Effect of past behavioral experience on intention to use cervical cancer screening services among women in resources poor settings of Ethiopia: applicability of theory of planned behavior

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Abstract

Background: Despite; it's effectively used to predicting the behavioral intentions of different health behaviors; the theory of planned behavior has been rarely tested in the context of low income countries. The current study has examined the effect of past behavioral experience on predictive applicability of theory of planned Behavior to intended use cervical cancer screening among women in resources poor settings.

Methods: The study employed cross-sectional design enrolling 422 women visiting maternal and child health clinic. A structured questionnaire was used to collect data. The research was conducted under the framework of the theory of planned behavior to measure attitude, intention, perceived social and contextual influences. The SPSS version 21.0 was used to analyze the data. A hierarchal multivariable linear regression analysis was conducted to estimate the predictive power of the theory. The adjusted R-square and standardized regression coefficient were used to interpret the variance and effects of predictors on intention to cervical cancer screening respectively. P-value less than 5% was used to indicate significant associations.

Results: The theory of planned behavior has explained variance in intention to use cervical cancer screening by 23.5% ($R^2 = 0.235$). The inclusion of socio-demographic factors and past behavioral experiences into the model improved the prediction to 34.6% ($R^2 = 0.349$) indicating;11.40% of the prediction was attributed by factors external to theory. Subjective norm and attitude accounted for the highest and least variances in intention with 12.4% ($R^2 = 0.124$, F= 64.41, p=0.001) and 5.1% ($R^2 = 0.051$, F= 22.38, P=0.001) respectively. The past behavioral experience of using cervical cancer screening was significantly accounted for very small variances in intention with; 1% ($R^2 = 0.01$, F= 4.11, p=0.043)

Conclusion: The past behavioral experience has small significant positive effect on the prediction. Intention to use cervical cancer screening among women can fairly be predicted by the application of theory of planned behavior. The predictive power of the theory could be improved with the inclusion of external factors like socio-demographic characteristics and behavioral experiences into the theory. Considering these factors while designing TPB based researches and health behavior change interventions is recommended.

Introduction

Globally, cervical cancer is a fourth most common types of cancer affecting women. There were an estimated 2,716 million women aged 15 years and older who are at risk of cervical cancer in the world. About 527,624 women had confirmed cervical cancer among which 265,672 die from the disease every year. Eighty seven percent of all deaths from cervical cancer occur in sub-Sahara countries [1]. Evidently, Ethiopia is one of the African countries with high prevalence of cervical cancer cases with about 27.19 million women who are at risk of developing cervical cancer [2]. In Ethiopian, about 4,732 women

die from the disease every year [3]. Despite its public health importance in Ethiopia, there was only less than 1% of age eligible women received cervical cancer screening (CCS) services [4].

Development of explicit interventions to changing behaviors of public health importance like cervical cancers screening behaviors, requires the application of effective theory that produce adequate prediction and explanation of these behaviors with all available internal and external factors to the theory [5, 6]. One of the most widely used and parsimonious model used for prediction of behavioral intentions and behavioral outcomes is the theory of planned (TPB) [7, 8]. The theory postulates that the best and immediate predictor of a behavior is behavioral intention. This will in turn determined by attitude toward the behavior, subjective norms (SN) regarding the behavior and perceived behavioral control (PBC) of performing the behavior under consideration.

These are called constructs of TPB [9]. These constructs have been found to account for variances in behavioral intention in statistical modeling. The amount of variance in behavioral intention explained by all of these constructs indicates the predictive ability of the theory. To this regard, study has indicated a rule of thumb in which an effective theory tend to explain variance in intention by more than 50% for it to be readily translated into practice; provided the target behavior is under the volitional control of the individuals [8].

Plenty of meta-analytic studies have conducted so far to reviewing the predictive power of the TPB as applied to health behaviors demonstrating that the theory has effectively predicted the behavioral intention with variance ranging from 44%-53% [10, 11, 13]. Recent meta-analytic review of TPB studies have reported 39%-50% of variance in behavioral intentions to health related behaviors was explained by the theory [12, 14]

Few studies which have been conducted in Ethiopian applying the theory reported conflicting results about the predictions of intention, 27% [15], 27% [16] and 55% [17] with SN being more important predictors than attitude and PBC respectively. Importantly; TPB has been found to be effective in predicting the intended cancer screening behaviors such screening for breast and colorectal cancers. More specifically; the theory has produced an effective prediction of cervical cancer screening (CCS) behavioral intention with variances ranging from 27.6%-51% in different previous studies [18, 19].

However, the SN construct is generally found to be a weak predictor of intentions in these studies. It has also been indicated in meta analysis of TPB based studies of screening behaviors like breast, testicular self-examination and cervical screening showed 44% of variance in behavioral intention across all studies was accounted for by constructs of TPB, attitude, SN and PBC, with attitude and SN being the strongest and least predictor of intention respectively [13].

Interestingly, the preliminary finding part of the current study which was published elsewhere [20] also indicated that the individuals' intention to use CCS was a function of attitude; subjective norms and perceived behavioral control with perceived behavioral control and attitude towards screening were found to be the strongest and least predictors of behavioral intention respectively. More importantly, the past

behavior experience (PBE) to CCS use which was treated together with the socio-demographic factors in the regression analysis; was significantly and positively associated to behavioral intention despite none of the socio-demographic variables were associated to intention. The raises a question' "what is the role of PBE in TPB in predicting behavioral intention, given that the effects of socio-demographic variables and constructs of TPB are all controlled?"

Notably; the influence of past behavior experience (PBE) on behavioral intention or future behavior has attracted considerable attention. The past behavior is the best predictor of future behavior when a set of factors affecting the behavior under consideration remained unchanged over time. If all factors (whether internal to the individual or external) that determine a given behavior are known and accounted for; then addition of PBE to the model should not significantly improve the prediction of later behavior and vice versa. In this case; a measure of PBE can be used to test the sufficiency of any model designed to predict future behavior [10].

Within the TPB; the influence of PBE on future behavior is either through its indirect influence on intention or its influence on underlying beliefs about the target behavior. It has been indicated that effects of PBE on prediction by TPB should be mediated by PBC; as repetition of behavior should lead to enhanced perceptions of control of individuals [10, 21]. The contribution of PBE to the predictions of intentions and behavior is seen after taking into account the TPB variables; despite this prediction was found to be considerably small [22]. For instance; a review of 12 TPB studies showed that after taking account of attitude, SN and PBC; PBE explained an average 7.2% of the variance in intentions [14]. More interestingly; Conner et'al (2005) explained in their commentary on how external factors influence intention or behavior as "the model is held to be a complete theory of behavior in that any other influences on behavior are held to have their impact upon behavior via influencing components of the TPB" [8].

To the best our knowledge; there is/are no evidence that examined the role of PBE and predictive utility of TPB to intended use of cervical cancer screening services among Ethiopian women in resources scarce settings. Therefore; this current study was conducted to answer two research questions. 1) To what extent does the TPB predict the intention to use of cervical cancer screening services? 2) What is the effect of PBE of using cervical cancer screening services on behavioral intention?

Method And Materials

The study has employed an institution based cross-sectional design enrolling 422 reproductive age women. Sample size was calculated using single population formula for mean difference taking the estimate of predicted variance in intention to CCS to be 0.5. The participants were recruited among women attending maternal and child health services. Systematic sampling technique was used to select participants from five health institutions providing cervical cancer screening services.

A structured questionnaire was used to collect data. Research tool development, scoring and analysis were conducted based on the frameworks and assumptions of the theory of planned behavior to measure behavioral intention, attitude, subjective norms and perceived behavioral control of having cervical cancer

screening services [21]. Details methods regarding study settings, sample size calculation, sampling techniques and data collection procedures are found in a study published elsewhere [20]

Measurements and scoring

Measurements for all components of TPB were developed after conducting an elicitation study. Elicitation study is a kind exploratory qualitative study which involves an in-depth interview of 15–20 participants selected among the target population [7, 10, 21]. The purpose is to elicit or explore salient and context specific beliefs regarding the consequences or outcomes resulting from particular health behavior (i.e. beliefs about the outcomes of using CCS services among women in this case), sources of normative influence (peoples who they think would encourage or discourage this practices) and control beliefs about factors that would either hinder or facilitate their use of CCS services.

The elicitation study is required to make TPB suitable across various types of cultures thereby improving the comprehensibility and validity of the theory [23]. Failure to elicit these culturally defined beliefs from the target population is the reason for the weak predictive power of the theory to explain the cross-culturally defined health behaviors. Therefore; conducting elicitation is found to essential to understand the behavior from the perspective of study populations [24]. Qualitative data was analyzed using content analysis approach guided by a predetermined theoretical or thematic framework based on TPB framework. This information provides content of the survey questionnaire, from which TPB measures are developed for a defined behavior and population. Furthermore; this finding was used later on to develop locally sensitive TPB oriented quantitative survey used for large scale study.

Accordingly, direct measures of intention, attitude and subjective norms toward CCS services were measured using four items each on five points Likert scale response format ranging from 'strongly disagree = 1' to 'strongly agree = 5' [25]. With attitude, both instrumental and affective domains were measured [9]. While the perceived behavioral control (PBC) component was measured using four items on five point semantic differential scales format. An exploratory component analysis (EPCA) and reliability test were conducted to ensure construct validity.

An EPCA was conducted for each the four components of the theory to validate whether these items are measuring the underlying TPB dimensions [26–28]. To ensure consistency of these extracted items, reliability analysis was conducted taking Cronbach's alpha values with acceptable level greater than 0.70 to retain items for subsequent analysis [29, 30]; (Table 3). Accordingly, the emerging items were summed up to build composite variables used for further analysis. Finally, PBE was recorded as self-reported on "YES = 1 and NO = 0" by asking women if they have ever had CCS services. Questionnaire was translated from English to local language, the sidamigna; for which pretesting was done recruiting 5% of the total sample prior to data collection. Furthermore; oral consent was sought from each participant to ensure ethical concerns.

Statistical data analysis

Data was checked for completeness, coded and carefully entered for analysis using statistical package for social science (SPSS) window 21.0 for analysis (v21.0; IBM Corporation, Armonk, NY, USA).). Reverse scoring for the negatively worded items was done before actual analysis. Summative score of items which were reliable in EPCA were done to create a composite score. Means and standard deviations were calculated for the composite scores to describe the data. Pearson correlation coefficient was used to examine the association between the dependent variable (i.e. intention to use CCS in this case) and the independent variables (i.e. constructs of TPB).

Furthermore; a hierarchical multivariable linear regression modeling was conducted keeping a fixed order of entry for components of TPB to determine the variability in dependent variable that is attributed by each independent variable. Accordingly; all socio-demographic variables were added to the first block to control for confounding factors. Attitude was added to the second block followed by SN in the third block and finally PBC component was entered in the fourth block. The order of entry was based on their structural appearances in the TPB.

Finally; PBE was added to the last block to see its independent residual effect on the variability in behavioral intention. This kind of ordered of entry is helpful to discriminate the variability in the dependent variable accounted for by each constructs of TPB and other external factors to TPB framework. Standardized regression coefficients (β) and adjusted R^2 values were used to interpret the effects and variability in the dependent variable, respectively. P-value < 0.05 was used to indicate significant association.

Results

Socio-demographic characteristics
From 422 participants; 402 respondents completed the interview and producing 95% response rate. The age of the respondents was ranged between 30 to 49 years with mean age of 36.40 ± 4.791 years. The majority 278 (69.2%) were protestant followed by orthodox accounting for 66 (16.4%). Most of the 288 (71.6%) of the respondents were Sidama ethnic groups. Majority of the respondents 362 (90%) were married. One hundred fifty-four; 46% of respondents were housewife. About; 191 (47.5%) had completed primary school and 60 (14.9%) were uneducated; who are unable to read and write (Table 1).

Table 1

Socio-demographic characteristics of reproductive age women in
Yirgalem town, Ethiopia 2017 (n = 402)

Variables	Categories	Frequencies	Percent
Age in Years	30–34	150	37.3
	35–39	131	32.6
	40–44	94	23.4
	45–49	27	6.7
Religion	Protestant	278	69.2
	Orthodox	66	16.4
	Muslim	33	8.2
	Catholic	25	6.2
Ethnicity	Sidama	288	71.6
	Amahara	42	10.4
	Oromo	29	7.2
	Gurage	17	4.2
	Wolayita	14	3.5
	Silte	12	3
Marital status	Married	362	90.0
	Widowed	21	5.2
	Single	13	3.2
	Divorced	6	1.5
Occupation	Housewife	185	46
	Self	129	32.1
	Governmental	88	21.9
Monthly income	> 1,000	231	57.5
	500–999	94	23.4
	< 500	77	19.2
Educational status	Uneducated	60	14.9

Variables	Categories	Frequencies	Percent
	Primary	191	47.5
	Secondary and above	151	37.6

Exploratory principal components analysis (EPCA)

The EPCA has been done to produce mutually exclusive factors and validate whether items designed to measure each construct are actually measuring the intended TPB constructs. The analysis considered Eigen-value greater than one as a cut off point for principal factor extraction, direct oblique rotation to produce meaningful factors and factor loading values less than 0.30 to retain items on their respective factors [26, 31]. The direct oblique rotation was chosen assuming the existing correlation between the emerging factors or constructs of TPB [21, 27]. An iterative analysis has been conducted till the data yield the model with highest possible total variance explained by the four factors (i.e. TPB constructs) jointly [28]. The total variance explained by this emerging model was 63.79%. Despite there were four items each measuring constructs of TPB used in the initial questionnaire, there were only three items emerged out or retained in the EPCA each for attitude, PBC and intention. The measure of internal consistency; value of Cronbatch's alpha; was found to be at acceptable level ranging from 0.70–0.78. Table 2

Table 2

Exploratory principal component analysis of constructs of theory of planned behavior; assuming direct oblique rotation and factor loading value greater than 0.30 for factor retention

S.N	Factors	Number of items	Rotated % Variance explained	Factor loading	Cronbach's alpha	Total % variance explained after rotation
1	PBC	3	17.21	0.73–0.83	0.78	63.79%
2	Attitude	3	15.74	0.73–0.86	0.75	
3	Subjective norm	4	15.44	0.52–0.80	0.73	
4	Intention	3	15.40	0.64–0.79	0.70	
Abbreviations: PBC = perceived behavioral control,						

Pearson's correlations r, between intention and direct measures of TPB constructs

As a bivariate analysis we have conducted correlation analysis using the Pearson correlation coefficients. The correlation coefficient showed that all the direct measures of TPB were positively correlated with behavioral intention and with each other. With intention, the highest and lowest positive correlations were

observed between intention and PBC (r = 0.46, p < 0.001), and between intention and attitude (r = 0.27, p < 0.001) respectively. This crudely implies that the high score for attitude, subjective norms and PBC would improve intention to use CCS services. Table 3

Table 3

Descriptive statistics and Pearson's Correlation coefficient (r) between intention and measures of TPB (n = 402)

Component	PBC	Attitude	Subjective norm	Intention
PBC	1	-	-	-
Attitude	0.31*	1	-	-
Subjective norm	0.52*	0.29*	1	-
Intention	0.46*	0.27*	0.43*	1
Scale mean (SD)	10.41(1.61)	10.93 (1.66)	13.70 (1.98)	9.85 (1.37)
Number of item	3	3	4	3

Abbreviations: PBC = perceived behavioral control, SD = standard deviation, Key="*" correlation is significant at P < 0.05.

Variability and prediction of intentions to use cervical cancer screening services

As part of convergent validity test, we conducted a hierarchical multiple linear regression analysis to elucidate the amount of independent and total variance accounted for in the intention to CCS services from each set of TPB components, socio-demographic factors and PBE. Since the aim of the study was to examine the predictive utility of components of TPB and the PBE to predicting women's intention to use CCS service; we have chosen the entry order of variables as "socio-demographic factors + TPB components + PBE". Furthermore, the entry orders for constructs of TPB variables were done "in steps" keeping in mind the assumptions of TPB. The assumption proposes that in testing of the TPB; the hierarchical linear regression analysis must follow the order in which its constructs (Attitude + Subjective norm + PBC) appear in the model; after controlling for the effects of external factors. Accordingly; each constructs of TPB were entered in separate blocks to see the variability in intention attributed by each constructs. In the same way; the independent effect of PBE to variances in intended use of CCS services was evaluated after controlling for the effects of socio-demographic factors and TPB constructs.

In doing so; a regression model consisting of five blocks was generated. In the first block of the model; the socio-demographic factors were emerged out accounting a 10.4% variance (R^2 change = 0.104, F change = 2.90, P, 0.001) in intention to use CCS. Attitude, SN and PBC which were entered into the second to fourth blocks of the regression model accounted 5.1% (R^2 change = 0.051, F change = 22.38, P, 0.001), 12.4% (R^2 change = 0.124, F change = 64.41, p, 0.001) and 6% (R^2 change = 0.06, F change = 34.05, P, 0.001) of variances in the intention to use CCS services respectively. The SN accounted for the highest variance in behavioral intention with 12.4%. Finally; the PBE which was entered in the final block showed very small significant variance in intention of 0.7% (R^2 change = 0.01, F change = 4.11, P, 0.043). Over all, the sum total of variability in the intention accounted for by all components of the TPB was 23.5% (R^2

adjusted = 0.235). The final model that includes socio-demographic factors, components of TPB and PBE explained intention to use CCS by 34.9% (R^2 adjusted = 0.349). (Table 4)

Table 4

Hierarchical regression analysis model summary for variance in intention to CCS attributed by component of TPB and PBE among women in Yirgalem town; Ethiopia; 2017 (n = 402)

Serial number	Components	R-square	R-square adjusted	R-square change	F-change	P value for F-change
1	SD factors	0.104	0.068	0.104	2.902	0.001
2	A	0.155	0.118	0.051	22.377	0.001
3	A + SN	0.279	0.246	0.124	64.413	0.001
4	A + SN + PBC	0.340	0.308	0.060	34.045	0.001
5	A + SN + PBC + PBE	0.349	0.315	0.010	4.114	0.043
Abbreviations: SD factors = socio-demographic factors, A = attitude, SN = Subjective norm, PBC = perceived behavior control, PBE = Past behavior experience of CCS						

Furthermore; the standardized regression coefficient; beta; has been interpreted to identify the independent predictors of intention to use CCS among components of TPB and PBE; after controlling for the effects of socio-demographic. It's been identified that PBC is the strongest predictor of intention to use CCS (standardized β = 0.30, P, 0.001) followed by SN (standardized β = 0. 237, P, 0.001). For PBC; intention to use CCS services will be increased by 30% for a unit positive change in individual's perception of control over circumstances that inhibit them from using it provided that all the other factors kept constant. A unit positive increment in women's perception that significant others will approve of their use of CCS will increase intention by nearly 24% keeping other conditions are unvaried. The attitude was found to be the least significant predictor of intention in the present study (standardized β = 0.098, P, 0.033) compared to subjective norms and PBC. This indicated; a unit positive increment in women's attitude toward the advantage attached to the use of CCS will increase intention by only 9.8%. The PBE or previous experience in using CCS was found to have small residual effects on intention (standardized β = 0.087, P, 0.043). Intention to use CCS will significantly be increased by nearly 9% for those women who have an experience of using the services. Table 5)

Table 5

Values of regression coefficients, beta (β) and significance level, (exact p-value) of the hierarchical regression analysis to predict intention to use of cervical cancer screening services among women in Yirgalem town; Ethiopia; 2017 (n = 402)

S.N	Components	Unstandardized-β	Standardized-β	95% CI	p-value
1	SD factors	-	-	-	-
2	A	0.081	0.098	[0.007, 0.156]	0.033
3	SN	0.163	0.237	[0.094, 0.232]	0.001
4	PBC	0.256	0.301	[0.169, 0.342]	0.001
5	PBE	0.410	0.087	[0.013, 0.808]	0.043
Abbreviations: S.N = serial numbers, SD factors = socio-demographic factors, A = attitude, SN = Subjective norm, PBC = perceived behavior control, PBE = Past behavior experience of CCS					

Discussion

The study has tried to examine the applicability of TPB to predict the intended use of CCS in resources limited settings of Ethiopia where utilization of such service is noticeably low. The study is the first to apply well established theoretical framework to understand CCS intention and evaluate the adequacy of TPB. The designation, development of tool or measurement and analysis of the data has been carefully undertaken based on the principles and assumptions of the TPB. One of the critical issues in testing the TPB is conducting a *priori* elicitation study. As briefly explained above; it is a kind of qualitative exploratory study mainly conducted to explore the underlying full range of beliefs regarding behavioral outcomes, specific referents and environmental circumstances about particular behavior before the development of the large scale quantitative questionnaire. Presumably; these considerations could improve the predictive validity of the theory [7, 10, 21].

It has been recommended that an effective theory tends to explain variance in intention by more than 50% for it to be readily translated into action [8]. The TPB has been effectively tested in predicting health behavior as shown in several earlier meta-analytic studies indicating the prediction ranging from 44%-53% [10, 11, 13]. In Ethiopia; the highest prediction was observed in a study done to predict the intended use of condom in a rural population [16]. To this end; despite it is consistent with finding from few previous studies [15, 19, 17]; the current study revealed considerably low prediction of behavioral intention with only 23.5% of the variance in intention. Debatably; the TPB has been criticized for its insufficiency to effectively predict intention or behavior as it doesn't take into account the influence of emotional dimension in individuals' decision making process. For instance; individuals may be motivated

to attend for screening but may worry about the "bad news" of test result (i.e. positive test result for cancer).

Indeed; scholars recommended the inclusion of "anticipated affect" concept to TPB model in addition to attitude would improve the prediction [9, 33]. However; this recommendation seems paradoxical for the current study as attitude was the least significant predictor of intention. The other possible reason was indentified in meta-analyses of applications of TPB studies that screening intention/ behavior is especially poorly predicted [34]. Further reasons for this discrepancy, according to the TPB, could be difference in behavior, target population and circumstances in which the behavior would occur [9, 10]. The behavior under the study was screening behavior which might not be as easy as deciding to do other behaviors like using condom or contraception. Furthermore; women in the present study were interviewed about their intention to use CCS in the context where there were profound lack of access to services for diagnosis and treatment due to variety of health system and psycho-social reasons [35]. However; the model's prediction was significantly improved from 23.5% to 34.6% up on the inclusion of socio-demographic factors and PBE into the model implying that external factors to the theory could play significant role in affecting the predictive power of the theory.

The current study has also exhaustively tried to discriminate the potential predictors of intention among components of TPB and PBE by conducting a series of hierarchical regression analysis. In doing so; the PBC was identified to be the strongest predictor of intention to use CCS which is similar to the result of previous meta-analysis study of health related behaviors [11] and individual study done on condom use intention in Ethiopia [16]. Favorably; the finding of the present study was consistent with TPB based studies to evaluate the applicability of the theory in predicting intention to CCS [6, 36]. The fact that PBC was found to be the most important variable in predicting intention to CCS may be due to the very contextual nature of the behavior and it is not wholly under volitional control and this could be further supported by a qualitative study conducted in Ethiopia revealing the poor access to diagnosis and treatment to cervical cancer cases was attributed the psycho-social and health system reasons [35].

Likewise other previous study [11]; the current study identified SN construct was the second predictor of intention to use CCS. However; studies have noted that subjective norms were the weakest predictor of intentions in the TPB [8]. A meta-analysis result was also indicated subjective norm to be the weakest predictor of intentions in the TPB across the reviewed studies [39]. It seems fair to justify the finding of this current in a context where health care decision making and choices are extremely determined by significant others for women. The Ethiopian study has explored the existence of profound social consequences and exclusion as common barriers to seek care for cervical cancer concerns [35]. In this study; despite plenty of studies; including the author of TPB; support the assumption that attitude would

be the strongest predictor of intention [13, 18, 37, 38]; it was found to be the least predictor of intention to CCS. Attitude would be the superior determinant of intention when the target behavior is altruistic free in nature and the individuals feel capable of controlling over the behavior. This is supported by the Ethiopian study which identified the psychosocial and health system barriers to seeking diagnosis and treatment for cervical cancer [35].

Importantly; the present study has tried to look into the effect of past behavior on intention to use CCS service. The past behavior influences future behavior either through its indirect influence on intention and underlying beliefs about the target behavior [10, 17]. Its effects should be mediated by PBC that could lead to enhanced perceptions of control. What is of particular interest is the contribution of past behavior to the predictions of intentions and behavior once the TPB variables are taken into account. However; the contribution of past behavior to the predictions of intentions after taking into account all the TPB variables was found to be considerably small in previous studies [22]. For instance; a review of 12 studies showed that after taking account of attitude, SN and PBC; past behavior explained an average 7.2% of the variance in intentions [14]. Furthermore, Ajzen (1991) reports that across three studies, the amount of variance added to the prediction of behavior by past behavior was so small; (mean 2.1 per cent) [10]. Another study done in Ethiopia revealed that past condom use contributed only marginally to the explained variance in intention after controlling for the effects of TPB variables [16]. Clearly; PBE has small contribution to the variance in intention to CCS and moderate independent significant effect on prediction as indicated by standardized regression coefficient in this study. As depicted so far; this may be due to experience of the behavior leads to a change in intentions and a reverting to a previous pattern of behavior [9].

Conclusion: The study revealed that the possibility to fairly predict intention to use cervical cancer screening services among women in Ethiopia using the theory of planned behavior. The past behavior experience has small significant positive effect on predictive applicability of the theory. Women's decision to go for cervical cancer screening services would primarily be influenced by their perception of control over external circumstances related to the services. The predictive power of the theory could significantly be improved with the inclusion of external factors like socio-demographic and previous behavioral experiences into the theory. Therefore; considering external factors to the theory while designing TPB based behavioral researches and health behavior change interventions is highly recommended.

Abbreviations

TPB=Theory of Planned Behavior

SNNRP=South Nation Nationality and Peoples Region

SPSS=Statistical Package for Social Sciences

CCS=Cervical Cancer Screening

TRA=Theory of Reasoned Action

PBC=Perceived Behavioral Control

HEW=Health Extension Workers

H.D.T=Health Development Team

PBE=Past Behavior Experience

USA=United States of America

Declarations

Ethics approval and consent to participate

The research was approved by Research Ethics Committee (REC) of Institute of Health, Jimma University, before data collection. Permission was obtained from Sidama Zone Health Department to get access to participants. For the exit interview with women; verbal consent was sought from each eligible woman at maternal and child health services clinic. The objectives of the study and its benefits were explained in a language they can understand. Study participants were informed that the study would not have any risks. Furthermore, items seeking personal information (like name, phone number and identification numbers) were kept confidential.

Consent for publication: not applicable

Availability of data and materials: The datasets used and analyzed during the current study is available from the corresponding author on reasonable le request.

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Author contributions

AT designed the study, collected data, analyzed the data and reviewed the manuscript. FA designed the study, supervised data collection, analyzed the data, drafted the manuscript and critically reviewed the

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