., 2010; Gefen et al., 2003
Electronic health literacy	H7	Norman & Skinner, 2006
Perceived health benefit	H8	Janz & Becker, 1984; Rosenstock, 1974
Interest in use (dependent)	–	Venkatesh et al., 2003; Venkatesh et al., 2012

2.5. Data Collection

Respondents received an explanation of the study and accessed the online questionnaire through a link or QR code after giving electronic informed consent. Participation was voluntary and anonymous, and data were stored securely and used only for research.

2.6. Data Analysis

Descriptive statistics summarized respondent characteristics. The research model was tested using partial least squares structural equation modeling (PLS-SEM) with SmartPLS 4, which is suitable for predictive, theory-extending models with multiple constructs (Hair et al., 2019, 2022). The measurement model was assessed through indicator loadings (threshold 0.70), Cronbach's alpha and composite reliability (threshold 0.70), average variance extracted (threshold 0.50) (Fornell & Larcker, 1981), and discriminant validity using the heterotrait-monotrait ratio (threshold below 0.90) (Henseler et al., 2015). Common method bias was examined using Harman's single-factor test and full collinearity variance inflation factors (Kock, 2015; Podsakoff et al., 2003). The structural model was evaluated through variance inflation factors, path coefficients with bootstrapping of 5,000 resamples, the coefficient of determination (R^2), and effect size (f^2) (Hair et al., 2022). Hypotheses were accepted at a significance level of 0.05.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Respondent Characteristics

A total of 125 questionnaires were distributed and 109 valid responses were analyzed (response rate 87.2 percent). The mean age was 26.5 years (SD 3.2); 55.0 percent were female and 45.0 percent were male. Regarding education, 30.3 percent had completed senior high school and 69.7 percent had a diploma or university degree. Of the respondents, 41.3 percent had previously heard of preconception counseling, and 78.0 percent had ever used a digital health service. The mean score of interest in using digital preconception counseling was 3.69 on a five-point scale.

3.1.2. Measurement Model Evaluation

Table 2 presents the reliability and validity of the constructs. All indicator loadings exceeded 0.75, so no items were removed. Cronbach's alpha ranged from 0.82 to 0.90 and composite reliability from 0.88 to 0.93, while average variance extracted ranged from 0.65 to 0.77, all above the recommended thresholds. The highest HTMT value was 0.56, well below 0.90, supporting discriminant validity. All inner variance inflation factors were below 1.5, and the first factor in Harman's test explained 27.8 percent of the variance, so collinearity and common method bias were not considered a serious concern.

Table 2. Measurement Model Results

Construct	Items	α	CR	AVE
Performance expectancy	4	0.860	0.905	0.705
Effort expectancy	4	0.816	0.879	0.646
Social influence	4	0.854	0.902	0.696
Facilitating conditions	4	0.898	0.929	0.765
Price value	4	0.868	0.910	0.718
Trust and privacy	4	0.852	0.900	0.693
Electronic health literacy	4	0.867	0.910	0.716
Perceived health benefit	4	0.888	0.923	0.750
Interest in use	4	0.865	0.908	0.712

Note: CR = composite reliability; AVE = average variance extracted.

3.1.3. Structural Model and Hypothesis Testing

The structural model explained 47.0 percent of the variance in interest in using digital preconception counseling ($R^2 = 0.470$). Table 3 reports the path coefficients, t statistics, and p values obtained from bootstrapping. Of the eight hypotheses, three (H1, H3, and H5) were supported. The effect sizes of these significant paths were small ($f^2 = 0.05$ to 0.07).

Table 3. Structural Model and Hypothesis Testing

Path	β	t	p	Decision
H1: PE → INT	0.191	2.35	0.021	S
H2: EE → INT	0.043	0.47	0.639	NS
H3: SI → INT	0.221	2.45	0.016	S
H4: FC → INT	0.120	1.61	0.110	NS
H5: PV → INT	0.190	2.45	0.016	S
H6: TP → INT	0.064	0.71	0.480	NS
H7: EHL → INT	0.169	1.93	0.057	NS
H8: PHB → INT	0.110	1.32	0.190	NS

Note: PE = performance expectancy; EE = effort expectancy; SI = social influence; FC = facilitating conditions; PV = price value; TP = trust and privacy; EHL = electronic health literacy; PHB = perceived health benefit; INT = interest in use; S = supported; NS = not supported.

3.2. Discussion

3.2.1. Technology Perceptions

Performance expectancy significantly influenced interest (H1 supported; $\beta = 0.191$, $p = 0.021$). This is consistent with UTAUT and UTAUT2, in which performance expectancy is typically a key determinant of intention (Tamilmani et al., 2021; Venkatesh et al., 2003, 2012), and suggests that couples are more interested when they believe digital counseling gives credible, personalized preparation for pregnancy. Effort expectancy was not significant (H2 not supported; $\beta = 0.043$, $p = 0.639$). A possible explanation is that most respondents were already used to digital health services, so ease of use did not differentiate their interest (Davis, 1989).

3.2.2. Social Context

Social influence had the largest coefficient and was significant (H3 supported; $\beta = 0.221$, $p = 0.016$). This agrees with the role of subjective norms in the Theory of Planned Behavior (Ajzen, 1991) and with the central role of family, religious leaders, and health workers in marriage preparation in Medan. Facilitating conditions were not significant (H4 not supported; $\beta = 0.120$, $p = 0.110$), possibly because smartphone and internet access is widespread in this age group and therefore does not discriminate between respondents (Venkatesh et al., 2003).

3.2.3. Cost and Trust

Price value was significant (H5 supported; $\beta = 0.190$, $p = 0.016$), in line with evidence that cost is a barrier to preconception care (Poels et al., 2016): couples who believe the benefits justify the cost are more interested. Trust and privacy were not significant (H6 not supported; $\beta = 0.064$, $p = 0.480$), which differs from findings in online health settings (Bansal et al., 2010; Gefen et al., 2003). Trust may be assumed when counseling is provided by midwives or recognized health institutions, or the scale may not have captured specific privacy concerns.

3.2.4. Health Literacy and Beliefs

Electronic health literacy had a positive but marginal effect (H7 not supported; $\beta = 0.169$, $p = 0.057$), which should be interpreted cautiously given the minimum sample size (Norman & Skinner, 2006). Perceived health benefit was not significant (H8 not supported; $\beta = 0.110$, $p = 0.190$). Because only 41.3 percent of respondents had heard of preconception counseling, many may not yet perceive susceptibility or benefit, as suggested by the Health Belief Model and by studies on perceived need (Janz & Becker, 1984; Poels et al., 2016; Rosenstock, 1974). Larger samples are needed to confirm these findings.

3.2.5. Implications

3.2.5.1. Midwifery and Public Health Practice

Digital counseling should be integrated with existing marriage preparation channels, such as pre-marital guidance and community health centers, and delivered or supervised by competent midwives and health workers so that digital and face-to-face care complement each other (BKKBN, n.d.; Ministry of Health of the Republic of Indonesia, 2021). Messages should emphasize concrete benefits, such as anemia and nutrition screening, immunization status, and chronic disease management before conception (Johnson et al., 2006; Stephenson et al., 2018).

3.2.5.2. Service Management

Providers should consider pricing and data-cost transparency, simple user journeys, clear privacy policies, and partnerships with religious and community institutions to build trust and social support. Service quality indicators and user feedback should be monitored to sustain use over time.

3.2.5.3. Theory

The study extends UTAUT2 to the preconception setting by testing trust and privacy, electronic health literacy, and perceived health benefit as additional determinants (Kim & Park, 2012; Venkatesh et al., 2012).

4. CONCLUSION

This study examined eight determinants of the interest of prospective couples in Medan in using digital preconception counseling: performance expectancy, effort expectancy, social influence, facilitating conditions, price value, trust and privacy, electronic health literacy, and perceived health benefit. Performance expectancy, social influence, and price value were significant determinants of interest, and the model explained 47.0 percent of its variance, whereas effort expectancy, facilitating conditions, trust and privacy, electronic health literacy, and perceived health benefit were not significant. These results can guide midwives, public health practitioners, and service managers in designing digital counseling that is useful, easy to use, affordable, trustworthy, and socially supported.

Several limitations should be noted. The cross-sectional design does not permit causal inference, and interest in use is an intention that may not translate into actual use. Self-reported data may be affected by social desirability, and non-probability sampling in a single city limits generalizability. In addition, the sample size equals the minimum required, so power to detect small effects is limited. Future research could apply longitudinal or experimental designs to follow couples from intention to actual service use, use mixed methods to explore cultural and religious influences, test a prototype counseling application with usability and effectiveness outcomes, and replicate the model in other regions of Indonesia.

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