

RESEARCH

Open Access



Determining behavioral intention and its predictors toward preconception care use among reproductive age women in Arba Minch town, Southern Ethiopia, 2022: a cross-sectional study based on the theory of planned behavior

Habtamu Alemu Tena^{1*}, Kassahun Fikadu¹, Gebremariam Temesgen Birgoda¹, Abel Belete Cherkos¹, Tesfahun Simon Hadaro¹ and Begetayinoral Kussia Lahole¹

Abstract

Background Preconception care is a highly effective, evidence-based intervention aimed at promoting the health of reproductive-age women and reducing adverse pregnancy-related outcomes. The Ethiopian Ministry of Health plans to integrate preconception care services into the country's existing healthcare system. However, women's preferences may be influenced by their values and customs. Therefore, this study used the theory of planned behavior to assess women's intention toward preconception care use and its predictors among reproductive-age women in Arba Minch town, southern Ethiopia.

Methods A community-based cross-sectional study was conducted in Arba Minch town from May 1 to 30, 2022. A simple random sampling technique was employed to select 415 study participants for data collection. Data were collected through a face-to-face interview using a pretested, structured questionnaire. Epi Data version 4.6 and SPSS version 26 were used for the entry and analysis of data, respectively. Multiple linear regression was performed to identify independent predictors of intention to use preconception care. The standardized β -coefficient was used as a measure of association. A *P* value of less than 0.05 was used to declare statistical significance.

Results This study had 415 participants, giving a response rate of 98.3%. The mean age of the participants was 28.4 (SD 5.18). The mean intention to use preconception care was 21.43 (SD 2.47). Direct perceived behavioral control ($\beta = 0.263, p < 0.001$), direct attitude ($\beta = 0.201, p = 0.001$), direct subjective norm ($\beta = 0.158, p = 0.006$), and age ($\beta = -0.115, p = 0.023$) were significant predictors of women's behavioral intention to use preconception care.

*Correspondence:
Habtamu Alemu Tena
habtishmid84@gmail.com

Full list of author information is available at the end of the article



Conclusion The study identified perceived behavioral control as the strongest predictor, followed by attitude and subjective norms, influencing the intention to use preconception care. These findings underscore the importance of integrating these predictors into health intervention programs aimed at promoting the implementation of preconception care services.

Keywords Preconception care, Intention, Reproductive age women, Theory of planned behaviors

Introduction

Preconception care (PCC) is a crucial intervention recommended for individuals of reproductive age before pregnancy to optimize their health and promote favorable outcomes for both the mother and the baby. It involves addressing a set of biomedical, behavioral, and social health factors through interventions designed to identify and modify women's health and pregnancy outcomes through prevention and management. Similarly, 'inter-conception care' refers to the provision of these interventions between two pregnancies [1, 2].

There is growing evidence that integrating PCC into the current health system can reduce maternal and child mortality and prevent unplanned and unwanted pregnancies, delivery complications, stillbirth, low birth weight, preterm labor, congenital anomalies, neonatal infections, stunting, and mother-to-child HIV/STI transmission [3, 4].

Despite the solid reasons for preconception care implementation, it is not integrated into the current maternal continuum of care in Ethiopia. Researchers identify several obstacles, including women's lack of knowledge, inadequate education, experience of adverse pregnancy outcomes and ongoing health problems, as well as a shortage of trained health professionals and national policy guidelines [5–7]. Even though there are initiatives in terms of guideline development and integration of preconception care into health science curricula, the implementation of PCC remains a missed opportunity in Ethiopia's contemporary healthcare system [8].

Furthermore, one of the reasons for the delay in implementing healthcare programs such as PCC is a lack of attention to research that takes into account social psychological models. Social psychological models are useful tools for understanding the factors that influence health behaviors and can help in designing effective interventions [9–11].

The Theory of Planned Behavior (TPB) is applicable to PCC, focusing on individual attitudes, perceived subjective norms, and perceived behavioral control [12]. According to this model, a person's intention—the most critical determinant—is formed through a combination of their attitude, subjective norms, and perceived behavioral control [13–15]. Evidence on individuals' intention to utilize preconception health services is crucial for predicting modifiable factors that influence the intra-uterine environment and fetal development, such as diet,

nutritional status, and lifestyle choices, which can be adjusted before conception [15].

However, little research has been conducted to evaluate predictors representing women's intention to receive preconception care and its predictors. Furthermore, the evidence generated from such research should serve as a cornerstone in developing and implementing preconception care within the healthcare system. Therefore, this study aimed to assess the intention to use preconception care and its predictors among reproductive-age women in Arba Minch town from the perspective of the theory of planned behavior.

Methods

Study design, period, and settings

A community-based cross-sectional study was conducted from May 1st to May 30th 2022, at Arba Minch town, southern Ethiopia. Arba Minch town is located approximately 495 km south of Addis Ababa, the capital city of Ethiopia. The town has twelve kebeles (Ethiopia's smallest administrative unit), with a total population of 123,446, of which 50.2% are females and 23.3% are of reproductive age. In the town, there are two health centers, one primary hospital, one general hospital, and more than 20 private health facilities. According to Arba Minch town's Health Department 2014 EC report, the expected number of pregnancies and estimated deliveries for this year were approximately 4,271.

Source participants

All women of reproductive age who lived in Arba Minch town were the source population.

Study populations

Randomly selected reproductive-age women who meet the inclusion criteria.

Sampling technique and sample size determination

Simple random sampling technique was used. Lists of households with women of reproductive age were obtained from health extension workers of respective kebeles. Samples were allocated to each kebele proportionally to their size. Then, samples were drawn using computer-generated random numbers. Randomly selected households with eligible women were traced using their house numbers, and health extension workers were used as guidance. The Lottery method was used

in households where more than one eligible woman was encountered. A single population mean formula was used to calculate the minimum sample size needed, with the assumption of a 95% confidence level, a 5% margin of error, and a 0.5 standard deviation of intention to use preconception care.

$$n = \frac{(Z)^2 * (SD) (1 - SD)}{d^2}$$

where n = sample size.

SD = 0.5 of intention to use preconception care.

d = 5% margin of error.

Z = Value of standard normal distribution (Z-statistic) at 95% confidence level, which is 1.96.

Based on the above assumptions,

$$n = \frac{(1.96)^2 * (0.5) (1 - 0.5)}{(0.05)^2} \approx 384$$

For possible non-response during data collection time, 10% was added, which gave the final sample size of 422.

Data collection procedure

The pretested interviewer-administered structured questionnaire was adapted from TPB constructs and different literature [16–18]. Before preparing the data collection tool, an elicitation study was performed by conducting in-depth interviews with 20 participants in the target groups to the locally available salient behavioral, normative, and control beliefs on preconception care use. Then, a structured questionnaire was prepared based on the TPB guidelines to collect data. The questionnaire has four sections: socio-demographic information, obstetrics and reproductive health characteristics, knowledge of preconception care, and the TPB. The first section collects demographic information, such as age, religion, marital status, employment, and education level. The second section covers the respondent's obstetric and reproductive factors with five questions. The third section assesses the participants' knowledge of preconception care with 12 items. The final section focuses on TPB, with 55 items separated into four subsets: intention, attitude, subjective norm, and perceived behavioral control. Four trained data collectors, Bachelor of Science degree holders in Midwifery, and one public health officer supervised the data collection process. Participants were engaged through local health authorities and selected using simple random sampling techniques. Interview locations were selected based on participants' preferences, such as their homes, to ensure privacy and comfort. The average duration of the interviews ranged from 15 to 20 min.

Data management and analysis

The completed questionnaire responses were entered into Epi-Data version 4.6 and exported to Statistical Package for Social Science (SPSS) version 26.0 for analysis. The recode command was used to recode negatively worded responses for the direct measures. Descriptive statistics were used and results were presented using tables. Pearson's correlation analysis was conducted to determine the direction and relationship between the direct and indirect constructs of the theory of planned behavior and to confirm the validity of the indirect measures. The assumptions were checked for model fitness. All independent variables were first entered into simple linear regression, and those variables whose P -value was less than 0.25 were included in multiple linear regression. Adjusted R² was used to determine the ability of explanatory variables to explain dependent variables. The standardized regression coefficient (β) was used to interpret the effect of predictors on the intention to use preconception care. A P -value of less than 0.05 was considered to indicate a significant association. Finally, the results were presented and summarized in text, tables, and numbers.

Data quality control

The questionnaire was prepared in English and then translated into Amharic and back to English to check language consistency. Before the commencement of the actual data collection, a pretest was performed on 10% of the computed sample in the Birbir district, which has similar sociocultural and living standards as the study area. Necessary feedback and adjustment of the phrasing were performed accordingly. Internal Consistency was checked using Cronbach's alpha and the result was above 0.7 for all constructs. Training was provided to all data collectors, and the supervisor performed a close follow-up and a random spot-check. The supervisor checked the questionnaire for consistency and completeness daily during data collection. The data collectors were then given feedback.

Variables

Dependent variables

Intention to use preconception care.

Independent variables

Sociodemographic characteristics: Age, religion, educational status, occupational status, and marital status.

TPB constructs: Direct Attitude, direct subjective norm, direct perceived behavioral control, indirect attitude, indirect subjective norm, and indirect perceived behavioral control.

Measurement and scoring

Intention to use preconception care was measured using five items on a five-point Likert scale response format (1=strongly disagree to 5=strongly agree). A composite score was obtained by summing all the items, and the score ranged from five to twenty-five. A higher score indicated a high intention to incline for preconception care (five items of a five-point Likert scale) [18].

Direct attitude was measured by five semantic differential items using a five-point scale. The composite score ranged from five to twenty-five, and a higher score indicated a positive attitude toward preconception care use.

Direct subjective norms were measured by five items on a five-point Likert scale. The five items were summed to form a direct subjective norm score, and the composite score ranged from five to twenty-five. A higher score indicated a higher social influence on using preconception care services.

Direct perceived behavioral control was measured by four items with a five-point Likert scale response format. The composite score ranged from four to twenty, and a higher score indicated higher perceived ability or less difficulty in using preconception care services.

Knowledge of preconception care was measured by 12 items based on correct responses scored out of 24 points. The mean score was calculated for analysis [19].

Table 1 Socio-demographic characteristics of respondents in Arba Minch town, Southern Ethiopia, 2022

Variables	Categories	Frequency	Percent (%)
Age	15–24	90	21.7
	25–34	272	65.5
	35–47	53	12.8
Religion	Orthodox	145	34.9
	Protestant	240	57.8
	Muslims	21	5.1
	Others*	9	2.2
Marital status	Married	375	90.4
	Single	20	4.8
	Divorced	16	3.8
	Widowed	4	1
Educational status	No formal education	39	9.4
	Primary school	139	33.5
	Secondary school	145	34.9
	Diploma and above	92	22.2
Occupation	Housewife	142	34.2
	Employed	101	24.4
	Merchant	78	18.8
	Student	42	10.1
	Daily Laborer	52	12.5

Notes: * Catholic=4, Adventist=3, Jehova=2

Results

Socio-demographic characteristics

A total of 415 women participated in the study, giving a response rate of 98.3%. The mean age of the participants was 28.4 (SD 5.18), with the majority of 272 (65.5%) falling between the ages of 25 and 34. More than half of the participants, 240 (57.8%), were protestants, while 145 (34.9%) were Orthodox Christians. In terms of marital status, 375 (90%) participants were married. Regarding educational and occupational status, 145 (35.7%) had completed secondary school, and 142 (34.2%) were housewives, respectively (Table 1).

Obstetrics and reproductive health characteristics

In this study, 388 (93.5%) of the women had been pregnant before. Two hundred seventy-five (70.9%) of them were multigravida, 261 (67.3%) were multiparous, and 113 (30.1%) were primiparous. The majority (87.9%) of the respondents had at least one ANC visit during their last pregnancy, 127 (32.7%) had previous PNC contact, 161 (41.5%) had a planned pregnancy, 40 (10.3%) had a previous adverse pregnancy outcome, and 127 (68.0%) reported a history of using family planning.

Source of information and knowledge of preconception care

Among the 415 participants, 140 (33.7%) women had ever heard about preconception care before. Healthcare workers, including health extension workers, composed 127 (30.6%) of the primary sources of information for those who had ever heard about preconception care, followed by 60 (14.5%) from mass media (TV, radio, social media, etc.), 38 (9.2%) from friends, and 34 (8.4%) from family members.

In terms of knowledge about ‘what should be done before pregnancy?’, 157 (37.8%) of the participants mentioned visiting a health facility, followed by 152 (36.6%) who mentioned family planning. Whereas weight should be maintained 12 (2.9%) and diet modification 8 (1.9%) were mentioned. For each item, scores were summed, and mean scores were computed. Accordingly, the mean score of knowledge was 12 (SD 6.6).

Theory of planned behavior variables

The mean score of participants’ intention to use preconception care was 21.4 (SD 2.5). The mean score of participants’ direct attitude toward preconception care was 18.8 (SD 4.8), followed by 16.5 (SD 4.7) mean score of direct subjective norm about preconception care. For the indirect constructs, attitude had the highest mean of 107.7 (SD 24.5) (Table 2).

Table 2 Descriptive statistics of the theory of planned behavior variables and intention among reproductive-age women in Arba Minch Town, Southern, Ethiopia, 2022 (N=415)

Variable	No of Items	Min. Value	Max. Value	Mean	SD	Cronbach's alpha
Intention	5	5	25	21.4	2.5	0.70
Direct Attitude	5	5	25	28.8	4.8	0.93
Direct Subjective norm	5	5	25	16.5	4.7	0.85
Direct PBC	4	4	20	12.4	4.5	0.85
Indirect Attitude	12	6	150	107.7	24.5	0.83
Indirect Subjective norm	10	5	125	65.5	26.2	0.88
Indirect PBC	14	7	175	80.4	42.0	0.91

SD=standard deviation, PBC=perceived behavioral control, α =Cronbach's alpha, Min and Max=minimum and maximum values

Table 3 Pearson correlation of theory of planned behavior variables among reproductive-age women of Arba Minch town, Southern, Ethiopia, 2022 (N=415)

Variables	Intention	DAT	DSN	DPBC	IAT	ISN	IPBC	knowledge
Intention	1							
DAT	0.431**	1						
DSN	0.421**	0.607**	1					
DPBC	0.463**	0.530**	0.588**	1				
IAT	0.441**	0.769**	0.547**	0.446**	1			
ISN	0.441**	0.578**	0.745**	0.492**	0.549**	1		
IPBC	-0.363**	-0.552**	-0.525**	-0.661**	-0.428**	-0.439**	1	
Knowledge	0.259**	0.481**	0.444**	0.480**	0.412**	0.377**	-0.500**	1

Abbreviations: DAT: Direct Attitude; DSN: Direct Subjective Norms; DPBC: Direct Perceived Behavioral Control; IAT: Indirect Attitude; ISN: Indirect subjective norm; IPBC: Indirect perceived behavioral control

Note: ** The correlation is significant at the 0.01 level (two-tailed)

Correlation of theory of planned behavior variables and other variables with intention

Karl Pearson's correlation coefficients show that all of the theories of planned behavior variables had a significant correlation with intention at a p -value of <0.01 . Direct perceived behavioral control had the highest correlation, followed by indirect attitude and indirect subjective norm. Indirect perceived behavioral control had a negative correlation with intention (Table 3).

Multiple linear regression

Level of education, knowledge, and all direct theory of planned behavior variables had a p -value of less than 0.025 in simple linear regression and age was included which was significant in the previous study. In multiple linear regression, age, attitudes ($\beta=0.201$, $P<0.001$, 95% CI=0.088, 0.285), subjective norms ($\beta=0.158$, $P<0.006$, 95% CI=0.045, 0.272), and perceived behavioral control ($\beta=0.263$, $P<0.001$, 95% CI=0.152, 0.374) significantly predicted the intention to use preconception care. This suggests that a unit-positive change in women's perception of their ability to influence the circumstances that prevent them from utilizing preconception care services will raise intention to use preconception care by 0.263 units, assuming that all other factors remain constant. Furthermore, a unit-positive change in women's attitudes toward the benefits of preconception care will increase the intention to utilize preconception care services by

Table 4 Multiple linear regression of intention to use preconception care and its predictors among reproductive-age women of Arba Minch town, Southern, Ethiopia, 2022 (N=415)

Variables	Value	Standard-ized β	PValue	95% for CI β
Age	15–24(Ref)			
	25–34	-0.115*	0.023	-0.213, -0.016
	35–49	-0.087	0.091	-0.189, 0.014
Educational status	No formal education (Ref)			
	Primary school	0.106	0.156	-0.041, 0.253
	Secondary school	0.090	0.245	-0.062, 0.242
	Diploma and above	0.103	0.157	-0.040, 0.247
Knowledge		-0.021	0.684	-0.124, 0.081
Direct PBC		0.263*	0.000	0.152, 0.374
Direct Attitude		0.201*	0.001	0.088, 0.285
Direct SN		0.158*	0.006	0.045, 0.272

* $p<0.05$, Ref=References

0.201 units when other characteristics remain constant. Additionally, women who believe their significant others will approve of using preconception care will increase their intention by 0.158 units, provided that all other factors are constant. The constructs of the model explained 27.0% (Adj. R^2) of the variation in intention to use preconception care (Table 4).

Discussion

This study assessed reproductive-age women's intention to use preconception care and its predictors using the theory of planned behavior.

The current study found that the mean value of intention to use preconception care was 21.4 (SD 2.5). This finding is consistent with previous studies conducted in Malaysia [20] and France [21], in which the majority of women revealed an interest in preconception health care.

This study revealed that perceived behavioral control was the predominant and most influential predictor of the intended use of preconception care services. This finding was consistent with a study conducted in Southwest Ethiopia [22], southern Ethiopia [23], and Jimma, Ethiopia [24]. Ajzen's theoretical assumptions [16] support this finding, suggesting that the greater women's control over factors enabling or hindering their use of preconception care, the stronger their intention to utilize these services. However, a study conducted in Iran found that perceived behavioral control did not predict women's intention to use pre-pregnancy care [17]. A similar outcome was reported in a study in the Netherlands [18], which examined constructs akin to perceived behavioral control, such as self-efficacy. These discrepancies could stem from variations in population characteristics, awareness levels regarding the behavior, and the availability of preconception services in the respective study areas.

In this study, attitude toward preconception care was ranked second in predicting the intention to use preconception care. These findings are consistent with studies conducted in Iran [25], Tanzania [26], southwest Ethiopia [22], and the Netherlands [18], where a positive attitude was identified as a significant predictor of intention to use preconception care services. This suggests that participants who perceive preconception care as beneficial are more likely to express intention to utilize these services compared to their counterparts.

According to the findings of this study, subjective norms were identified as another important predictor of intention to use preconception care. The finding is supported by studies conducted in southwest Ethiopia [22], China [27], Nairobi (25), Norway (26), and Laresta, Iran 2016 (16). This implies that the individual's intention to use preconception care is more likely to be influenced by important referent individuals such as families, friends, spouses, healthcare professionals, and neighbors. Therefore, interventions aimed at improving preconception care utilization may benefit from targeting these influential individuals collectively, rather than focusing solely on women within a specific age group. This approach is supported by Ajzen's TPB assumptions [16], which suggest that the intention to engage in a behavior is determined

by attitude, subjective norms, and perceived behavioral control.

The correlation analysis of this study showed that there is a direct relationship between the indirect and direct measurement items of the theory of planned behavior. This shows that the commonly held salient beliefs identified from the reviewed literature regarding attitude, subjective norms, and perceived behavioral control about preconception care were well explored through indirect constructs of each measurement. This indicates that indirect measures directly influence the direct measures of attitude, subjective norm, perceived behavioral control, and intention toward preconception care use, which is consistent with the principles of TPB [16].

The study's findings have significant implications for preconception care policy and initiatives. The findings imply that strategies should prioritize increasing women's control over healthcare access, promoting favorable attitudes through public health campaigns, and utilizing the impact of key social referents. Programs should focus on improving healthcare infrastructure, implementing education and awareness campaigns, involving communities, and incorporating preconception care into larger health programs. These tailored interventions can have the potential to improve preconception care uptake and mother-and-child health outcomes.

Limitations of the study

Despite using an interviewer-administered questionnaire, there was a possibility of participants providing responses they perceived as socially desirable, potentially introducing social desirability bias.

As the nature of the study design was cross-sectional, it does not reflect cause-and-effect relationships. Furthermore, we cannot be certain that women who stated they intended to use preconception care services in the future intended to do so. The theory of planned behavior assumes that behavior is a linear decision and does not consider that it can change over time.

Conclusion

The mean score of participants' intention to use preconception care was 21.43 (SD 2.47), approaching the maximum possible score. This indicates a strong intention among participants to use preconception care. Perceived behavioral control emerged as the strongest predictor, followed by attitude and subjective norms, independently influencing the intention to use preconception care. These factors should be carefully considered by health professionals when designing interventions aimed at promoting preconception care among reproductive-age women.

Abbreviations

AT	Attitude
PBC	Perceived Behavioral Control
PCC	Preconception Care
SN	Subjective Norm
TPB	Theory of Planned Behavior
WHO	World Health Organization

Acknowledgements

We would like to thank the Arba Minch town Health Department, Health Extension Workers of Arba Minch town, data collectors, supervisors, and study participants for their invaluable support in making this study real.

Author contributions

HAT designed the study, was involved in supervision, performed analysis and interpretation of the results, and drafted the manuscript. KF, GTB, ABC, TSH, and BKL assisted in the design and proposal development, monitored data collection, assisted during analysis, and revised subsequent drafts of the paper. All the authors have read and approved the final manuscript.

Funding

Arba Minch University provided funds for the data collection and stationary materials of this research work with a project grant code of Acct. No GOV-1000021480502. The website of the university is www.amu.edu.et. "The funders had no role in study design, data collection, and analysis, the decision to publish, or preparation of the manuscript".

Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethical approval and consent to participate

Ethical approval with a reference number of IRB/1279/22 was obtained from The Institutional Ethical Review Board of Arba Minch University's College of Medicine and Health Sciences and a supportive letter was also obtained from Arba Minch town local health administration, before data collection. Data collectors and supervisors wore face masks, kept physical distance, and other COVID-19 prevention protocols. Data were collected after informed written consent was obtained from the women whose ages are above 18 years old and from the parents and/or husbands of those whose ages are below 18 years old. Informed written consent to participate was also obtained from a closed one for the uneducated. All study subjects were informed about the purpose of the study, including its goal, the importance of their participation, the right to withdraw at any time if they wanted, and the privacy and confidentiality of their responses given by each respondent kept properly and anonymously. The methods employed in this study strictly adhered to the applicable guidelines and regulations.

Consent to publish

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

¹Department of Midwifery, College of Medicine and Health Sciences, Arba Minch University, Arba Minch, Ethiopia

Received: 7 December 2023 / Accepted: 5 August 2024

Published online: 23 August 2024

References

- Bernstein M, Afshar Y, Han CS. Preconception care: in the continuum of women's healthcare. In: Handbook of Gynecology. edn. Edited by Shoupe D. Cham: Springer International Publishing; 2023: 39–61.
- Temel S, van Voorst SF, de Jong-Potjer LC, Waelpuut AJ, Cornel MC, de Weerd SR, Denkaş S, Steegers EA. The Dutch national summit on preconception care: a summary of definitions, evidence and recommendations. *J Community Genet.* 2015;6:107–15.
- Dorney E, Black KI. Preconception care. *Australian J Gen Pract.* 2018;47(7):424–9.
- Fowler JR, Jenkins SM, Jack BW. Preconception counseling. Treasure Island (FL). StatPearls Publishing; 2017. <http://www.ncbi.nlm.nih.gov/books/NBK441880/>
- Teshome F, Kebede Y, Abamecha F, Birhanu Z. Why do women not prepare for pregnancy? Exploring women's and health care providers' views on barriers to uptake of preconception care in Mana District, Southwest Ethiopia: a qualitative study. *BMC Pregnancy Childbirth.* 2020;20(1):504.
- Ayele AD, Belay HG, Kassa BG, Worke MD. Knowledge and utilization of preconception care and associated factors among women in Ethiopia: systematic review and meta-analysis. *Reproductive Health.* 2021;18:1–15.
- Biratu AK. Addressing the high adverse pregnancy outcomes through the incorporation of preconception care (PCC) in the health system of Ethiopia. Pretoria University 2017:94–113. <https://core.ac.uk/download/pdf/162048251.pdf>. Accessed 8 July 2024.
- Ethiopia FMOH. Obstetrics Management Protocol for hospitals. In., ed. Addis Ababa: FMOH; 2021. pp. 16–9.
- Pattnaik JI, Panda UK, Samal B, Das S, Ravan JR. Validity of biopsychosocial model of intervention in contemporary medical practice: walking a few extra miles. *J Integr Med Res.* 2023;1(2):74–6.
- Freda MF, Picione RDL, Martino ML, Lemmo D, Auriemma E. The psychological model of scaffolding for the development of the healthcare relationship: addressing a contemporary challenge of healthcare systems. *Handbook of research on healthcare standards, policies, and reform.* ed. IGI Global; 2022. pp. 52–74.
- Boyle JA, Black K, Dorney E, Amor DJ, Brown L, Callander E, Camilleri R, Cheney K, Gordon A, Hammarberg K. Setting preconception care priorities in Australia using a Delphi technique. *Seminars in reproductive medicine.* 2022. Thieme Medical Publishers, Inc.; 2022. pp. 214–26.
- Agus Y, Pamungkasari EP, Soemanto R. Theory of planned behavior: determinants of the use of modern family planning method. *J Maternal Child Health.* 2019;4(5):369–79.
- Lee S, Vincent C. Analysis and evaluation of the theory of planned behavior. *Adv Nurs Sci.* 2021;44(4):E127–40.
- Nguyen T-M, Nham PT, Hoang V-N. The theory of planned behavior and knowledge sharing: a systematic review and meta-analytic structural equation modeling. *VINE J Inform Knowl Manage Syst.* 2019;49(1):76–94.
- Kirk TN, Haegele JA. Theory of planned behavior in research examining physical activity factors among individuals with disabilities: a review. *Adapted Phys Activity Q.* 2019;36(1).
- Ajzen I. The theory of planned behavior: frequently asked questions. *Hum Behav Emerg Technol.* 2020;2(4):314–24.
- Zamani O, Tabatabaei SVA, Mohseni M, Khanjani N. Factors affecting pre-pregnancy care among women based on the theory of planned behavior in Larestan, Iran, in 2016. *J Public Health.* 2021;29:393–401.
- Temel S, Birnie E, Sonneveld H, Voorham A, Bonsel G, Steegers E, Denkaş S. Determinants of the intention of preconception care use: lessons from a multi-ethnic urban population in the Netherlands. *Int J Public Health.* 2013;58:295–304.
- Ayalew Y, Mulat A, Dile M, Simegn A. Women's knowledge and associated factors in preconception care in Adet, West Gojjam, northwest Ethiopia: a community-based cross-sectional study. *Reproductive Health.* 2017;14:1–10.
- Talib RA, Idris IB, Sutan R, Ahmad N, Bakar NA. Patterns of pre-pregnancy care usage among reproductive age women in Kedah. *Malaysia Iran J Public Health.* 2018;47(11):1694.
- Blondel B, Beuzelin M, Bonnet C, Moreau C. Pregnancy intention and preconception contraceptive behaviors and substandard prenatal care in France. *J Gynecol Obstet Hum Reprod.* 2023;52(7):102608.
- Setegn M. Intention to use and its predictors towards preconception care use among reproductive age women in southwest Ethiopia, 2020: application of the theory of planned behavior (TPB). *Int J Gen Med.* 2021:4567–77.
- Abamecha F, Tena A, Kiros G. Psychographic predictors of intention to use cervical cancer screening services among women attending maternal and child health services in Southern Ethiopia: the theory of planned behavior (TPB) perspective. *BMC Public Health.* 2019;19:1–9.
- Endalew GB, Gebretsadiq LA, Gizaw AT. Intention to use maternity waiting home among pregnant women in Jimma District, Southwest Ethiopia. *Glob J Med Res.* 2017;16(6):1–9.

25. Bayrami R, Didarloo A, Asadinejad A. Predictors of preconception care behavior among women of reproductive age using a behavior-change model. *Proc Singap Healthc*. 2021;30(2):125–30.
26. Moshi FV, Kibusi SM, Fabian F. Using the theory of planned behavior to explain expecting couples birth preparedness intentions in a rural setting: a cross-sectional study from Rukwa, Southern Tanzania. *Adv Public Health*. 2018;2018(1):1087342.
27. Zhu G, Qian X, Qi L, Xia C, Ming Y, Zeng Z, Liu Y, Yang Y, Zhang M, Zhang H. The intention to undertake physical activity in pregnant women using the theory of planned behavior. *J Adv Nurs*. 2020;76(7):1647–57.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.