

Non-evidence-based preconception information on Xiaohongshu and delayed assisted reproductive care attendance: an observational study with propensity score matching

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Abstract

Background

Infertility is recognised as a major global reproductive public health concern, and timely access to standardised assisted reproductive technology (ART) care is a core prerequisite for improving pregnancy outcomes. Social media has become integrated into the health information-seeking pathways of people of reproductive age. As a leading domestic image-and-text social platform in China, Xiaohongshu serves as a core information source for individuals planning pregnancy. Nevertheless, non-evidence-based preconception content is widely disseminated on the platform, and the quantitative association between such content and delayed ART attendance among people with infertility remains unclear.

Methods

This cross-sectional observational study was based on publicly available text content from the Xiaohongshu platform. A total of 470 valid samples were retrieved and enrolled. Two trained professionals conducted independent double-blind coding. Six covariates were selected under the theoretical framework of the Health Belief Model (HBM). 1:1 propensity score matching (PSM) with a caliper width of 0.02 was performed to balance confounding between groups. McNemar's test and conditional binary logistic regression were applied to examine the association between non-evidence-based information exposure and delayed care attendance.

Results

A total of 130 matched pairs were successfully generated via PSM. After matching, the standardised mean difference (SMD) for all covariates was below 20%, indicating satisfactory baseline balance between groups. The rate of delayed care attendance in the non-evidence-based exposure group was 30.77%, which was significantly higher than the 7.69% recorded in the evidence-based control group (McNemar's $\chi^2 = 22.29$, $P < 0.001$). Non-evidence-based information exposure was significantly and positively associated with delayed care attendance (OR = 5.33, 95% CI: 2.53–11.23, $P < 0.001$). The median DISCERN score in the non-evidence-based group was 9, significantly lower than the median score of 15 in the control group (Mann–Whitney U = 6269, $P < 0.001$). A moderate positive correlation was observed between information quality and delayed care attendance ($r = 0.47$, $P < 0.001$). Stratified subgroup analyses by age and infertility duration, together with sensitivity analyses using multiple matching parameters, consistently confirmed the robustness of the primary findings.

Conclusions

Among active users planning pregnancy on Xiaohongshu, exposure to non-evidence-based preconception information has a statistically significant positive association with self-reported delayed attendance for assisted reproductive care. This study provides quantitative empirical evidence for social media reproductive health governance and clinical reproductive health literacy interventions.

Introduction

Infertility is a core reproductive health concern in global public health^[1, 2]. In recent years, against a backdrop of delayed childbearing and shifting lifestyle patterns among people of reproductive age, the global prevalence of infertility has remained persistently high. Assisted reproductive technology (ART) serves as an effective intervention for the standardised clinical management of infertility^[3–6]. In clinical practice, however, delays in seeking ART care are pervasive. A substantial proportion of individuals living with infertility engage in prolonged, non-standardised self-management practices, miss the optimal window for formal clinical intervention, and face a heightened risk of progressive fertility decline^[5, 7–9].

A threshold of ≥ 3 months from symptom onset to initial medical consultation has been widely adopted to define delayed healthcare-seeking in chronic disease research^[10]. This definitional threshold remains widely adopted as the reference standard across most chronic disease research.

For the purpose of this study, delayed attendance for formal reproductive care is defined as a delay of ≥ 6 months in initiating specialist assisted reproductive technology (ART) services. This cut-off value is informed by existing domestic studies examining delayed ART care-seeking. A six-month period constitutes a critical window for age-related female fertility decline, and delays exceeding this duration have been consistently demonstrated to significantly reduce live birth rates following ART treatment^[2, 5, 7].

In the digital health era, social media has become deeply embedded in the health information-seeking pathways of reproductive-age populations. As a leading image-and-text-based social media platform in China, Xiaohongshu has a user base that overlaps substantially with women of reproductive age, and has emerged as one of the primary channels through which this group accesses health information on preconception care and infertility management^[11–14].

However, content moderation mechanisms on social platforms remain inadequate. A large volume of folk remedies, dietary self-care regimens, and promotional content for dietary supplements — all devoid of evidence-based medical support — circulate widely, resulting in highly variable health information quality. Previous research has confirmed that Xiaohongshu represents one of the key domestic hubs for misleading health information in China^[15–19]. Infodemiological studies have consistently demonstrated that health decision-making among vulnerable populations can be disrupted by online misinformation, which in turn leads to adverse health behavioural outcomes^[4, 18, 20, 21].

To date, most existing studies have focused on video-sharing platforms including Twitter, Instagram, Bilibili and Douyin, with a primary emphasis on descriptive analyses of content themes and information quality assessment^[4, 12–15, 17–20, 22, 23]. By contrast, research examining the image-and-text platform

Xiaohongshu has been largely confined to descriptive characterisation of content features, and quantitative evidence regarding healthcare-seeking behavioural outcomes remains notably scarce.

Furthermore, prior investigations have predominantly adopted purely cross-sectional descriptive designs without adequate control for confounding factors. They are consequently unable to disentangle the joint effects of individual characteristics on both information selection and healthcare-seeking decision-making, meaning the independent association between exposure to non-evidence-based information and adverse healthcare-seeking behaviours remains poorly established^[15, 20, 22].

The present study draws on the well-established Health Belief Model (HBM) to systematically delineate the underlying pathways through which non-evidence-based information may interfere with healthcare-seeking decision-making^[24]

The present study employs propensity score matching (PSM) to balance individual-level confounding factors, and aims to quantify the association between exposure to non-evidence-based preconception information on the Xiaohongshu platform and delayed attendance for assisted reproductive technology care^[25].

Materials and methods

Study design

A cross-sectional observational study was conducted using publicly available user-generated text content from the Xiaohongshu platform. This manuscript was reported in strict compliance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (Supplementary Material 1). Only publicly accessible image and text content was extracted from the platform. No personally identifiable information – including names, mobile phone numbers and medical records – was collected, and no participant interventions were undertaken, such as face-to-face interviews, biological sample collection or clinical record retrieval.

Ethical approval was granted by the Medical Ethics Committee of The Reproductive Hospital of Guangxi Zhuang Autonomous Region (Approval No. KY-LL-2023-001). The study was formally registered via the National Medical Research Registration and Filing Information System (Registration No. MR-45-25-014817), a platform that maintains full data interoperability with the Chinese Clinical Trial Registry (ChiCTR).

All raw post data were de-identified prior to statistical analysis, with all identifying markers including user account handles and post URLs removed.

Theoretical framework

The Health Belief Model (HBM) was adopted as the core analytical framework for this study. Its six core constructs – perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy – were applied to guide covariate selection^[12, 24, 26]. Building on established findings from reproductive epidemiology and digital reproductive health research, six individual characteristics that influence both health information browsing preferences and healthcare-seeking behaviour were selected for inclusion in the propensity score matching model.

Age and infertility duration are well-documented core demographic and clinical confounders of online health information-seeking and delayed care attendance among individuals with infertility^[1, 2, 5]. Geographic administrative tier is associated with disparities in reproductive healthcare accessibility and variations in preferences for online information acquisition channels^[21, 22]. Preconception anxiety drives frequent engagement with unregulated online folk remedy content and delayed uptake of formal specialist reproductive care^[1, 23]. Individual perceived fertility risk influences acceptance of non-evidence-based online remedies and the sense of urgency to seek formal medical consultation^[14, 21]. Willingness to critically appraise health information – a core dimension of digital reproductive health literacy – differentiates user preferences for evidence-based versus non-evidence-based content, and is a recognised confounder in social media reproductive health research^[21].

Data sources

Xiaohongshu was selected as the sole data source platform for three principal reasons: (1) Xiaohongshu is one of the most active image-text platforms for the dissemination of preconception health information in China. Its content is primarily text supplemented with images, delivering high consistency in information format that facilitates standardised coding. (2) Existing research has confirmed that Xiaohongshu is one of the key domestic hubs for misleading health information, lending strong representativeness to the study sample. (3) The static nature of image-text content allows for independent dual-coder assessment and repeated verification, offering greater feasibility for rigorous reliability control^[15, 22].

Data collection was conducted on 1 July 2026, with retrospective coverage of all publicly available content published on the platform since its launch. This time window mitigates the impact of seasonal fluctuations in discussion volume around preconception topics, and aligns with the methodology used in comparable social media health information studies^[15, 22].

Search terms were selected with reference to the study by Sormunen et al. examining infertility-related content on Xiaohongshu^[21], and further supplemented with targeted terms aligned with the study's variable framework. A final set of nine search terms was determined: infertility, prolonged difficulty conceiving, preconception conditioning, ovulation regulation, fallopian tube conditioning, natural conception folk remedies, fertility-enhancing health supplements, IVF consultation, and assisted reproductive technology healthcare decision-making.

Search procedures were performed by researchers using incognito browser mode. A newly registered Xiaohongshu account was utilised, with location-based permissions disabled, and each search term was entered sequentially to retrieve results. All outputs from the keyword searches were pooled, and duplicate entries were removed based on unique post URLs to form the initial sample pool.

Inclusion criteria: Posts were eligible for inclusion if they satisfied all of the following criteria: The post was fully publicly accessible on the platform; The core content of the post centred on preconception care, infertility, or assisted reproductive technology service attendance; The post contained a minimum of 30 Chinese characters and conveyed a complete, coherent viewpoint; Both the information exposure group assignment and the delayed care-seeking outcome could be reliably ascertained from the post text.

Exclusion criteria: Posts were excluded from analysis if they met any of the following: commercial promotional advertisements, verbatim reposted duplicate content, posts consisting solely of unsubstantiated emotional venting with no substantive information, posts containing only medical report images without accompanying narrative text, garbled invalid text, purely interrogative posts with no substantive discussion, and posts with missing data for key study variables.

Variable definitions and coding protocol

All coding specifications were documented in the Xiaohongshu Preconception Information Coding Manual (Supplementary Material 2), and all coding decisions were made exclusively on the basis of the main text content of each post.

Exposure variable: The non-evidence-based exposure group was defined as posts that simultaneously promoted folk remedies or dietary supplements as alternative treatments, and questioned or disparaged formal specialist reproductive care. The evidence-based control group was defined as posts that advocated standardised diagnostic assessment and standard ART treatment, without rejection of evidence-based medical care. Posts that described only one perspective without presenting opposing views were not allocated to either group.

Outcome variable: Delayed attendance for assisted reproductive technology: Delayed care was defined as self-reported postponement of formal reproductive healthcare for ≥ 6 months. No delay was defined as individuals having already booked a clinical appointment or being scheduled to commence standard treatment such as ovulation induction or in vitro fertilisation (IVF). Posts with ambiguous timeframes or a reported delay of less than six months were not classified as having delayed care.

Covariates: Guided by the Health Belief Model framework and prior published evidence^[12, 24], six individual-level covariates were selected for inclusion in the propensity score matching model: age stratum (<35 / ≥ 35 years), geographic administrative tier (provincial/municipal / prefectural city / county and rural areas), infertility duration (<3 / ≥ 3 years), anxiety level (mild / moderate / severe), risk awareness (low / moderate / high), and willingness to critically appraise health information (passive conformity / active verification).

Coding quality control

All eligible posts were independently coded in a double-blind manner by two researchers who had completed standardised training. Both coders held professional backgrounds in reproductive medicine and public health. A pre-coding calibration exercise using 30 pilot posts was conducted to align coding standards prior to the formal coding phase. For continuous scores derived from the Brief DISCERN scale, inter-rater reliability between the two coders was evaluated using a two-way mixed-effects intraclass correlation coefficient (ICC) for absolute agreement. For categorical judgement variables – including exposure group allocation, delayed care status, preconception anxiety severity, and willingness to critically appraise health information – any coding discrepancies between the two coders were resolved via consensus discussion with a third senior researcher. The senior reviewer assessed the original post content to confirm a unified final coding outcome, a procedure implemented to minimise systematic coding bias.

Information quality assessment tool

The Brief DISCERN scale was employed to assess the information quality of all included posts. This instrument yields total scores ranging from 6 to 30, with a score of ≥ 16 categorised as high-quality evidence-based content.

The rationale for adopting the brief version was twofold. First, the scale is well adapted to the fragmented, short-form image-text content typical of Xiaohongshu. Second, it has well-documented reliability and validity for application in social media content analysis^[27-31].

Statistical analysis

All statistical analyses were performed using SPSSAU version 26.0, with a two-tailed significance level set at $\alpha = 0.05$. Baseline characteristics were compared between groups using the chi-square test. One-to-one nearest-neighbour propensity score matching without replacement (caliper width = 0.02) was applied to balance confounding variables across groups. A standardised mean difference (SMD) of < 0.2 was defined as the threshold for acceptable covariate balance. Two sets of sensitivity analyses – using adjusted caliper widths and kernel matching respectively – were conducted to verify the robustness of the primary results. Following matching, the strength of the association between non-evidence-based information exposure and delayed care attendance was quantified using McNemar's test and conditional logistic regression. Spearman's rank correlation analysis was performed to explore the relationship between information quality and delayed ART attendance. Stratified subgroup analyses were further conducted by age and infertility duration.

Results

Sample profile and coding reliability

A total of 932 records were initially retrieved from the platform. After deduplication, 830 posts remained for eligibility screening; 360 were excluded per pre-specified criteria, leaving 470 valid posts for final analysis. The study selection flow diagram is presented in Figure 1.

Following 1:1 propensity score matching, 130 matched pairs were generated, with a matching success rate of 100%. The intraclass correlation coefficient (ICC) for Brief DISCERN scale ratings was 0.91, indicating excellent inter-rater reliability of the coding procedure (Supplementary Material 3).

Baseline characteristics prior to matching

Prior to propensity score matching, no statistically significant between-group differences were observed for age, infertility duration, or risk awareness (all $P > 0.05$). By contrast, statistically significant between-group differences were identified for preconception anxiety and willingness to critically appraise health information (both $P < 0.05$), with a higher proportion of passive conformity classification recorded in the non-evidence-based exposure group. These patterns confirmed the presence of baseline confounding, justifying covariate adjustment via PSM. Baseline comparisons across groups are presented in Table 1.

Table 1 Comparison of baseline covariates between the two groups before propensity score matching [n (%)]

Variable	Category	Evidence-based control group (n = 340)	Non-evidence-based exposure group (n = 130)	χ^2	P
Author type	Non-professional posters	260 (76.47)	89 (68.46)	3.16	0.080
	Professional posters	80 (23.53)	41 (31.54)		
Posting entity	Public hospital / reproductive centre	16 (4.71)	10 (7.69)	9.92	0.080
	Individual licensed medical practitioners	64 (18.82)	30 (23.08)		
	Health administrative authorities	0 (0.00)	1 (0.77)		
	Individual users	186 (54.71)	68 (52.31)		
	Unqualified health / maternal health influencers	51 (15.00)	19 (14.62)		
	Commercial accounts	23 (6.76)	2 (1.54)		
Geographic administrative tier	Provincial / municipality level	70 (20.59)	17 (13.08)	5.37	0.070
	Prefectural city level	230 (67.65)	102 (78.46)		
	County-level and rural areas	40 (11.76)	11 (8.46)		
Age stratum	<35 years	115 (33.82)	37 (28.46)	1.24	0.270
	≥35 years	225 (66.18)	93 (71.54)		
Infertility duration	<3 years	109 (32.06)	43 (33.08)	0.04	0.830
	≥3 years	231 (67.94)	87 (66.92)		
Anxiety severity	Mild	72 (21.18)	41 (31.54)	11.41	**0.001
	Moderate	125 (36.76)	28 (21.54)		
	Severe	143 (42.06)	61 (46.92)		
Risk awareness	Low	77 (22.65)	27 (20.77)	0.19	0.910
	Moderate	113 (33.24)	44 (33.85)		
	High	150 (44.12)	59 (45.38)		
Willingness to critically appraise health information	Passive conformity	267 (78.53)	114 (87.69)	5.14	*0.020
	Active verification	73 (21.47)	16 (12.31)		

Note: * $p < 0.05$, ** $p < 0.01$

Covariate balance after propensity score matching

A total of 130 matched pairs were successfully generated. Following matching, the standardised mean differences (SMDs) of all six covariates fell below 0.2, with SMD values of 0 observed for both age and willingness to critically appraise health information, indicating excellent baseline balance between the two groups (Table 2).

Sensitivity analyses conducted with adjusted caliper widths and alternative kernel matching both produced minimal fluctuations in SMD values and odds ratios (ORs), confirming the robustness of the primary findings. (Supplementary Material 4).

Table 2 Comparison of standardised mean differences (SMDs) for covariates before and after propensity score matching

Covariate	SMD before matching	SMD after matching
Geographic administrative tier	0.082	0.032
Age stratum	0.116	0.000
Infertility duration	-0.022	0.117
Anxiety severity	-0.067	0.090
Risk awareness	0.040	0.072
Willingness to critically appraise health information	-0.246	0.000

Association between non-evidence-based information exposure and delayed ART attendance

For the 130 matched pairs, the incidence of delayed care attendance was 30.77% (40/130) in the non-evidence-based exposure group and 7.69% (10/130) in the evidence-based control group. McNemar's test returned a χ^2 statistic of 22.29 ($P < 0.001$). Conditional logistic regression analysis demonstrated that non-evidence-based information exposure was associated with a significantly elevated odds of delayed ART attendance (OR = 5.33, 95% CI 2.53 to 11.23, $P < 0.001$) (Tables 3 and 4).

Table 3 Comparison of delayed care attendance incidence between the two groups after propensity score matching

Group	Sample size	Number of delayed cases	Delayed attendance rate (%)
Evidence-based control group	130	10	7.69
Non-evidence-based exposure group	130	40	30.77

Note: McNemar $\chi^2=22.29$, $P<0.001$

Table 4 Conditional logistic regression: association between non-evidence-based information exposure and delayed ART attendance

Variable	β coefficient	χ^2	P	OR (95% CI)
Non-evidence-based exposure (vs. evidence-based control)	1.67	19.4	** < 0.001	5.33 (2.53 to 11.23)

Note: * $p<0.05$, ** $p<0.01$. Outcome variable: delayed care attendance (0 = no delay, 1 = delay); Nagelkerke $R^2 = 0.14$.

DISCERN information quality and its correlation with delayed ART attendance

Total DISCERN scores were not normally distributed (Kolmogorov–Smirnov test, $P < 0.001$), so the Mann–Whitney U test was applied for between-group comparisons. The median DISCERN score was 9 in the non-evidence-based exposure group and 15 in the evidence-based control group ($U = 6269$, $Z = -3.63$, $P < 0.001$). Spearman's rank correlation analysis yielded a correlation coefficient of 0.47 ($P < 0.001$), indicating that lower information quality was associated with a higher risk of delayed care attendance (Table 5).

Table 5 Comparison of DISCERN scores between the two groups and their correlation with delayed ART attendance

Group	Sample size	Median (P_{25}, P_{75})	U	Z	P
Evidence-based control group	130	15.00 (13.00, 19.00)	6269	-3.63	** < 0.001
Non-evidence-based exposure group	130	9.00 (8.00, 22.00)	—	—	—

Note: * $p<0.05$, ** $p<0.01$. Spearman's rank correlation (DISCERN score vs. delayed care attendance): $r = 0.47$ (95% CI: 0.36 to 0.56), $P < 0.001$.

Stratified subgroup sensitivity analyses

Stratified analyses by age stratum revealed a statistically significant positive association between non-evidence-based information exposure and delayed ART attendance in both subgroups. The adjusted odds ratio was 4.58 in the ≥ 35 years subgroup and 8.40 in the < 35 years subgroup (Table 6).

Stratified analyses by infertility duration yielded consistent results: non-evidence-based information exposure was significantly associated with increased odds of delayed ART attendance in both subgroups, corroborating the robustness of the primary findings. The ≥ 3 -year subgroup (larger sample size) produced a more precise effect estimate (adjusted OR = 4.58, 95% CI: 1.94–10.80, $P < 0.001$). The < 3 -year subgroup showed a higher point estimate of

effect (adjusted OR = 8.21, P = 0.01) but wider confidence intervals, reflecting lower statistical precision due to limited sample size and fewer outcome events.(Table 7).

Table 6 Stratified subgroup analysis by age stratum

Subgroup	Total n	Delayed attendance rate,non-evidence-based group	Delayed attendance rate,evidence-based control group	McNemar χ^2	P	OR (95% CI)
≥ 35 years	186	30.11% (28/93)	8.60% (8/93)	13.78	**<0.001	4.58 (1.96 to 10.70)
< 35 years	74	32.43% (12/37)	5.41% (2/37)	8.81	*0.003	8.40 (1.73 to 40.88)

Note:* p<0.05, ** p<0.01.

Table 7 Stratified subgroup analysis by infertility duration

Subgroup	Total n	Delayed attendance rate,non-evidence-based group	Delayed attendance rate,evidence-based control group	McNemar χ^2	P	OR (95% CI)
≥ 3 years	181	29.89% (26/87)	8.51% (8/94)	13.53	**<0.001	4.58 (1.94 to 10.80)
< 3 years	79	32.56% (14/43)	5.56% (2/36)	8.85	*0.003	8.21 (1.72 to 39.14)

Note:* p<0.05, ** p<0.01.

Discussion

Main findings

Following adjustment for confounding via propensity score matching, our study identified a statistically significant positive association between exposure to non-evidence-based preconception information on the Xiaohongshu platform and delayed attendance for assisted reproductive technology. The odds of delayed care attendance among individuals exposed to non-evidence-based content were 5.33 times higher than those in the evidence-based control group. Non-evidence-based content demonstrated significantly lower overall information quality, and a moderate positive correlation was observed between DISCERN quality scores and the risk of delayed ART attendance. Stratified analyses by age stratum and infertility duration, alongside multiple matching-based sensitivity analyses, all returned consistent directions of association, indicating good robustness of the primary findings.

It is important to note that as this is a cross-sectional observational study, the reported findings represent only statistical associations and do not establish a causal relationship.

Comparison with existing literature

Our findings are broadly consistent with conclusions from related prior studies. An analysis of infertility-related content on Instagram^[23] found that nearly half of all posts contained inaccurate information, posing potential risks of distorting patient decision-making. A systematic review conducted by Zhang et al. ^[14, 16, 17, 20, 22] confirmed that reproductive health information shared on social media commonly lacks professional oversight and may exert a negative impact on patients' healthcare-seeking behaviour.

Our previous work assessed the quality of infertility information across two major video platforms, Bilibili and Douyin, and demonstrated a low proportion of professional content and heterogeneous information quality across platforms; however, that analysis did not further quantify the impact of information exposure on healthcare-seeking behaviour^[32]. A cross-platform comparative study by Zhang et al. ^[22] similarly found that health information on Xiaohongshu achieved the lowest scores for comprehensibility and content completeness among the three platform types evaluated.

The magnitude of the association observed in the present study (OR = 5.33) was greater than that reported in most comparable studies. This finding is likely closely tied to the unique dissemination characteristics of the Xiaohongshu platform. Its core narrative model is built around personal experience sharing: non-evidence-based content is predominantly framed from the first-hand perspective of individuals claiming successful conception, a format that readily elicits emotional resonance and identity alignment among users. Compared with the generalised popular science content delivered via video platforms, image-text personal experience posts exert a stronger persuasive influence on individual decision-making, which may explain the more pronounced association effect observed in our analysis^[12, 15, 33].

Potential mechanisms underpinned by the Health Belief Model

The Health Belief Model (HBM) was adopted as the core theoretical framework for this study. Drawing on our empirical observations, we propose three theoretical pathways to explain the underlying association. It should be emphasised that the mechanisms outlined below are derived from logical deduction based on established theory and study findings, and have not been empirically verified within the present research.

First, the perceived threat attenuation pathway. Non-evidence-based content is typically centred on the narrative that natural conception can be achieved exclusively through lifestyle and bodily conditioning. Such content downplays the risk of fertility decline driven by advancing age and disease progression,

and reduces users' perceptions of infertility severity and the urgency of formal care-seeking, thereby dampening motivation to attend specialist reproductive services.

Second, the perceived benefit distortion pathway. Non-evidence-based content systematically overstates the efficacy of alternative interventions, including folk remedies and dietary supplements, while consistently omitting potential adverse outcomes such as treatment failure and delayed disease progression. This misrepresentation elevates users' perceived benefits of unregulated conditioning regimens, and simultaneously amplifies apprehensions and resistance towards assisted reproductive technology, ultimately distorting healthcare-seeking decision-making.

Third, the cues to action substitution pathway. Reinforced by platform algorithmic recommendation systems, homogeneous posts featuring personal conditioning experiences form a dense set of substitute cues to action. These displace the positive, normative guidance function that evidence-based information should fulfil in directing users towards standardised care attendance. This dynamic readily entraps users in a self-reinforcing behavioural cycle: continuously searching for folk remedies, repeatedly attempting self-directed conditioning, and incrementally delaying formal medical consultation.

Study strengths

The present study has four key methodological strengths.

First, propensity score matching was applied to control for observed confounding variables. Following matching, standardised mean differences for all covariates fell below 20%, effectively enhancing between-group comparability. This approach yields a more robust estimate of the independent effect of exposure compared with a conventional crude cross-sectional analysis^[25]. Second, double-blind independent coding was performed by two trained coders. The intraclass correlation coefficient (ICC) for Brief DISCERN scale scores was 0.91, indicating excellent inter-rater reliability. Third, standardised search procedures were implemented using incognito browser mode, which effectively mitigated sample selection bias arising from the platform's algorithmic personalised recommendation system. Fourth, a comprehensive set of sensitivity analyses — including matching parameter sensitivity testing, alternative matching method validation, and stratified subgroup analyses — was conducted, providing multi-dimensional verification of the robustness of the primary findings.

Study limitations

First, exposure to health information on social media platforms is not randomly assigned. Users who actively engage with non-evidence-based content may inherently hold lower trust in evidence-based medicine and a stronger preference for alternative therapeutic approaches. This individual predisposition drives both information selection behaviour and exerts an independent effect on healthcare-seeking decisions. Although propensity score matching balanced observed covariates in this study, it cannot control for confounding from unmeasured characteristics such as underlying health beliefs and medical trust. Consequently, the association observed in the present study cannot be interpreted as a causal effect of information exposure on delayed care attendance.

Second, the outcome of delayed ART attendance was ascertained solely on the basis of self-reported accounts within post text, with no objective corroboration from clinical medical records or standardised follow-up. Systematic discrepancies may exist between users' textual narratives and their actual clinical behaviour.

Third, the study sample was recruited exclusively from active users posting content on preconception topics on Xiaohongshu. This group may differ from passive browsing users and the general population of women of reproductive age with respect to information-seeking behaviour, anxiety severity, and health literacy. As such, the study findings cannot be generalised to broader reproductive-age populations.

Fourth, the three mechanistic pathways derived from the Health Belief Model remain purely theoretical inferences. This study did not incorporate standardised psychological scales to measure mediating variables, and thus cannot provide empirical evidence to validate the proposed mechanisms.

Practical implications

These findings hold important reference value for both health governance on social media platforms and clinical reproductive health practice.

For platform governance, it is recommended to establish a tiered review mechanism for reproductive health content on the Xiaohongshu image-text platform. A Brief DISCERN score of ≥ 16 may be adopted as the reference threshold for high-quality evidence-based content, and preferential traffic allocation should be implemented to support professional content produced by medical institutions and licensed medical practitioners. Meanwhile, in light of the distinct attributes of video platforms such as Douyin and Bilibili, support should be prioritised for systematic, in-depth popular science content, to build a differentiated cross-platform reproductive health communication system.

For clinical practice, it is recommended that reproductive specialty clinics integrate online information source assessment into routine initial consultation evaluations. High-risk patients — those with a history of long-term self-directed conditioning and who source health information predominantly from social media — should be proactively identified. Targeted evidence-based health education should be delivered to correct cognitive biases and mitigate the adverse impact of health misinformation on treatment adherence.

For population health literacy, the core items of the Brief DISCERN scale can be adapted into an accessible health information screening tool. This tool can be embedded in educational materials from maternal and child health institutions and community reproductive health promotion programmes, to help people of reproductive age develop basic information appraisal competencies and reduce the negative impact of non-evidence-based information at the audience end.

Future research directions

Future research could be advanced across four key directions. First, linkage with electronic medical record (EMR) data from reproductive centres could be established to verify the consistency between text-ascertained delayed care attendance indicators and actual clinical behaviour. Second, concurrent multi-platform comparative studies covering Xiaohongshu, Bilibili and Douyin could be implemented to clarify the differential impacts of diverse content formats on reproductive health decision-making. Third, standardised measurement instruments aligned with the Health Belief Model could be incorporated to examine the mediating pathways and effect sizes through which non-evidence-based information shapes healthcare-seeking decisions.

Conclusions

Among active users engaging with preconception content on the Xiaohongshu platform, a statistically significant positive association was identified between exposure to non-evidence-based preconception information and self-reported delayed attendance for assisted reproductive technology. This association is subject to confounding from multiple sources, including self-selection bias and measurement bias arising from text-based outcome ascertainment. Non-evidence-based content on the platform demonstrated significantly lower overall information quality, and lower information quality was associated with an elevated risk of delayed care attendance.

Abbreviations

ART	Assisted Reproductive Technology
HBM	Health Belief Model
PSM	Propensity Score Matching
SMD	Standardised Mean Difference
ICC	Intraclass Correlation Coefficient
IVF	In Vitro Fertilization
EMR	Electronic Medical Record

Declarations

Ethics Statement

This study was reviewed and approved by the Ethics Committee of Guangxi Zhuang Autonomous Region Reproductive Hospital, with waiver of informed consent granted (Approval Number: KY-LL-2023-001). All procedures performed in this study involving analysis of publicly available social media data were conducted in accordance with the principles outlined in the Declaration of Helsinki.

Consent to Participate

Not applicable. As this study is based on publicly accessible social media content without involving human subjects in any interactive or participatory research activities, the requirement for consent to participate is not relevant.

Consent to Publish

Not applicable. The content analyzed in this study is publicly available on social media platforms, and there is no use of any non-publicly disclosed personal data or materials that would require individual consent for publication.

Data Availability Statement

The de-identified coded dataset used in this study is available. All other supporting data can be obtained from the corresponding author, Quanhai Luo, upon reasonable request.

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Competing interests

The authors declare no potential financial or non-financial conflicts of interest in relation to the subject matter and materials presented in this manuscript. No author has received any form of remuneration or personal benefit that could influence the interpretation or reporting of the study results.

Author contributions Statement

Z.J contributed to study conception and design, analyzed and interpreted data, and drafted the core content of the manuscript. Y.H acquired and organized data, and undertook sample coding and quality control. S.X critically revised the intellectual content of the work and optimized the methodological

framework. Q.L prepared figures and tables (including the PRISMA flow diagram), reviewed and approved the final manuscript, and is accountable for the accuracy and integrity of the work as well as resolving related academic issues. All authors reviewed and approved the final manuscript.

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Figures

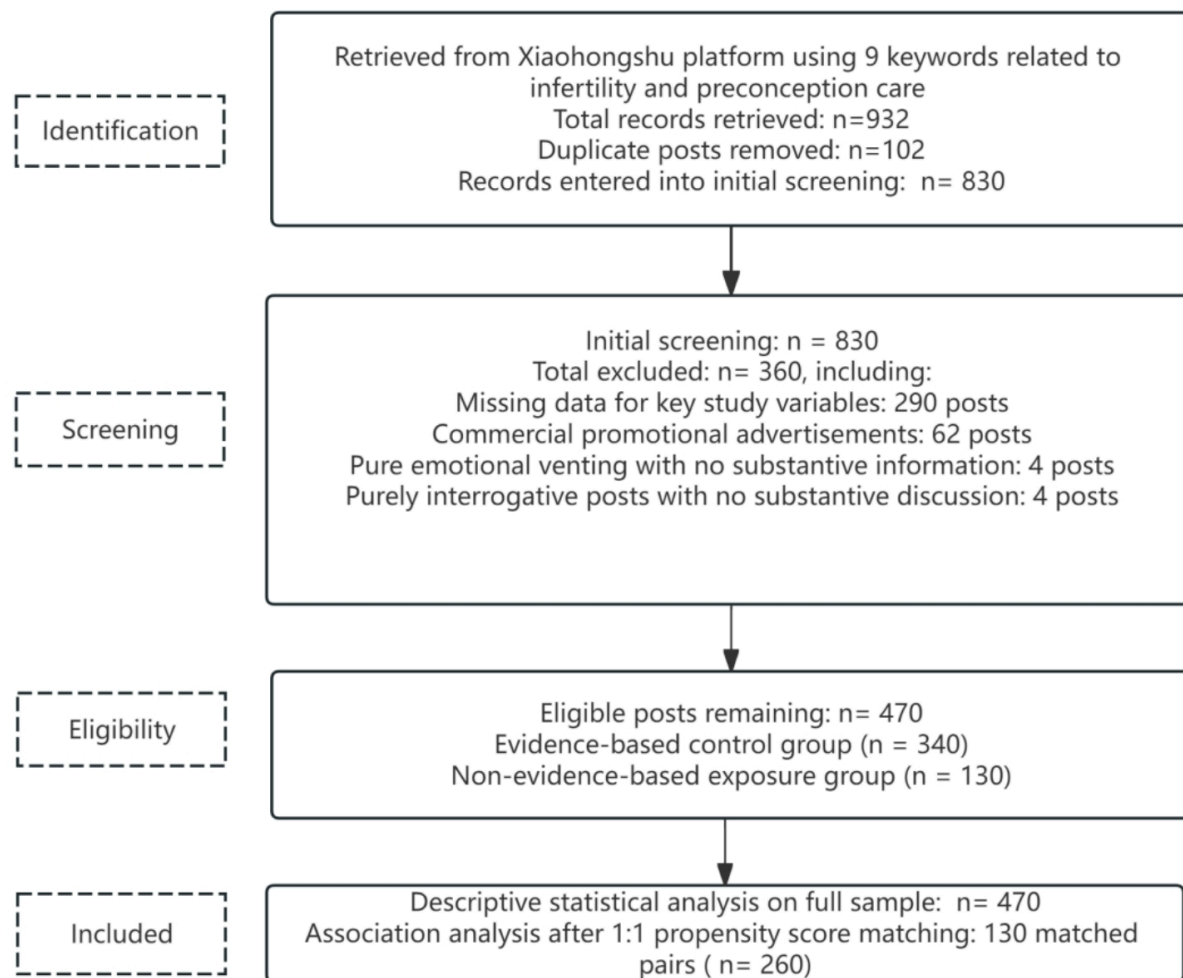


Figure 1

PRISMA-compliant flowchart of sample screening for infertility-related posts on Xiaohongshu platform

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementaryMaterial1.STROBStatementChecklistforCrossSectionalObservationalStudies.docx](#)
- [SupplementaryMaterial2.CodingManualforPreconceptionHealthInformationContentonXiaohongshuPlatform.docx](#)
- [SupplementaryMaterial3.IntraclasscorrelationcoefficientsforinterraterreliabilityoftheBriefDISCERNscaleinwaymixedeffectsmodelconsistencytype.docx](#)
- [SupplementaryMaterial4.SensitivityAnalysisResultsofPropensityScoreMatchingwithMultipleParameters.docx](#)