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Research Article

Trust and Consumption of Print Media for Nutrition Information among Pregnant Women: Insights in the Context of Rising Smartphone Usage

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ABSTRACT

Background: Nutrition literacy in pregnancy shapes diet quality and health outcomes, yet the credibility and channel preferences for information are shifting amid rapid digitization.

Objective: To assess pregnant women's trust and reliance on print media for nutrition information in Punjab, India, in the context of rising smartphone access.

Methods: A quantitative cross-sectional survey was administered to 600 pregnant women attending public and private antenatal centres across six districts (two per region). Stratified sampling ensured proportional representation. A structured, pre-tested questionnaire (English/Punjabi/ Hindi) captured sociodemographic, frequency of use, and trust in newspapers, magazines, and health-worker leaflets, alongside smartphone use for nutrition information. Associations were examined using Chi-Square tests and directional measures.

Results: Reliance on newspapers and magazines was low (59% and 62% "never," respectively). Leaflets distributed by ASHAs/ANMs showed comparatively higher uptake, with nearly one-third reporting frequent/consistent use. Smartphone use for nutrition was limited: 87.2% reported either no use or <1 hour/day. Area of residence showed a significant but weak association **(**$\chi^2[4] = 14.406$, $p = .006$**),** whereas working status was not associated with trust. Across channels, interpersonal communication with doctors/health workers was most trusted, with leaflets serving a complementary role.

Conclusions: The results indicate that print leaflets, when distributed alongside interpersonal counselling by health professionals such as ASHA workers and ANMs, remain influential. In contrast, smartphones are comparatively less used for nutrition literacy because of concerns regarding the credibility of online information.

Implications: Testing is needed for hybrid strategies that combine redesigned leaflets with carefully vetted digital resources.

Future research: Mixed-methods and longitudinal designs should probe cultural factors and evaluate hybrid models' effectiveness over time.

Keywords: Maternal Nutrition Literacy, Health Communication, Pregnant women, Print Media, Smart Phone Usage, Media Trust, and Sociodemographic Factors.

Introduction

Print media has historically been one of the most trusted and accessible channels of health communication in India. Print media serves as a reliable channel for disseminating health information by providing credible, culturally relevant, and easily accessible messages that enhance public awareness and promote healthy practices(Kanchan & Gaidhane, 2024). Newspapers, magazines, and locally distributed health pamphlets or leaflets, often provided by Accredited Social Health Activists (ASHAs) and Auxiliary Nurse Midwives (ANMs),

have consistently played a central role in shaping maternal nutrition awareness(Barik et al., 2019a). Its credibility, wide reach, and cultural alignment made print media a reliable medium for communicating dietary guidelines, preventive care practices, and health campaign messages, particularly in rural and semi-urban communities. Print media has played an important role in improving nutrition literacy among pregnant women and supporting better maternal and child health(Gupta, 2000).

Nutrition literacy during pregnancy is a critical determinant of maternal and child health outcomes (Kharazi et al., 2020). Adequate dietary knowledge and informed decision-making enable expectant mothers to meet their increased nutritional needs, thereby reducing the risk of complications such as anemia, low birth weight, and developmental delays(Olloqui-Mundet et al., 2024). Access to credible and timely nutrition information is essential. Traditionally, print media, comprising newspapers, magazines, and community-distributed materials such as leaflets provided by health workers, including ASHAs and ANMs, has played a pivotal role in disseminating information to pregnant women in India. These sources have historically been trusted for their perceived credibility, cultural relevance, and accessibility, especially in rural and semi-urban areas(Hasanica et al., 2020).

However, the rapid integration of digital technology and the increasing penetration of smartphones have altered media consumption patterns. The immediacy, interactivity, and personalization offered by online platforms have led to a gradual decline in the use of print media as a primary source of health information(Davis Adam, 2023). Recent studies indicate that while many pregnant women now rely on mobile-based applications, social media platforms, and online news portals, print media continues to hold residual value, particularly among those with limited digital literacy or in regions with inconsistent internet connectivity(Frid et al., 2021). This shift raises important questions about the continuing relevance, reach, and trustworthiness of print media in the current information ecosystem.

Understanding pregnant women's usage patterns and trust levels in print media for nutrition information is not only academically significant but also policy-relevant. Health communication strategies that integrate both traditional and digital channels may enhance the dissemination and acceptance of nutrition-related messages. This study examines the extent to which pregnant women engage with print media for nutrition information in the context of evolving digital habits, with a focus on the interplay between usage frequency, trust perceptions, and the role of health workers in content distribution. A study evaluating a nutrition education pamphlet demonstrated that materials written in clear English and supplemented with local Shona phrases were most preferred by pregnant women compared to other formats. The findings underscore that tailoring language and incorporating cultural relevance enhance both the acceptability and the likelihood of uptake of print-based educational materials among target audiences (Mahundi et al., 2023).

Review of Literature

A review of existing literature provides the foundation for understanding how the media influences maternal nutrition literacy and health-seeking behaviour. It situates the present study within the broader body of research, highlighting both the strengths and gaps in current knowledge. Previous studies have examined the role of print media, digital platforms, and interpersonal communication in shaping women's access to and trust in nutrition information. They also emphasize the importance of sociodemographic factors such as education, residence, and employment status in determining patterns of media use.

The following section reviews relevant national and international studies that explore the intersection of media, health communication, and maternal nutrition, thereby offering context and rationale for the present investigation.

The role of print media in maternal health communication has been widely examined by scholars, particularly in the context of its ability to provide credible, accessible, and culturally relevant information to pregnant women. In comparison to the fast-growing digital platforms, print continues to demonstrate a distinct influence on knowledge acquisition, trust-building, and behaviour change. The following studies highlight how newspapers, magazines, flyers, and handouts contribute to maternal nutrition literacy and antenatal care practices.

According to the study conducted by Das Ashavaree & Sarkar Madhurima (2014), exposure to mass media, including newspapers and magazines, is significantly associated with enhanced maternal healthcare outcomes, such as increased antenatal care visits. For instance, women with higher exposure to print media in rural India were substantially more likely to complete at least eight ANC visits. This demonstrates that tangible health behaviours are correlated with print media exposure, supporting its relevance and trustworthiness. A qualitative analysis of social media content (YouTube, Instagram, TikTok, Facebook) revealed that most pregnancy nutrition advice online is inconsistent with evidence-based guidelines, with much of it being inaccurate, produced by non-professional sources, or aspirational in tone. A contrast print media, usually curated by credible organizations or health authorities, may be perceived as more trustworthy compared to the often-misleading digital content (Drummond et al., 2024) A quasi-experimental study conducted by Kohli et al (2015)., investigated pregnant women of short stature (< 150 cm), comparing an intervention group that received leaflets plus health worker accompaniment versus a control group that received leaflets alone. The group receiving accompaniment showed notable improvements in knowledge, attitudes, and behaviours related to antenatal care utilization and dietary practices, outperforming the leaflet-only group. This highlights

the importance of combining print materials with interpersonal support in significantly improving outcomes. Print provides credibility and trust, especially when local influencers or government-backed campaigns endorse messages. Super & Wagemakers (2021), in their study examining pregnant women's perspectives on food and eating, revealed that fostering empowerment and self-efficacy is key to healthy dietary choices during pregnancy. Flyers through relatable stories, visual cues, and culturally aligned messaging can reinforce this empowerment, bolstering both trust and practical uptake. Dlamini and Dlamini (2024) conducted a qualitative exploration to examine pregnant women's awareness and utilisation of maternal health information handouts distributed during antenatal visits. The study found that although the handouts were provided, many women were either unaware of their presence or faced challenges in using them effectively due to factors such as their placement at the back of case records and a general reluctance to engage with written materials. The participants emphasized the need for more proactive distribution strategies and better integration of handouts within counselling sessions. These findings highlight that while print handouts hold potential as an educational resource, their effectiveness is contingent upon appropriate design, presentation, and delivery mechanisms to ensure usability and engagement.

Taken together, these studies demonstrate that print media, whether in the form of newspapers, magazines, flyers, or health worker-distributed handouts, remains a vital channel of maternal health communication. While digital platforms offer speed and reach, the trustworthiness, cultural alignment, and tangible accessibility of print continue to play a critical role in influencing pregnant women's knowledge, attitudes, and dietary practices. The evidence suggests that integrating print with supportive interpersonal communication and localized cultural adaptations can further enhance its effectiveness in improving maternal and child health outcomes.

Nutrition Literacy among Pregnant Women

Nutrition literacy can be defined as the ability to access, understand, evaluate, and apply nutritional information in making everyday dietary decisions(Velardo, 2015). For expectant mothers, this literacy is essential for shaping food choices, ensuring adequate intake of key nutrients, and reducing the risk of complications such as anemia, gestational diabetes, and low birth weight in infants. It extends beyond knowledge of dietary guidelines to include the ability to interpret food labels, health recommendations, and media messages (Silva et al., 2023)

In developing countries like India, rural-urban disparities in nutrition remain profound. Women from rural regions are often among the most nutritionally disadvantaged groups(Nguyen et al., 2021). Gender bias within households frequently determines not only the quality but also the quantity of food women receive. Combined with the physiological and psychological stress of pregnancy, these conditions increase women's vulnerability to undernutrition and heighten their demand for nutrient-rich diets(RAJ, 2019). Addressing this gap requires targeted education to raise awareness among rural women about the additional dietary requirements of pregnancy for safeguarding maternal and child health(Jood et al., 2002).

Although multiple channels of nutrition-related information are available today, many pregnant women still face challenges in interpreting and applying such information. Limited formal education, low levels of health literacy, and poor access to credible sources are key barriers(Lobo et al., 2020). The media plays an instrumental role in bridging this gap. Traditional platforms such as newspapers, magazines, and health leaflets distributed by community health workers are often trusted for their cultural relevance and accessibility, particularly in rural and semi-urban settings(Barik et al., 2019b). Smartphones and digital platforms, on the other hand, provide rapid and widespread access to dietary content, although the credibility of information remains inconsistent and sometimes misleading(Wei, 2023).

Geographically advantaged with fertile soil and high agricultural productivity, Punjab is one of India's largest producers of cereals. Despite its strong agricultural base and relatively better health care, malnutrition persists, and maternal mortality remains a concern(Singh Kulwinder, 2023). Between 2016 and 2018, the maternal mortality ratio (MMR) in Punjab was recorded at 129, an increase of seven points compared to 2015 to 2017 (Singh Harmandeep, 2020). Health experts have attributed maternal deaths to anemia, compounded by migrant populations, entrenched traditional beliefs, and gaps in health care services. These realities highlight the need for strategies that focus not only on improving access to health services but also on promoting dietary awareness and locally available nutrition options(Olde Loohuis et al., 2023).

Scholars have consistently emphasized that health information, appropriate communication and nutrition literacy are interdependent in driving behavioural change. Effective communication enhances women's ability to adopt balanced diets, use local food sources, and maintain better maternal and child health. Ongoing research continues to focus on improving nutrition literacy as a pathway to enhancing overall quality of life and achieving sustainable health outcomes.

Print Media as a Source of Nutritional Information

Print media remains a crucial channel for health and nutrition information dissemination in India.(Kanchan & Gaidhane, 2023). Newspapers and magazines often feature special columns or supplements on maternal and child health, while community-distributed leaflets, particularly those circulated by Accredited Social Health Activists (ASHAs) and Auxiliary Nurse Midwives (ANMs), remain central to public health communication(Ameen & Faye, 2024). These print formats are considered credible, accessible, and easy to

understand, especially for women in rural and semi-urban areas where digital penetration may be limited. Their tangible nature allows repeated reference and discussion within families, making them a favoured medium for many pregnant women.

Magazines targeting women frequently include articles on diet during pregnancy, recipes, and expert advice, which help bridge the gap between medical recommendations and everyday practice(Reynolds & LoRusso, 2016). Newspapers, often regarded as trustworthy sources of information, also serve as a means of legitimizing health campaigns when they carry messages endorsed by government agencies or health professionals(Gugsa et al., 2016). Leaflets, in particular, play a unique role. In recent years, however, the expansion of smartphones and digital platforms has created an alternative pathway for accessing nutrition information. Pregnant women are increasingly exposed to health content through Google searches, WhatsApp groups, mobile apps, and social media channels(AL-Zoubi, 2024). Smartphones offer speed, convenience, and interactive content, which often surpass the static format of print. Yet, the reliability of such digital information is questionable. The spread of unverified or misleading content remains a concern, particularly for women with low digital literacy.

However, findings from the present study indicate that most participants do not frequently use newspapers and magazines as a source of nutrition information. In contrast, leaflets and pamphlets distributed by health workers were perceived as highly valid and useful. Participants reported greater trust in these materials, largely because they are designed in simple language, often include visual cues, and are directly handed out by frontline health providers. This makes them more relatable and practical compared to other forms of print media. Distributed through antenatal care visits, village health camps, and door-to-door awareness programs by ASHA workers, these materials provide concise, practical guidance on food groups, supplementation, and preventive care. Despite this digital growth, leaflets retain their importance in maternal health communication. Their distribution through ASHA workers ensures credibility, cultural relevance, and alignment with national health programs such as POSHAN Abhiyaan. Unlike smartphone content, which may overwhelm or confuse users, leaflets are designed to be simple, focused, and visually instructive. According to Sudo (2011), leaflets or pamphlets are a trusted and practical source of guidance for pregnant women, especially in rural contexts where trust in community health workers is high.

Theoretical Integration

To strengthen the interpretation of findings, this study draws upon established communication and health behaviour theories. The use and trust of media sources by pregnant women, whether interpersonal consultation, print materials such as leaflets and flyers, or smartphones, can be better understood when situated within theoretical frameworks. Theories not only provide explanatory depth but also highlight why certain channels are trusted over others and how sociodemographic factors shape media choices. The following are some of the theories that are highly related to this study.

Health Belief Model (HBM) – Rosenstock (1966), Becker & Maiman (1975)

The Health Belief Model explains health behaviours through perceived susceptibility, severity, benefits, and barriers. In this study, pregnant women's reliance on doctors and health workers reflects their belief that interpersonal advice reduces barriers to action and ensures credible benefits. Leaflets and flyers distributed by health workers also fit within this framework. Women perceive these materials as more useful than newspapers or magazines because they are delivered directly by trusted health staff, contain simple messages, and often support verbal explanations. Their perceived benefits lie in their accessibility and credibility, though reliance on them remains limited compared to direct consultation. The limited use of smartphones can be linked to low perceived benefits (due to doubts about credibility) and high perceived barriers (difficulty distinguishing reliable sources).

Diffusion of Innovations Theory – Everett Rogers (1962)

Rogers' theory explains how new ideas and technologies spread across social systems. Smartphones represent a widely adopted innovation, yet their use for nutrition literacy among pregnant women is still in the "early adoption" stage. Leaflets, though a traditional medium, are effective because they are distributed through trusted "change agents" such as ASHAs and ANMs, who act as opinion leaders and accelerate adoption within communities.

Uses and Gratifications Theory – Katz, Blumler & Gurevitch (1973)

This theory emphasizes that audiences actively select media based on their needs and gratifications. Pregnant women rarely use newspapers or magazines for nutrition because these formats do not satisfy their immediate informational needs. Interpersonal consultations gratify the need for credibility and relevance, while leaflets meet the need for accessibility. Smartphones, though used for entertainment, fail to provide the gratification of trust, which limits their value for nutrition literacy.

Theory of Planned Behaviour (TPB) – Ajzen (1985, 1991)

Ajzen's TPB argues that behaviour is influenced by attitudes, subjective norms, and perceived behavioural control. Pregnant women's preference for consulting doctors reflects positive attitudes toward professional

guidance and strong subjective norms shaped by family and community expectations. Leaflets and flyers distributed by health workers fit within this framework as well. They are often accepted because of the supported community norms that value health worker advice, and their simple, accessible content enhances women's perceived control over understanding and applying nutrition information. Their limited reliance on smartphones reflect low perceived behavioural control, as many women doubt their ability to evaluate and trust online nutrition content.

Two-Step Flow Theory of Communication – Paul Lazarsfeld, Bernard Berelson & Hazel Gaudet (1944)

This theory highlights how opinion leaders mediate the influence of media on audiences. In this study, health workers act as opinion leaders by distributing and reinforcing the messages contained in leaflets and flyers. This interpersonal reinforcement enhances the trust and value of such print media, whereas newspapers and magazines, which lack this interpersonal mediation, are less relied upon.

Objectives

1. To assess the extent of print media usage (newspapers, magazines, and health worker-distributed leaflets) among pregnant women for obtaining nutrition information.
2. To examine the relationship between sociodemographic factors, such as educational qualification, employment status, and area of residence (urban or rural) and the use of print media for nutrition literacy among pregnant women.
3. To analyze the pregnant women's trust in print media for nutrition information.

Hypothesis

This study aims to examine how sociodemographic factors such as education, residence, and employment influence pregnant women's media exposure, trust, and usage, with a focus on their smartphone and print media use for communication and nutrition information.

Null Hypothesis (H0):

There is no significant association between sociodemographic factors (residence, education, and employment status) and the usage of print media for nutrition information among pregnant women.

Alternative Hypothesis (H1):

There is a significant association between sociodemographic factors (residence, education, and employment status) and the usage of print media for nutrition information among pregnant women.

Methodology

A quantitative cross-sectional research design was employed to investigate the extent to which pregnant women in Punjab rely on print media, specifically newspapers, magazines, and health workers distributed leaflets for accessing nutrition-related information. This design was chosen to enable systematic collection of structured data and to examine the associations between sociodemographic characteristics and patterns of print media usage. The study focused on assessing the type of print media accessed, frequency of use, and level of trust in these sources for maternal nutrition information. Data were collected from six districts of Punjab, with two districts selected from each of the state's three regions: Amritsar and Pathankot from the Majha region, Hoshiarpur and Kapurthala from the Doaba region, and Ludhiana and Fatehgarh Sahib from the Malwa region. Selection was based on government health records, with districts chosen to represent variations in maternal mortality rates between 2008 and 2020, thereby ensuring a balanced inclusion of areas with both high and low maternal health risks.

A stratified sampling technique was adopted to secure proportional representation from all three geographic regions. Within each district, 100 pregnant women were recruited from antenatal care centres, ensuring equal participation from government and private healthcare facilities. This yielded a total sample of 600 respondents, all of whom were aged 18 years and above and attending antenatal services at the time of data collection. A structured and pretested questionnaire, designed following an extensive review of relevant literature and validated by subject experts, was administered to collect data. The instrument captured comprehensive sociodemographic details, including age, education, caste, employment status, socio-economic class (assessed using the B.J. Prasad Scale), type of family (joint or nuclear), and area of residence (urban or rural). In addition, the questionnaire gathered information on participants' exposure to print media, such as frequency of reading newspapers and magazines, extent of engagement with health leaflets distributed by ASHA workers and ANMs, and their level of trust in each medium. To ensure clarity and inclusivity, the questionnaire was translated into Punjabi and Hindi.

The sample size of 600 was determined at a 95% confidence level with a 5% margin of error, ensuring adequate statistical power for generalizing findings to the broader population of pregnant women across Punjab.

Ethical Consideration:

The study received ethical approval from the Institutional Review Board, and written informed consent was obtained from all participants before the commencement of data collection. Participation was entirely

voluntary, and strict measures were implemented to maintain the confidentiality and anonymity of the respondents.

Statistical analysis

The statistical analysis was designed to examine how sociodemographic factors such as education, area of residence, and working status influence the use and trust of different media sources for nutrition information during pregnancy.

Descriptive statistics were first used to outline the participants' background, including religion, caste, education, employment, residence, and family structure. This provided a clear profile of the respondents and allowed for identifying patterns in media use. Frequencies and percentages were calculated to assess the extent of reliance on newspapers, magazines, and leaflets for nutrition information, along with smartphone usage patterns. To test associations between sociodemographic factors and media trust, inferential statistics were applied. Chi-Square tests determined the significance of relationships between education, residence, and working status with levels of trust in print media. Measures of association such as Phi, Cramer's V, Somers'd, and Kendall's tau-c were also computed to assess the strength and direction of these relationships. These analyses helped establish whether higher education, urban residence, or employment status led to greater trust in specific media sources. By combining descriptive and inferential techniques, the statistical analysis provides a comprehensive understanding of how pregnant women in Punjab access, evaluate, and trust both print for nutrition information.

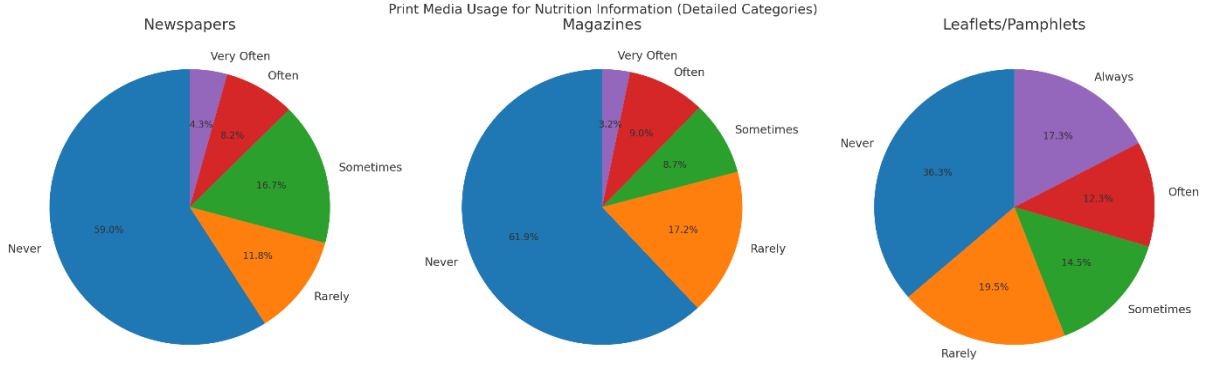
Descriptive Analysis

The study was conducted among 600 pregnant women in Punjab, with equal representation (16.7 percent each) from six districts: Amritsar, Fatehgarh Sahib, Hoshiarpur, Kapurthala, Ludhiana, and Pathankot. The sociodemographic profile of the participants showed that 49 percent (n = 297) identified as Hindus, 46 percent (n = 273) as Sikhs, 3 percent (n = 18) as Muslims, and 2 percent (n = 12) as Christians. In terms of caste distribution, nearly half of the women (49.5 percent, n = 297) belonged to the Scheduled Caste category, while 34.5 percent (n = 207) were from the General category, 12.3 percent (n = 74) from Other Backward Classes (OBC), and 3.6 percent (n = 22) either did not disclose or were unsure of their caste background.

Educational attainment varied within the sample: 27 percent (n = 162) had completed higher secondary education, 21.7 percent (n = 130) had studied up to matriculation, and 16.3 percent (n = 98) were graduates. A smaller proportion, 10.2 percent (n = 61), had attained postgraduate education, while 7.6 percent (n = 46) were illiterate. With regard to employment, the majority were homemakers (89 percent, n = 534), and only 11 percent (n = 66) reported being employed. The residential distribution was almost evenly split, with slightly more women from rural areas (51 percent, n = 306) than from urban areas (49 percent, n = 294). In terms of family structure, 51.3 percent (n = 308) lived in joint families, while 48.7 percent (n = 292) resided in nuclear families.

Print Media Usage for Nutrition Literacy

Figure 1: Diagram showing the usage of Print Media for Nutrition Literacy



Source: Compiled by the author

Interpretation

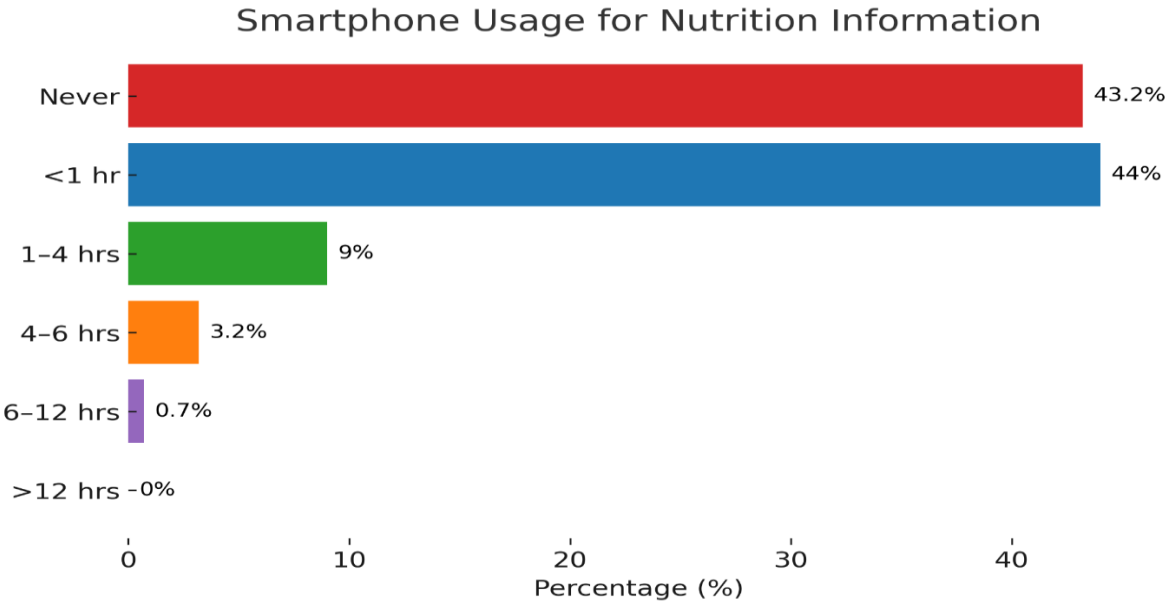
These findings suggest that the usage pattern of newspapers for accessing nutrition information shows that a majority of participants, 59 percent, reported that they never read newspapers for this purpose. A smaller proportion, 11.8 percent, indicated that they rarely read them, while 16.7 percent stated that they sometimes used newspapers for nutrition-related content. Only 8.2 percent reported reading them often, and 4.3 percent stated that they very often used newspapers to obtain nutrition knowledge.

A similar trend was noted in the case of magazines. Here, 61.9 percent of the participants reported never reading magazines for nutrition information. About 17.2 percent mentioned that they rarely used them, while

8.7 percent reported sometimes referring to them. Only 9 percent of the women indicated that they often read magazines for nutrition purposes, and 3.2 percent reported very often using them.
By contrast, leaflets and pamphlets distributed by health workers emerged as relatively more utilized sources of nutrition information. While 36.3 percent of respondents stated that they
never used these materials, 19.5 percent reported rarely using them, and 14.5 percent indicated that they sometimes did so. In addition, 12.3 percent of women reported that they often used leaflets for nutrition information, while 17.3 percent stated that they always relied on them during pregnancy.

Smartphone usage for nutrition Literacy

Figure 2: Diagram showing the usage of smartphones for Nutrition Literacy



Source: Compiled by the author

Interpretation

The analysis of smartphone usage for nutrition information shows that a large proportion of pregnant women did not actively engage with mobile devices for this purpose. Nearly half of the participants (43.2 percent) reported that they never used their smartphones to access nutrition-related content, while an additional 44 percent used them for less than one hour per day. A smaller proportion, 9 percent, reported spending between one and four hours, while 3.2 percent used them for four to six hours, and only 0.7 percent used them for six to twelve hours. None of the respondents reported using smartphones for more than twelve hours a day for nutrition information.

These findings indicate that although smartphone ownership and use are widespread, their role in enhancing nutrition literacy remains limited. The majority of women spend minimal time less than one hour per day on nutrition-related content, suggesting that mobile phones are underutilized as a medium for nutrition awareness during pregnancy.

Comparative interpretation of print media and Smartphone usage

Taken together, these findings highlight a significant contrast between print media and smartphones. While smartphones are widely owned and used for multiple purposes, their role in improving nutrition literacy among pregnant women remains minimal, as the vast majority (87.2 percent) spend less than one hour daily or none at all on nutrition-related content. In comparison, leaflets and pamphlets circulated by health workers appear to play a more direct and trusted role in disseminating nutrition information, with nearly one-third of women relying on them often or always. Newspapers and magazines, however, remain the least consulted sources, as over 60 percent of respondents reported no reliance on them.

Crosstabulation

In this study, area of residence, educational qualification, and employment status were considered as key sociodemographic variables, since these factors strongly influence access to information, literacy levels, and exposure to media sources. They provide important insights into how structural, cognitive, and occupational backgrounds shape the degree of trust pregnant women place in print media.

Qualification and Print Media Usage

Table 1: Crosstabulation for Qualification and Print Media Usage among Pregnant Women (N = 100)

Qualification	1.0	2.0	3.0	4.0	5.0	Total
Graduate	22	24	25	8	19	98
Higher Secondary/12th	71	35	34	3	19	162
Illiterate	14	12	18	0	0	44
Just Literate	3	12	6	0	0	21
Matric/10th	65	27	27	2	9	130
Others	0	1	0	0	1	2
Post Graduate	17	11	14	7	12	61
Primary	27	28	26	0	1	82
Total	219	150	150	20	61	600

Source: Compiled by the Author

Note: Trust scale ranges from 1 = lowest trust level to 5 = highest trust level.

Hypothesis Testing

Hypothesis (H0): There is no significant association between educational qualification and trust in print media.

Hypothesis (H1): There is a significant association between educational qualification and trust in print media.

Statistical Results

Chi-Square Test

- Pearson Chi-Square = 100.867, df = 28, p = .000
- Since $p < 0.05$, H0 is rejected and H1 is accepted. This confirms that qualification is significantly associated with trust in print media.

Strength of Association

- Phi = 0.410, Cramer's V = 0.205, p = .000
- Indicates a moderate strength of association between qualification and trust.

Directional Measures

- Somers' d = –0.064 (p = .053), Kendall's tau-c = –0.062 (p = .053), Gamma = –0.082 (p = .053)

These suggest a weak and negative direction. So higher qualifications do not consistently correspond to higher trust in print media.

Interpretation

The results establish that educational qualification has a statistically significant impact on trust in print media. Respondents with graduate and postgraduate qualifications show relatively higher percentages in the upper categories of the trust scale, while those with lower qualifications (illiterate, just literate, primary) are concentrated in the lower or middle trust levels.

Although the association is moderate in strength, the negative directional measures imply that increased education does not guarantee stronger trust in print media. In fact, higher education may foster more critical attitudes, leading to a cautious stance toward traditional print sources.

Thus, while qualification influences trust, the relationship is not linear and highlights a nuanced pattern. Those with minimal education often rely on print media due to limited alternatives, whereas highly educated respondents may diversify across multiple media platforms, thereby moderating their trust in print media.

Employment Status and Trust in Print Media

Table 2: Crosstabulation for Working Status and Trust in Print Media (N = 600)

Employment Status	1.0	2.0	3.0	4.0	5.0	Total
Not Working	199	137	132	16	50	534
Working	20	13	18	4	11	66
Total	219	150	150	20	61	600

Source: Compiled by the Author

Note: Trust scale ranges from 1 = lowest trust level to 5 = highest trust level.

Hypothesis Testing

H0: There is no significant association between employment status and trust in print media.
H1: There is a significant association between employment status and trust in print media.

Statistical Results

1. **Chi-Square Test**

- Pearson Chi-Square = 6.504, df = 4, p = .165
- Since p > 0.05, the result is not statistically significant.
- Thus, H0 is accepted, meaning employment status does not significantly affect trust in print media.

2. **Strength of Association**

- Phi = 0.104, Cramer's V = 0.104, p = .165
- This shows a very weak association.

3. **Directional Measures**

- Somers' d (Working Dependent) = 0.039, p = .056
- Kendall's tau-c = 0.057, p = .056
- Gamma = 0.195, p = .056
- These measures indicate a weak positive tendency, but they are not statistically significant (p > 0.05).

Interpretation

The analysis indicates that working status is not significantly associated with trust in print media. Both working and non-working respondents exhibit similar trust patterns, with the majority concentrated in lower to mid-level categories of trust. Although working respondents show slightly higher percentages in the upper categories (scores 4 and 5), this difference is not strong enough to reach statistical significance.
The weak positive values from directional measures suggest that working women may demonstrate marginally higher trust in print media compared to non-working women, but this trend cannot be generalized due to a lack of statistical significance.
Overall, working status does not play a decisive role in shaping levels of trust in print media among the respondents.

Table 3: Crosstabulation for Area of Residence and Trust in Print Media (N = 600)

Area	1.0	2.0	3.0	4.0	5.0	Total
Rural	121	70	87	7	21	306
Urban	98	80	63	13	40	294
Total	219	150	150	20	61	600

Source: Compiled by the Author
Note: Trust scale ranges from 1 = lowest trust level to 5 = highest trust level.

Hypothesis Testing

H0: There is no significant association between area of residence and trust in print media.
H1: There is a significant association between area of residence and trust in print media.

Statistical Results

1. **Chi-Square Test**

- Pearson Chi-Square = 14.406, df = 4, p = .006
- Since p < 0.05, H0 is rejected and H1 is accepted.
- This confirms that the area of residence significantly influences trust in print media.

2. **Strength of Association**

- Phi = 0.155, Cramer's V = 0.155, p = .006
- Indicates a weak but significant association.

3. **Directional Measures**

- Somers' d = 0.066 (p = .070)
- Kendall's tau-c = 0.082 (p = .070)
- Gamma = 0.111 (p = .070)
- These values show a weak positive trend, but the directional relationship is not statistically significant.

Interpretation

The findings reveal that residence plays a significant role in shaping trust in print media. Rural respondents are more concentrated in the middle trust categories (particularly scale point 3), whereas urban respondents are more evenly spread, with a stronger presence in the higher trust categories (scale points 4 and 5).

Although the Chi-Square test confirms statistical significance, the effect size (Cramer's V = 0.155) shows that the relationship is weak in strength. Directional measures indicate only a marginal positive trend, suggesting that urban residents may exhibit slightly higher trust in print media compared to rural residents.
Overall, while residence significantly influences trust levels, the association remains weak, implying that other factors such as education, exposure to alternative media, and socio-economic background may also shape trust in print media.

Discussion

The findings of this study highlight significant variations in the use and trust of media sources for nutrition information among pregnant women in Punjab. The sociodemographic profile illustrates a heterogeneous sample, with nearly half belonging to the Scheduled Caste category and a majority being homemakers, reflecting regional diversities and cultural realities of Punjab. Education levels were varied, and this factor emerged as a significant determinant of trust in print media.
The low reliance on newspapers and magazines suggests that these traditional print forms are losing relevance as credible sources of health communication during pregnancy. More than 60 percent of participants reported never using these media for nutrition-related purposes, which resonates with broader trends of declining readership in the digital era. In contrast, leaflets and pamphlets distributed by health workers retained relatively higher levels of engagement. Nearly one-third of the respondents reported frequent or consistent use of such materials, demonstrating that interpersonal distribution through community health channels ensures both accessibility and trust. This underscores the importance of locally contextualized and direct dissemination of information in maternal health communication.
Smartphone usage presented a paradox. Although mobile penetration is high, the majority of participants did not actively use smartphones for nutrition information, with 87.2 percent reporting either no use or less than one hour per day. This suggests that while smartphones are integrated into daily lives, they are underutilized for health literacy. Possible explanations include a lack of digital health awareness, limited e-literacy, and mistrust of online nutrition content.
The crosstabulation analysis deepens this understanding. Educational qualification was significantly associated with trust in print media ($p < .001$), but the relationship was not linear. While higher education facilitated access and engagement, it also fostered critical attitudes, leading to scepticism towards traditional print. Conversely, women with lower educational attainment appeared to depend more on print media due to limited exposure to alternative platforms. This ambivalent relationship aligns with literature suggesting that education enhances critical media literacy, thereby shaping differentiated trust patterns.
Area of residence also influenced trust, with urban women demonstrating relatively higher trust in print media compared to rural women ($p < .01$). However, the strength of association was weak, suggesting that both urban and rural residents interact comfortably with other sources, such as family members, friends, doctors and related health workers. In contrast, employment status did not show a significant effect on trust, suggesting that occupational differences may have little influence on pregnant women's health communication preferences.
Overall, the results reflect a shifting media ecology in maternal health communication: while traditional print media such as newspapers and magazines are increasingly bypassed, localized print forms (leaflets/pamphlets) distributed by health professionals and smartphones present contrasting pathways that require further engagement strategies.

Conclusion

Pregnant women largely prefer consulting doctors and health workers when it comes to health and nutrition. Interpersonal communication, therefore, stands out as the most trusted and effective channel, as it provides credibility, immediate responses, and guidance tailored to individual needs. This preference shows that face-to-face interaction continues to hold a central place in maternal health communication, even in an era of expanding media options.
Among print media, leaflets and flyers distributed by health workers are relatively well-accepted and considered useful. However, their overall usage remains modest compared to interpersonal consultation. The limited reliance on these materials can be explained by the influence of external factors such as family advice, cultural traditions, community practices, and prior health experiences, which together shape how women seek and evaluate nutrition information.
Smartphones, despite their prevalence in daily life, are regarded with limited trust for nutrition information during pregnancy compared to print media. Although online sources are readily available, women questioned their accuracy and reliability. The credibility of smartphone-based information is questioned, and this scepticism makes pregnant women rely more heavily on health professionals.
Overall, the findings highlight that interpersonal communication with doctors and health workers remains the backbone of nutrition-related decision-making during pregnancy. Print materials such as leaflets and flyers play a supportive but secondary role, while smartphones are yet to be fully integrated into trusted sources of nutrition knowledge due to credibility issues. Strengthening the role of interpersonal communication, while at

the same time developing more reliable and accessible print and digital resources, is essential for enhancing maternal nutrition literacy in Punjab and beyond.

Suggestions

Prioritize Interpersonal Communication
Doctors, nurses, and frontline health workers (such as ASHAs and ANMs) should remain the main channel for nutrition communication during pregnancy. Structured counselling sessions and one-to-one interactions during antenatal visits should be strengthened, as these are the most trusted by women.

Enhance the Quality of Print Materials
Leaflets and flyers circulated by health workers should be made more visually appealing, culturally relevant, and easy to understand. Since they already have some acceptance, improving their design and clarity could increase their effectiveness.

Build Trust in Digital Platforms
Mobile-based nutrition resources should focus on credibility. Verified apps, government-certified content, and clear endorsements from doctors and health institutions can help address women's doubts about online information.

Integrate Hybrid Approaches
Combining interpersonal counselling with supportive print and digital resources can maximize impact. For example, health workers could distribute leaflets that also include QR codes linking to trustworthy digital content, ensuring women have both offline and online references.

Address Contextual Influences
Family members and cultural practices strongly influence pregnant women's health choices. Future communication programs should involve families and communities to reinforce positive nutrition messages.

Recommendations for Future Research
Future research should adopt mixed-methods approaches that combine quantitative surveys with in-depth qualitative interviews. This will help capture the underlying reasons why pregnant women show limited trust in digital platforms and only modest reliance on print media.

Studies should also examine the effectiveness of hybrid communication strategies, for example, how interpersonal counselling by health workers can be complemented with redesigned, visually engaging leaflets and digitally integrated tools such as government-certified apps or QR-linked resources. Further, longitudinal and comparative studies across different states and regions of India are needed to assess whether current patterns of media trust are sustained over time and how cultural norms, family influence, and socio-economic factors shape women's information-seeking behaviour. Cross-cultural comparisons with other developing countries could also provide valuable insights into global trends in maternal health communication.

Finally, future research should explore media literacy interventions among pregnant women, assessing whether training in digital health literacy can improve confidence in identifying credible online content. Such evidence would be critical for designing policies that effectively blend interpersonal, print, and digital strategies to strengthen maternal nutrition literacy.

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