Title
Emergency Contraception in Ghana –
An Application of the Theory of Planned Behavior

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Abstract

There is growing worldwide acceptance and promotion of emergency contraception (EC) as a measure to reduce unwanted pregnancies and unsafe abortions, and its potential impact in this regard can be most evident in developing countries with unmet contraceptive need. This analysis employs structural equation models to test whether the theory of planned behavior can be applied to explain past and intended use of EC among clients in Ghana, and examines model-based correlates of EC use and intention to use among a random sample of 992 clients attending the family planning clinic at Komfo-Anokye Teaching Hospital in Kumasi, Ghana. Scales are developed for the 4 main elements of the theory of planned behavior (attitudes, subjective norms, perceived behavioral control and intention to use EC -- Chronbach's α 0.77, 0.71, 0.84, 0.80, respectively). No previous studies have applied a psychosocial theory to elicit an understanding of clients' EC use in a developing country.

Introduction

There is growing worldwide acceptance and promotion of emergency contraception (EC) as a measure to reduce unwanted pregnancies and unsafe abortions, and its potential impact in this regard can be most evident in developing countries with unmet contraceptive need. Biomedical aspects of EC have been investigated and documented for more than three decades, but a large number of social science questions remain to be answered. Specifically, service delivery aspects and the mechanism by which decisions about EC-related practices are made by clients and providers are still poorly understood and need to be studied in order to help formulate or refine programs to enhance their likelihood of success.

Although other studies have examined clients' and providers' FP knowledge, attitudes, intentions and practices, none has used a theory-based approach to understanding the interplay of these factors with regard to EC in a developing country. This analysis seeks to test whether the theory of planned behavior (TPB) can be applied to explain past and intended practice and delivery of EC among clients and by providers in Ghana.

The Theory of Reasoned Action (TRA), developed by Fishbein and Ajzen (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), addresses the impacts of cognitive components, such as attitudes, social norms, and intentions, on behaviors. According to this theory, individuals' attitudes toward a certain behavior and norms representing their perception of other people's view of such behavior will determine their behavioral intentions, which may further lead to performance of the behavior. Since behaviors that are not fully volitional are also influenced by the individual's perception of his or her ability to perform the behavior, Ajzen (1985) extended the TRA by adding the perceived behavioral control as an additional predictor of behavioral intentions. A new theory named the Theory of Planned Behavior (TPB) was thus developed (Ajzen, 1985). The TPB model is displayed in Figure 1.

The TRA and TPB have been applied to numerous behaviors including diet (Arvola et al., 1999; Conner et al., 2003), physical activity (Blue et al., 2001; Nguyen et al., 1997), smoking (Hu and Lanese, 1998; Hanson, 1999; O'Callaghan et al.1999; Bursey and Craig,

2000; Harakeh et al., 2004; Maassen et al., 2004), safer sex (Bowen et al., 2001), consuming genetically engineered foods (Sparks et al., 1995); condom use (Sheeran and Taylor, 1999; Albarracin et al., 2001; Armitage and Conner, 2001) and contraceptive use (Richard et al., 1998; Fekadu and Kraft, 2001). The few studies that have used the TPB in relation to contraception in general found that behavioral intentions explained about 34% of the variance in contraceptive behavior (Richard et al., 1998). Two recent meta-analyses concerning the TPB have identified relatively strong correlations between intentions to use condoms and actual condom use (Albarracín et al., 2001; Sheeran and Orbell, 1998).

Countries with high maternal health costs, such as Ghana, are likely to obtain large benefits from making EC widely available and used. EC has the potential to significantly reduce the incidence of unintended pregnancy and the consequent need for abortion. Additionally, its provision creates an opportunity to reach women and counsel them on modern contraceptive methods. Although EC does not protect against sexually transmitted infections, it does offer reassurance to women who rely on condoms for protection against pregnancy in case of condom slippage or breakage, in cases when oral contraceptive pills are missed or unprotected intercourse occurs for any reason.

This study proposes to use the TPB to examine the correlates of EC use and intention to use EC by family planning clients in Ghana. Intention has been characterized as the most significant predictor of individual behavior and reflects the degree of motivation to engage in specific actions. Results of this study will provide information about clients' and practices that might assist the design of interventions to increase EC awareness, access and use. No previous studies have applied such psychosocial theory to elicit an understanding of clients' EC practices in a developing country.

Study Objectives
This study aims to: (1) assess the validity and utility of an extended TPB model to EC practice among family planning clients, and (2) examine extended TPB-based correlates of EC use or intention to use EC among clients attending the family planning clinic at Komfo-Anokye Teaching Hospital in Kumasi, Ghana.

Methods
The Mainstreaming Emergency Contraception in Ghana (MECG) study is a cross-sectional survey that consists of in-depth interviews conducted with family planning (FP) clients attending the FP clinic at Komfo-Anokye Teaching Hospital in Kumasi, Ghana. A random sample of female clients older than 18 years of age attending the clinic between March 1-July 15, 2008 (N=992) were invited to participate in the study; clients were interviewed using structured questionnaires only after they have been counseled and have received FP services. The questionnaire collected data on socio-demographic and experiential variables, as well as on attitudes, subjective norms and perceived behavioral control over prior or intended use of EC. Additionally, contraceptive calendar data was collected retrospectively over a 39-month period prior to the interview. Written informed consent was obtained from all study participants. The response rate was 93%.

The direct measures for attitudes, subjective norms, perceived behavioral and behavioral intention are based on one, two or three items that directly solicit respondents to rate their attitudes, subjective norms, perceived control over behavior and intention to use EC. When more than one item is included, the mean item score is calculated and used in the analyses.

The indirect measures for attitudes, subjective norms, perceived behavioral and behavioral intention are based on scales with 5-11 items each.

Client intention scale -- For each of the following cases, participants were asked the extent to which they intend to use EC: if they have unprotected sex, experience incest or rape, experience a problem with their method, such as a condom break, have sporadic sex, have EC at home, their partner/husband asks them to use EC. Additionally, an item asking about opposition to using EC that reads "My opposition to EC precludes using it " was used as a 7th item in the score. Responses are given on a seven-point scale (1="not at all" to 7="very much"). In the indirect measure for intention was calculates as the sum of scores to the 7 items in the scale. Thus, possible scores range between 7 and 49.

Client attitude scale -- We weighted the beliefs about the outcomes by their evaluation by clients. The 11 beliefs of clients about possible outcomes of EC use are: it enhances my reproductive options; discourages consistent use of other contraceptives; prevents an unintended pregnancy; prevents an induced abortion; takes too much time at the clinic; takes too much time in the pharmacy or chemical shop; is inconvenient, encourages the client to have unprotected sex; encourages partner to have unprotected sex; poses health risks; causes side effects. Participants were asked how likely each of these beliefs are to be true for them; answers will range from 1="extremely unlikely" to 7="extremely likely". Participants were also asked how good or bad each of these outcomes is; answers will range from +3 = "extremely good" to -3 = "extremely bad". The total scores range from -99 to +99.

Client subjective norms scale -- We weighted individuals' beliefs about the specific salient referents by their motivation to comply with those referents. The specific referents are partners/husbands; other family members; friends; doctor or FP counselor; other community members; priest. Two measures were sued to assess clients' beliefs about whether specific referents think they should use EC (+3 = "definitely should" to –3 = "definitely should not") and how much they want to comply with each referent (1="not at all" to 7="very much"). The total score ranges from -126 to +126.

Client perceived behavioral control scale -- We weighted individuals' beliefs over the frequency with which they encounter seven identified barriers to EC use: lack of information, feeling ashamed to ask the provider/pharmacist for EC, supply shortages, cost, not being offered EC, not being given EC at home, by the confidence they have in the power to overcome these barriers. Two measures were used to assess clients' beliefs over the frequency of EC use barriers (1="never" to 7="very frequently") and how easy they consider it is to use EC in the context of the identified barriers (+3 = "much easier" to -3 = "much more difficult"). The total score ranges from -147 to +147.

We recoded the items in all scales to have negatively worded endpoints on the right, so that the higher numbers always reflect a positive attitude, subjective norm, perceived behavioral and intention toward the target behavior. In the case of indirect measures, behavioral beliefs are multiplied by relevant evaluation score, normative beliefs by the relevant

motivation to comply score and control beliefs by the power to affect behavior score. The results are summed products across all the beliefs to create overall attitudes, subjective norms, perceived behavioral and behavioral intention scores. Using this method, a positive score means that, overall, the participant experiences social pressure to use EC, while a negative score means that, overall, the participant experiences social pressure not to use EC.

We conducted exploratory analyses of each of the measures, tests of association and tests of correlation between independent variables and the outcomes of interest using Pearson and Spearman correlation coefficients. Bivariate correlations were computed between the direct and indirect measures of attitudes, subjective norms, perceived behavioral and behavioral intention to confirm the validity of the indirect measures. Psychometric analyses were used to test the internal consistency of direct and indirect measures -- a cut-off of 0.7 or higher for the Cronbach's alpha scores will be accepted for all the scales.

The proposed relationships between constructs as delineated by the extended TPB conceptual model will be examined through structural equation modeling (SEM), with Mplus software (version 5). SEM is chosen because this approach is superior to OLS techniques in its capacity to assess the adequacy of theorized models and in comparing models. The key feature of this approach is the assumption of the existence of latent variables, not observed directly but instead expressing themselves through responses to survey items. Any one of these items may be imperfectly measured, but collectively they are assumed to provide an adequate representation of the unobserved variable.

This technique consists of two interrelated components, a measurement model and a structural model. The measurement model, which specifies how the latent constructs are indicated by their observed indicators, describes these indicators' measurement properties (reliabilities and validities). The observed indicators are partitioned into exogenous variables whose variation is predetermined outside the model, and endogenous variables whose variation is explained within the model. The structural equation model specifies causal relationships among the latent variables, describes their direct and indirect effects, and allocates explained and unexplained variance of the dependent constructs. The direct and indirect effects can be summed to give an estimation of the total effect. Figure 2 displays the extended TPB model that will be tested and whose predictive utility will be assessed.

The null hypothesis to be tested is that there is no statistically significant difference between the proposed model and the observed data. The chi-squared statistic will indicate whether the proposed model fits the data well. A non-significant chi-squared statistic indicating no difference will be indicative of a good fit between the proposed and observed models. Additionally, the root mean square error of approximation (RMSEA) with 90% confidence intervals will be reported, where a value <0.05 indicates very good fit and values up to 0.08 indicate reasonable errors of approximation in the population. The standardized root mean residual (SRMR) has been shown to be sensitive to model misspecification and its use recommended by Hu and Bentler (1999); values less than 0.08 are considered to be indicative of acceptable model fit. The comparative fit index and the Tucker-Lewis index will also be reported.

Path coefficients to be depicted in the model are analogous to standardized regression coefficients. The relative importance of the predictors is not measured but, instead, is estimated by means of multiple regression or structural equation analyses. The standardized regression or path coefficients serve as estimates of the relative importance (weights) of the predictors. Based on the statistical significance of the coefficients of structural parameters we will be able to identify the key predictors of the intention to use EC among clients. Additionally, we will be able to report how much of the variance in intention is accounted for by the model's predictor variables and identify whether the experiential variables have both direct and indirect effects (mediated by attitudes, subjective norms, perceived behavioral control constructs) and if they explain an additional part of the variance in intention to use EC.

We will calculate the difference in model fit by comparing the fit index for the two models. Only if the likelihood ratio test for the difference between the two fit indices is statistically significant, then the TPB model is not a significantly worse fit than the ETPB model and we would conclude that there is no difference between the two models. Additionally, we will use the Akaike Information Criterion (AIC), a goodness-of-fit measure which adjusts model chi-square to penalize for model complexity (over-parameterization). The AIC reflects the discrepancy between model-implied and observed covariance matrices. AIC is used to compare models and is not interpreted for a single model. The absolute value of AIC has no intuitive value, except by comparison with another AIC, in which case the lower AIC reflects the better-fitting model.

Results

There were no statistically significant differences between characteristics of all clients attending the family planning clinic at Komfo-Anokye Teaching Hospital and the characteristics of the women in our sample (N=992). Thus, the client randomization procedures worked adequately.

The majority of women in our sample are married or in union (94.8%) and live in urban areas (85.7%). The mean age of these family planning clients is 31 years, and they have on average 3 children. About 52% of them report ever having had an abortion, while 94.9% of them report ever using family planning. Almost three fifths of the women in our sample are currently using injectables, some 11.6% are using pills and 11.5% are using implants (Table 1).

All 4 scales developed for attitudes, subjective norms, perceived behavioral control and behavioral intention to use EC have a Chronbach's α greater than 0.7; thus, all scales are internally reliable and will be used in the structural equation models to test whether the theory of planned behavior can be applied to explain past and intended use of EC among family planning clients in Ghana (Table 2).

Discussion – to be added

Table 1. Clients' characteristics: MECG Study

Characteristics	N (%)
Marital status	
Married/in union	940 (94.76)
Single/separated/divorced/widowed	52 (5.24)
Residence	
Urban	849 (85.67)
Rural	142 (14.33)
Religion	
Catholic	110 (11.09)
Methodist	105 (10.58)
Other Christian	698 (70.36)
Muslim	72 (7.27)
Other	7 (0.01)
Ever had an abortion	
Yes	513 (51.87)
No	479 (48.13)
Ever used family planning	
Yes	941 (94.86)
No	51 (5.14)
Current contraceptive method used	
Pills	115 (11.59)
Injectables	577 (58.16)
Implants	114 (11.49)
Condoms	34 (3.43)
IUDs	57 (5.75)
Other modern methods	41 (4.13)
Traditional methods	19 (1.92)
No method	35 (3.53)
Ever used emergency contraception	
Yes	277 (27.92)
No	715 (72.08)
Emergency contraception used in the last 12 months	
Yes	205 (20.66)
No	72 (7.3)
Age (years)	mean=31.25; std dev=6.24
Education (years)	mean=8.88; std dev=4.05
Number of living children	mean=2.99; std dev=1.56

Table 2. Characteristics of the developed scales in the Theory of Planned Behavior Model

| Scale	Number of items	Mean	Standard deviation	Chronbach's α
Attitudes toward EC	11	227.07	60.43	0.77
Subjective norms related to EC use	6	136.57	44.60	0.71
Perceived behavioral control over using EC	7	87.27	49.62	0.84
Intention to use EC	7	40.97	8.36	0.80

Note: EC=emergency contraception

Figure 1. Conceptual Framework for the MECG Study
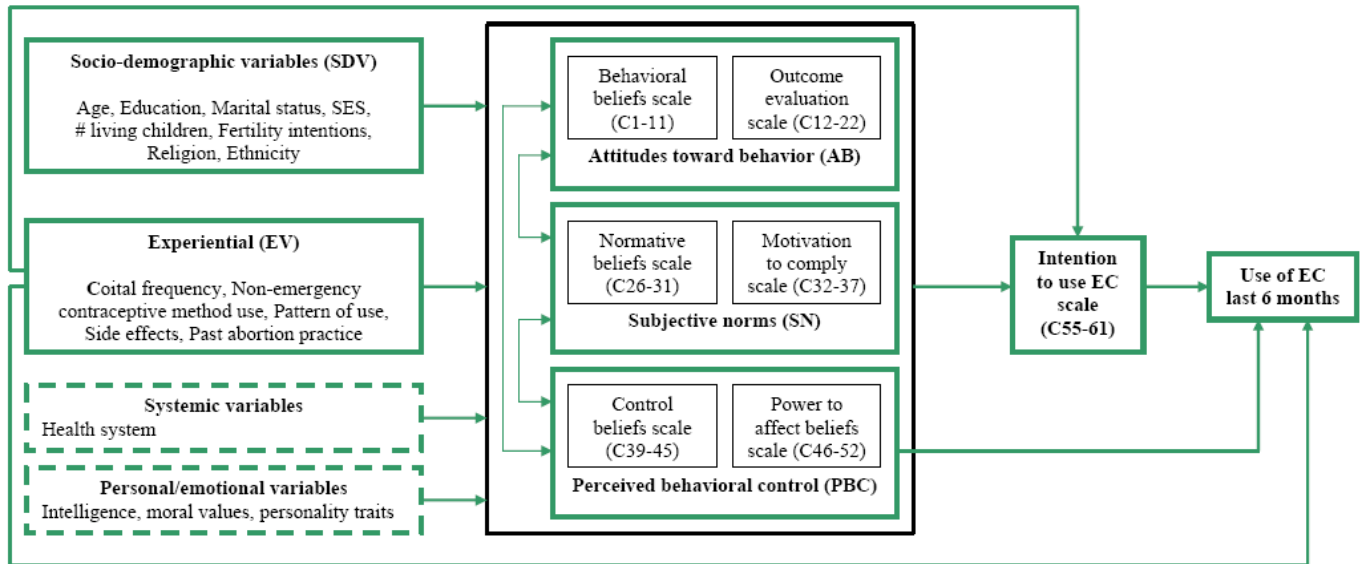
Adapted from: Ajzen I. The theory of planned behavior. Organizational Behavior and Human Decision Processes. 1991; 50: 179-211.

Note: The dotted line represents (unmeasured) latent constructs; C1-C61 refers to specific scale items in the MECG questionnaire.

Figure 2. Structural equation model to predict emergency contraception-related intentions and practices among family planning clients in Kumasi, Ghana.
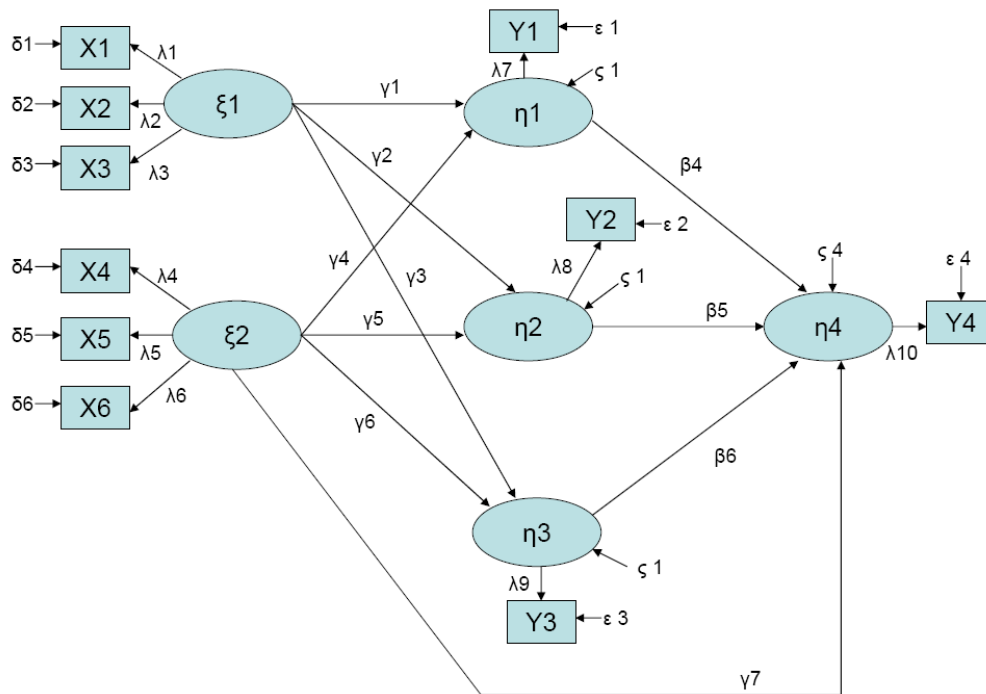
Legend: **η1**=AB; **η2**=SN; **η3**=PBC; **η4**=intention to use/use EC (clients) or intention to provide/provide EC (providers); **ξ1**=SDV; **ξ2**=EV (clients) or WRV (providers); **X1**=age (clients) and sex (providers); **X2**=education (clients and providers); **X3**=marital status (clients) and religion (providers); **X4**=current contraceptive method(clients) and health sector (providers); **X5**=pattern of contraceptive use (clients) and years of FP service experience (providers); **X6**=experience of contraceptive side-effects (clients) and knowledge score (providers); **Y1**=AB measure; **Y2**=SN measure; **Y3**=PBC measure; **Y4**= intention to use/use EC measure (clients) and intention to provide / provide EC (providers); **βs, λs and γs** are path coefficients of parameters; **εs and δs** are vectors that contain the error terms of the indicators, **and ςs** are vectors of unobserved errors.