



**HAL**  
open science

# **Barriers to family planning use in the Eastern Democratic Republic of the Congo: an application of the theory of planned behaviour using a longitudinal survey**

Wyvine Ansima Bapolisi, Ghislain Bisimwa, Sonja Merten

## ► To cite this version:

Wyvine Ansima Bapolisi, Ghislain Bisimwa, Sonja Merten. Barriers to family planning use in the Eastern Democratic Republic of the Congo: an application of the theory of planned behaviour using a longitudinal survey. *BMJ Open*, 2023, 13 (2), pp.e061564. <10.1136/bmjopen-2022-061564>. <hal-04146177>

**HAL Id: hal-04146177**

**<https://hal.science/hal-04146177v1>**

Submitted on 29 Jun 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons CC BY-NC 4.0 - Attribution - Non-commercial use - International License

# BMJ Open Barriers to family planning use in the Eastern Democratic Republic of the Congo: an application of the theory of planned behaviour using a longitudinal survey

Wyvine Ansima Bapolisi <sup>1,2</sup>, Ghislain Bisimwa,<sup>3</sup> Sonja Merten<sup>2</sup>

**To cite:** Bapolisi WA, Bisimwa G, Merten S. Barriers to family planning use in the Eastern Democratic Republic of the Congo: an application of the theory of planned behaviour using a longitudinal survey. *BMJ Open* 2023;**13**:e061564. doi:10.1136/bmjopen-2022-061564

► Prepublication history for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2022-061564>).

Received 28 January 2022  
Accepted 30 January 2023



© Author(s) (or their employer(s)) 2023. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

<sup>1</sup>Epidemiology, University of Basel Faculty of Science, Basel, Switzerland

<sup>2</sup>Epidemiology and Public Health, Swiss Tropical and Public Health Institute, Basel, Switzerland

<sup>3</sup>Ecole Régionale de Santé Publique, Catholic University of Bukavu, Bukavu, South-Kivu, Congo (the Democratic Republic of the)

**Correspondence to**  
Wyvine Ansima Bapolisi;  
bawiansi@gmail.com

## ABSTRACT

**Objective** In the Democratic Republic of the Congo, there is a low adherence of the population to the use of family planning (FP) due to various social barriers. This study aimed to understand the drives from social barriers to the use of FP in women in the Kivu, a region particularly affected by poverty and many years of conflicts. A theory of planned behaviour (TPB) using a generalised structural equation modelling has been applied to understand the complex sociocultural drivers to the intention and the ultimate decision to use FP.

**Design** Longitudinal study.

**Setting** A community-based approach was used to investigate FP use in the North and South-Kivu regions.

**Participants** Overall, 1812 women 15 years and older were enrolled in the baseline study and 1055 were retrieved during the follow-up.

**Primary and secondary outcomes** FP use and intention to use FP.

**Results** The mean age was  $36 \pm 12.9$  years, with a minimum of 15 years old and a maximum of 94 years old. Among sexually active participants, more than 40% used a modern contraceptive method at the last sexual intercourse. Education was positively and significantly associated with intention to use FP ( $\beta=0.367$ ;  $p=0.008$ ). Being married was positively and marginally significantly associated with intention to use FP ( $\beta=0.524$ ;  $p=0.050$ ). *Subjective norms* were negatively and significantly associated with intention to use FP ( $\beta=-0.572$ ;  $p=0.003$ ) while *perceived control* was positively associated with intention to use FP ( $\beta=0.578$ ;  $p<0.0001$ ). Education and *perceived control* were positively and significantly associated with the use of FP (respectively,  $\beta=0.422$ ,  $p=0.017$ ; and  $\beta=0.374$ ;  $p=0.017$ ), while *Intention to use FP* was positively and marginally significantly associated with the use of FP ( $\beta=0.583$ ;  $p=0.052$ ).

**Conclusion** TPB helped understand sociocultural barriers to FP use and it can be useful to define adapted strategies in different contexts.

## INTRODUCTION

Family planning (FP) refers to policies, services and methods aimed at controlling fertility. The use of FP can help sub-Saharan

### STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study is relevant to embrace the complexity of sociocultural factors associated with family planning use.
- ⇒ Large community-based survey with random selection.
- ⇒ The components used to define *attitudes* and *subjective norms* may not be complete.
- ⇒ Generalised structural equation models design do not allow causal inference.
- ⇒ Most deprived women could not have been included due to lack of enough resources to integrate the intervention group, but they could have been found in control area.

Africa (SSA) countries to fight poverty and hunger.<sup>1</sup> In African countries including the Democratic Republic of the Congo (DRC), researchers have identified many barriers to adhering to FP, all methods confounded, including financial aspects, religious beliefs or couple dynamics.<sup>2,3</sup> On the other hand, children are seen as a sign of wealth; the more children a family has, the wealthier it is considered to be.<sup>3</sup> Moreover, many authors found that the fear of side effects was a principal barrier to the uptake of FP methods.<sup>3-5</sup>

To overcome economic barriers to FP use in DRC, non-governmental organisations (NGOs) are working with the government to promote and provide FP. Social marketing approaches using social networks or mobile apps and media campaigns are widespread to provide information on FP even in remote areas. Many programmes give incentives such as small gifts (soap, etc...) or money for the use of FP or support health facilities so that women and couples can access free FP methods.<sup>6,7</sup> The assumption often underlying such interventions is that FP methods are



unavailable or difficult to access for those who want to use them.<sup>8 9</sup>

Even though FP methods are now more available and affordable throughout countries in SSA, increasing FP use has remained challenging. Despite many individuals' intentions to use a FP method, intention is not always followed by an uptake of FP. Qualitative research has highlighted that social factors that may act as barriers to uptake of contraception are seldom considered when implementing FP programmes.<sup>3 5 10</sup>

The decision to use FP is complex. Therefore, understanding the drivers of behaviour change requires a comprehensive model, such as the theory of planned behaviour (TPB), to understand how knowledge, social norms and beliefs can interfere with women's intentions. Ajzen developed the TPB in 1991.<sup>11–13</sup> TPB states that *attitudes*, *subjective norms* and *perceived behaviour control* are the three components shaping an individual's behaviour and intentions. *Attitudes* are defined by behavioural beliefs that represent an individual's favourable or unfavourable evaluation of the behaviour. *Subjective norms* refer to perceived social pressure from society/individual's community. *Perceived behaviour control* refers to the ease or difficulty of performing a behaviour in different situations.<sup>11</sup>

Many authors used the TPB to study health-related behaviours, including the use of condoms and other contraceptives.<sup>14–17</sup> Its efficacy has been demonstrated for years<sup>12</sup> although some authors postulate that the TPB is out-of-date, raising controversy to understand health behaviours.<sup>18–20</sup> The definition of *perceived control* was among authors' criticisms although it is an important aspect of health behaviour. However, supporters of the theory state that TPB does not need to be retired, rather, extended. They recommend that the application of the theory must be adapted in every context for better operationalization.<sup>21 22</sup>

Using TPB as a framework for analysis, this study provides quantitative evidence on the importance of considering the full range of factors, which influence contraceptive behaviour. This analysis brings to light barriers women encounter when attempting to use FP methods, contributing to the development of adapted strategies to meet first-time contraceptive users' needs.

## METHODS

### Study setting and design

This study is embedded in the impact evaluation of an intervention called *Mawe Tatu* in North and South-Kivu Provinces, DRC. *Mawe Tatu* is a gender transformative approach associating women's empowerment through village savings and loans associations (VSLA) with a 'men engage' component to improve household economies and maternal health. The *Mawe Tatu* project targeted specifically economically vulnerable women in the community. In order to establish associations of sociocultural factors with the use of FP prior to the intervention, this analysis uses the data set of the *Mawe Tatu* evaluation

(baseline and follow-up). A longitudinal cohort study was conducted from May to December 2017, before any sensitisation for gender issues and/or FP had taken place (baseline) and from July 2018 to January 2019 (follow-up), with at least a 1 year interval (exposure) for each participant between the first and last interview. For more details on the *Mawe Tatu* project, the impact evaluation protocol was published elsewhere.<sup>23</sup>

### Study population and sampling

Women eligible for the project or for the control group were identified by using community-based targeting, that is, approaching community leaders to provide listings with vulnerable households and invite women from these households to an initial meeting—but participation in the project was voluntary.<sup>23 24</sup>

The initial sample size calculation was based on the hypothesis that VSLA lower the risk of stunting in children.<sup>23</sup> A two-stage cluster-randomised sampling was used to select first 120 villages in eight health zones (80 in the intervention area and 40 in the control) for inclusion in the study.<sup>23</sup> A second level of random selection was done using the list of all participants in the *Mawe Tatu* project and from the control groups. A control group consisted of a sample of women in villages with no intervention, that is, economically vulnerable women invited to informative sessions on household economy held by community leaders were considered controls, based on a list of those present. For villages with VSLA, 15 (one VSLA) to 25 (>1 VSLA) women participating in a VSLA were then randomly selected for inclusion in the study. In the control villages, 15 women were randomly chosen from the lists of those present at the information meetings.<sup>23 24</sup> More details on the selection were provided elsewhere.<sup>23 24</sup>

Twenty-three thousand women were expected to take part in the *Mawe Tatu* project. The calculated sample size was 1200 women (respectively 800 in the intervention group and 400 in the control group). Ultimately, 1812 women were enrolled in the baseline study and an individual identification number (ID) was assigned to every participant. To ensure that they would be easily retrieved, addresses, the mobile number of participants when available (or mobile number of someone living in the house) and the names of the head of the household were taken. Out of the initial sample, 1055 were retrieved during the follow-up (12 months interval) using the unique ID for individual and households: 748 women were retrieved in the intervention group (93.5% of the calculated sample size) and 307 participants in the control group (76.7% of the calculated sample). The loss to follow-up was mainly due to security reasons in the North-Kivu. Two villages were insecure and could not be reached during the entire period of the follow-up. The other reasons involved the natural movement of the population looking for better places to survive. Sample size calculation was maximised taking into account a high rate of loss to follow-up described in the region.<sup>23</sup>

All women participating in the study aged 15 years and older were included in the present analysis.

### Patient and public involvement

The public was involved in the conduct and dissemination plans of the research. Stakeholders and the community guided the researchers in the field and dissemination sessions were planned to obtain the community's feedback on the findings and ways forward.

### Data collection

Survey data were collected via electronic tablets using the Open Data Kit software package. To control bias, additionally to the random selection, a team of local researchers fluent in the locally spoken languages was trained over a week in data collection methods, followed by a pilot study. Data were directly saved on a secure server located at the Swiss Tropical and Public Health Institute in Basel, Switzerland.

### Instrument

The impact evaluation questionnaire included Demographic Health Surveys-validated questions about the use of FP and knowledge of different contraceptive methods: 'Did you ever use a contraceptive?'; 'Did you use any contraceptive at last sex intercourse?'; 'Use of modern contraceptive at last sex intercourse?'; 'Who in a couple should, according to you, decide the use of a contraceptive?'

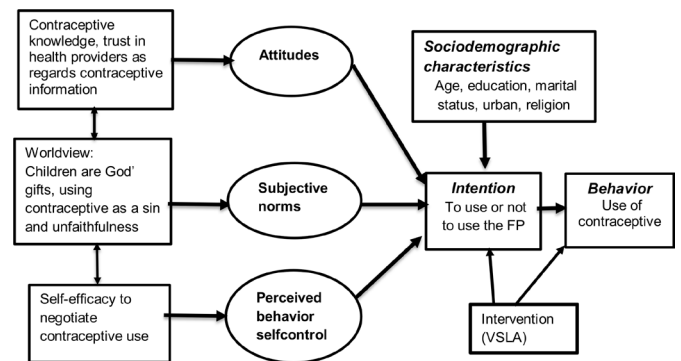
The content validity of the questionnaire was assessed by Public health experts from the Swiss Tropical and Public Health Institute and Catholic University of Bukavu (Content validity index=0.95). Test-retest reliability of the questionnaire was obtained by administering the questionnaire two times to the same 30 households after 2 weeks interval in a semi-urban rural health zone, Casha.

To control sociodemographic factors that may affect the use of FP, we also recorded participant's age, education level, religion (catholic or other), provenance (urban, semirural or rural) and marital status (married/in couple or single).

### Data analysis

Descriptive statistics were calculated for sociodemographic variables, and FP use-related questions (uptake of contraceptives, decision-making on the use within the couple).

FP pathways have been studied in the past using many types of regression analyses. However, to address the complexity of FP uptake, especially in the study region, the use of generalised structural equation modelling (GSEM) appeared appropriate when building the model of the TPB. GSEM is a multivariate statistical analysis technique used to analyse structural relationships between variables and latent constructs. GSEM is a combination of factor analysis and multiple regression analysis using endogenous and exogenous variables. Structural equation modelling has been used previously to determine the utilisation of condoms or other contraceptive methods.<sup>25 26</sup>



**Figure 1** TPB model built from existing qualitative findings. FP, family planning; VSLA, village savings and loans associations; TPB, theory of planned behaviour.

Data with missing values were discarded. Analyses were performed using Stata V.15.0.

### Model specification

To build the model of planned behaviour, qualitative findings from previous researches were used<sup>3 27 28</sup> (figure 1)

This TPB model analyses pathways linking *personal beliefs* (attitudes, subjective norms in the society and *perceived control*), *intention to use or not a FP method* and the *uptake of the behaviour* (use of a FP method) (figure 1).

To identify and confirm the underlying structure of latent variables in the GSEM, different factors were tested using factor exploratory analysis. Factor exploratory analysis identified the number of latent constructs and the underlying factor structure of the TPB *attitudes*, *subjective norms* and *perceived control*. The confirmatory factor analysis (CFA) examined the appropriateness and generalisability of the measurement portion of the GSEM. Factor loadings >0.4 were retained.

Two 'yes/no' items reflecting knowledge and behaviour beliefs on contraceptives measured 'Attitudes': (1) 'Contraceptive methods obtained at a health facility, are of good quality' and (2) 'I trust in what health professionals in this community say about contraceptives'.

Three 'yes /no' items constructed 'subjective norms': (1) 'Children are a gift of God. Contraceptives should not be used'; (2) 'The use of contraceptives is a sin' and (3) 'The use of contraceptives encourages infidelity'.

To assess 'the *perceived control* on behaviour', two 'yes/no' items were considered: (1) 'If my partner and I want to have sex and I want to protect myself I can always convince him/her to use protection'; and (2) 'If your partner wants to have sexual relations with you, do you think you can convince him/her to use a contraceptive method?'

### Primary and secondary outcomes

The '*intention* to use a contraceptive method' was assessed by the question: 'Even if you have never used a method, we would like to learn about your preferences: which contraceptive method do you or would you prefer?' Intention to use any FP was coded '1' if the woman cited one modern contraceptive method and '0' otherwise. In

**Table 1** Sociodemographic characteristics

Variables	Baseline		Follow-up	
	Frequency Mean/SD	%	Frequency Mean/SD	%
Age (years)	36.0±12.9		37.8±12.5	
Education	<b>n=1806</b>		<b>n=1055</b>	
None	345	19.1	217	20.6
Primary	599	33.2	316	30.0
Secondary	765	42.3	469	44.6
University	97	5.4	51	4.8
Marital status	<b>n=1740</b>		<b>n=1055</b>	
Single	420	23.2	218	20.7
Married/couple	1320	76.8	837	79.3
Number of children	5±3	5±3	6±3	
Religion	<b>n=1806</b>		<b>n=1055</b>	
Catholic	959	53.1	606	57.4
None catholic	847	46.9	449	42.6
Urban	<b>n=1471</b>		<b>n=1055</b>	
Urban	317	21.6	234	26.4
Semiurban	940	63.9	555	62.6
Rural	214	14.5	97	11.0
Intervention	<b>n=1806</b>		<b>n=1055</b>	
VSLA	1225	67.6	748	70.9
Control	587	32.4	307	29.1

VSLA, village savings and loans associations.

the present analysis, we consider baseline values to define the *intention* to use.

The behaviour, the 'use of a FP method', was defined by the use of a modern FP method during the last 12 months. For the final analysis, the outcome included all new users of modern FP at follow-up, excluding those who were already using it at baseline.

The coefficient of determination of 0.951 and the Standardised Root Mean Square Residual of 0.074 (less than 0.08) indicated that the model fit our data.<sup>29</sup> The potential confounding effects of the intervention (being member of VSLA) and sociodemographic characteristics such as age, religion, provenance (rural or urban), education and marital status were controlled. Only education and perceived self-control were significantly associated (at level of 0.10) with the use of FP in a binary association controlling for intention, therefore, we kept these associations in the final model.

## RESULTS

### Descriptive results

Table 1 indicates the sociodemographic characteristics of the participants in the study.

The mean age was 36±12.9 years, with a minimum of 15 years old and a maximum of 94 years old at the beginning

of the study. Over 76% of the study participants were married (table 1).

Table 2 details participants' uses of contraceptive methods. The results are presented separately for single women and married women/living together with their partners.

Approximately 76.9% of the participants in the study thought that the couple must decide together whether to use a contraceptive, while only 70.6% thought the same (table 2). Among participants who were sexually active, more than 40% used a modern contraceptive method at the last sexual intercourse (table 2). At the baseline, 29.3% used modern FP during the past 12 months, whereas 34.0% used FP during the follow-up; 19.7% were defined as new users during the endline. Approximately, 57.1% of the participants at baseline thought that the couple must decide together whether to use a contraceptive compared with 63.8% during the follow-up (table 2).

### Factor analysis results

Three factors (eigenvalues>1.0) emerged as results in the factor analysis (table 3): *attitudes* (two indicators), *subjective norms* (three indicators) and *perceived control* (two indicators).

### SEM results

The final adjusted SEM results are presented in figure 2 and table 4. The standard path coefficients and p-values in the standardised metric are reported (figure 2 and table 4).

Education (high level) was positively and significantly associated with intention to use FP ( $\beta=0.367$ ;  $p=0.008$ ). Being married was positively and marginally significantly associated with intention to use FP ( $\beta=0.524$ ;  $p=0.050$ ) (table 4). Among latent constructs, *subjective norms* was negatively and significantly associated with intention to use FP ( $\beta=-0.572$ ;  $p=0.003$ ), while *perceived control* was positively associated with intention to use FP ( $\beta=0.578$ ;  $p<0.0001$ ). Education and *perceived control* were positively and significantly associated with the use of FP (respectively,  $\beta=0.422$ ,  $p=0.017$ ; and  $\beta=0.374$ ;  $p=0.017$ ), while *Intention to use FP* was positively and marginally significantly associated with the use of FP ( $\beta=0.58$ ;  $p=0.050$ ) (table 4).

## DISCUSSION

The percentage of those who used a contraceptive method in our sample population was low (36% during the follow-up) and is similar to other study findings elsewhere in DRC.<sup>30 31</sup> In the last decade, many NGOs made contraceptive methods free or available at a lower cost in the Kivu region, which can explain why the prevalence of contraceptive use is higher compared with other regions.<sup>32-34</sup>

Education was significantly associated with the use of contraceptives, corroborating findings from existing literature that higher education enhances women's ability

**Table 2** Use of contraceptives

Variables	Baseline		Follow-up	
	Frequency	%	Frequency	%
Did you ever use a contraceptive?	<b>n=1709</b>		<b>n=1015</b>	
Yes	583	34.1	365	36.0
No	1126	65.9	650	64.0
Use of contraceptive at last sexual intercourse	<b>n=567</b>	%	<b>n=359</b>	%
Yes	365	64.4	204	56.8
No	202	35.6	155	43.2
Use of modern contraceptive at last sexual intercourse	<b>n=567</b>	%	<b>n=359</b>	%
Yes	243	42.9	130	36.2
No	324	57.1	229	63.8
Who in a couple should, according to you, decide the use of a contraceptive?	<b>n=1673</b>	%	<b>n=997</b>	%
Myself	121	7.2	55	5.5
My partner	299	17.9	150	15.1
The couple together	1253	74.9	792	79.4
Who decides within your couple the use of a contraceptive?	<b>n=573</b>	%	<b>n=357</b>	%
Myself	117	20.4	82	23.0
My partner	85	14.8	55	15.4
The couple together	371	64.8	220	61.6
FP last 12 months	<b>n=583</b>	%	<b>n=365</b>	%
Yes	171	29.3	124	34.0
No	412	70.7	241	66.0
FP new users	–	–	72	19.7

FP, family planning.

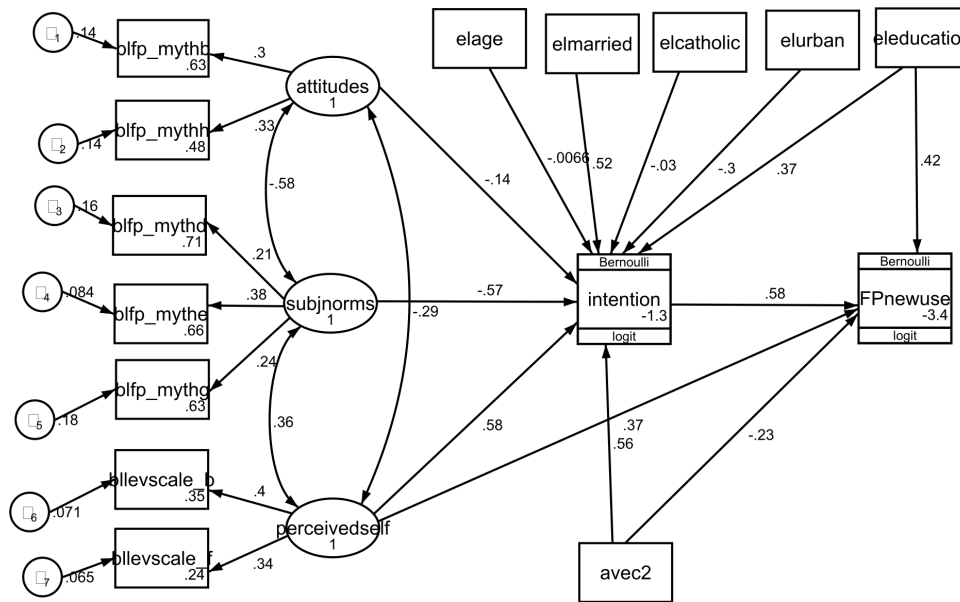
to make reproductive choices including contraceptive use.<sup>32 35–37</sup> Education ‘corrupts’ peoples’ normative values and ways of seeing the world, which can include changing women’s perspective on fertility. Fertility preference becomes a ‘calculus of conscious choice’<sup>38 39</sup> rather

than a predetermined destiny. In addition, schooling changes the objective conditions under which women and couples’ decisions are made such as by increasing the opportunity cost of women’s labour.<sup>40 41</sup> To enhance their career, educated women are more likely to use FP

**Table 3** Factor analysis for indicators of the TPB

Latent construct	Items included in the survey	Factor loadings EFA	Determinant of the correlation
Attitudes	Contraceptive methods, which are obtained at a health facility, are of good quality.	0.539	0.838
	I trust in what health professionals in this community say about contraceptives.	0.500	
Subjective norms	Children are a gift of God. Contraceptives should not be used.	0.574	0.767
	The use of contraceptives is a sin.	0.488	
	The use of contraceptives encourages infidelity.	0.445	
Perceived control	If my partner and I want to have sex and I want to protect myself, I can always convince him/her to use protection.	0.694	0.638
	If your partner wants to have sexual relations with you, do you think you can convince him/her to use a contraceptive?	0.695	

All factor loadings were significant at  $p < 0.05$  (table 3).  
EFA, exploratory factor analysis; TPB, theory of planned behaviour.



**Figure 2** GSEM results explaining the TPB. GSEM, generalised structural equation modelling; TPB, theory of planned behaviour.

because they can decide how many children they want and when to have them.

The model constructed fits our data well and significantly predicted contraceptive use. In a given society, as Ajzen<sup>11</sup> postulated, behaviour is shaped by the interaction between *attitudes*, *subjective norms* and *perceived behaviour control*.<sup>11</sup> These factors lead to *intention* before adoption—or not—of the designed behaviour. Authors found that misconceptions and misinformation were associated

with lower contraception use.<sup>42 43</sup> However, in our survey, (mis)trust of health providers or knowing where to get information (defining *attitudes*) was not statistically associated with the use of FP. This reflects that an individual’s knowledge and favourable evaluation of FP might not necessarily lead to its use. Some other factors rooted in social life may be more decisive.

In our study context, *subjective norms* are first rooted in religion as contraceptive use is considered a sin. People choose not to use a contraceptive to avoid feeling guilty, judgement by society or punishment by God. Many other studies have also found that religious beliefs were barriers to contraceptive use.<sup>5 31 44 45</sup> The literature describes religious barriers in terms of blanket prohibition and many religious communities are against the use of FP in the study region.<sup>45 46</sup>

We also found, like other studies in comparable contexts, that children are considered as ‘gifts from God’, and therefore it is wrong to use contraceptives to avoid pregnancy.<sup>10 27</sup>

Moreover, our findings suggest that power dynamics within the couple are a strong predictor of contraceptive use. While FP use ideally requires the implication of both partners, the male partner is more often the key decision-maker.<sup>47</sup> Existing literature states that partner’s opposition is a limiting factor for women to use FP.<sup>28 33 48 49</sup> In these male-dominant societies, partner’s opposition can result from many reasons like personal beliefs against FP use or society’s pressure.

Across low-income and middle-income contexts, the communities perceive there is no need to use FP within marriage. Furthermore, the conviction that someone using contraceptive methods is susceptible to being unfaithful is another limiting factor to use FP.<sup>28</sup> When a married woman uses contraceptive methods (mainly

Table 4 Standardised path coefficients of the latent variables GSEM		
Variables		
Intention	β (95% CI)	P value
Endogenous variables		
Attitudes	-0.136 (-0.573 to 0.299)	0.539
Subjective norms	<b>-0.572 (-1.013 to 0.131)</b>	<b>0.003</b>
Perceived self-control	<b>0.578 (0.293 to 0.862)</b>	<b>&lt;0.0001</b>
Exogenous variables		
Age	-0.006 (-0.024 to 0.011)	0.474
Marital status	<b>0.524 (0.0007 to 1.048)</b>	<b>0.050</b>
Religion	-0.029 (-0.462 to 0.403)	0.893
Urban	-0.295 (-0.660 to 0.069)	0.113
Education	<b>0.367 (0.097 to 0.636)</b>	<b>0.008</b>
Intervention	<b>0.563 (0.108 to 1.019)</b>	<b>0.015</b>
Contraception use		
Education	<b>0.422 (0.076 to 0.767)</b>	<b>0.017</b>
Intervention	-0.025 (-0.771 to 0.32)	0.419
Perceived self-control	<b>0.374 (0.067 to 0.682)</b>	<b>0.017</b>
Intention	<b>0.583 (-0.005 to 1.171)</b>	<b>0.052</b>
Statistically significant results (p < 0.05) are presented in bold GSEM, generalised structural equation modelling.		

without her partner's knowledge) that implies she has extraconjugal affairs and does not want to be caught with an unexpected pregnancy.<sup>28 50</sup> However, previously, researchers highlighted that some women are ready to use contraceptive methods without their partner's knowledge<sup>27</sup> to protect themselves from approaching births and consequences.

The third element of TPB, *perceived behaviour control*, was illustrated in our study as perceived control over the decision to use any FP method. Women with enough confidence and capacity within their partnership to negotiate the use of contraceptives are most likely to use a contraceptive method, corroborating other findings.<sup>51 52</sup> Through education and financial independence, women acquire negotiation skills empowering them to raise and fight for their own opinions within the couple.<sup>37</sup>

The intervention was not statistically associated with an increased in the use of FP. The results also demonstrated that before any intervention, women who joined the VSLA were already more likely to have an intention to use FP. The short-term interval (1 year between the baseline and the follow-up) might explain why we did not see any change in the use of FP despite the expressed intention. However, it is not excluded that *subjective norms* could have prevented them from taking action. A long-term evaluation could help understand better all the interactions.

Many FP interventions focus on health system-based solutions such as information campaigns and increasing availability of FP methods. This study contributes to the growing literature base and shows that health system-related factors do not seem to play a dominant role in contraceptive uptake. Rather, subjective norms such as religion and couple power dynamics, namely women's low bargaining power, remain crucial considerations to increase FP uptake.

### Limitations

The selection of the two groups (intervention and control) was done randomly assuring the representability of the population of selected areas. However, due to the self-selection in VSLAs groups, it is not excluded that some women could have been marginalised either because they were too poor to afford the weekly contribution in VSLA or because of a poor social network. These analyses cannot necessarily be generalised to all the population given the self-selection of participants in the groups.

Another limitation is that the definition of certain concepts like subjective norms could not have been exhaustive. We only considered the measurements reported in an existing questionnaire, which was broader and covering many aspects. However, others have used the same scales or items to understand the use of FP in similar settings. Finally, some control variables such as employment status were not taken in account because they did not fit in the GSEM. However, before discarding them, we ran univariate and bivariate regressions of employment status over intermediary and dependent variables (intention and/or use of FP) and the associations were

not statistically significant, which reinforced our decision of not considering them.

### Policy implications

To circumvent barriers to FP use, programmes should:

- ▶ Promote women's education to empower women by raising their self-efficacy to negotiate the use of contraceptives when needed.
- ▶ Consider addressing gender norms and other cultural aspects with religious leaders and other stakeholders.
- ▶ Fight against subjective norms by providing accurate information on FP use to the two partners and the community.

### CONCLUSION

A TPB, using a GSEM, allowed us to demonstrate that the use of contraceptives is deeply related to one's perception of contraceptive use and many other sociocultural constructs. Education, *subjective norms* (children are gifts from God, the use of contraceptive is sin, contraceptive use encourages infidelity), and *perceived control* (self-efficacy to negotiate the use of contraceptives) influence a woman's intention to use FP. Programmes promoting FP use must take into account the empowerment of women to give them accurate information and involve the male partner in sensitisation sessions.

**Acknowledgements** The authors acknowledge Christian Schindler for assistance with statistical features. The authors also acknowledge Mari Dumbaugh who revised the manuscript for critical important content. We also acknowledge Giovanfrancesco Ferrari, all research assistants and local partners for their help during the data collection.

**Contributors** SM and WAB were involved in conception, writing the study protocol, formulating the study, training for data collectors, supervising data collection process. WAB drafted the manuscript. SM and GB critically revised subsequent versions for important intellectual content. All authors have read and approved the final version of the manuscript. Christian Schindler helped with the statistical analyses. WAB is the author acting as the guarantor for this study.

**Funding** The research activities in the field were funded by the non-governmental organisation CARE. Swiss theory of planned behaviour was subcontracted for monitoring and evaluation of the Mawe Tatu programme.

**Disclaimer** The funder did not influence the study design, nor the data collection or analysis and interpretation of data.

**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were involved in the design, or conduct, or reporting or dissemination plans of this research. Refer to the Methods section for further details.

**Patient consent for publication** Not required.

**Ethics approval** This study involves human participants and was approved by The EKNZ Ethical committee (Ethik Kommission Nord-und Zentralschweiz No EKNZ BASEC UBE 2016-01878) in Switzerland and the Ethics Committee of the Catholic University of Bukavu (No UCB/CIE/NC/019/2016) approved the main research proposal for the impact evaluation of the 'Mawe Tatu' intervention in 2016. Informed verbal and written consent was obtained from each individual before the beginning of the survey. Confidentiality was guaranteed. For participants below 18 years old, written consent from the parent or legal tutor were obtained. Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available upon reasonable request. Data set generated and analysed are not publicly available due to confidentiality and anonymity of study population. Data sets are stored on a secure Alfresco website and are available from the corresponding author on reasonable request.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

#### ORCID iD

Wyvine Ansima Bapolisi <http://orcid.org/0000-0001-8504-6953>

#### REFERENCES

- Alhaji AA. Family planning services in africa: the successes and challenges. In: Zouhair OA, ed. *Family Planning*. Rijeka: IntechOpen, 2018: 5.
- Tilahun T, Coene G, Temmerman M, et al. Spousal discordance on fertility preference and its effect on contraceptive practice among married couples in jimma zone, Ethiopia. *Reprod Health* 2014;11:27.
- Muanda MF, Ndongo GP, Messina LJ, et al. Barriers to modern contraceptive use in rural areas in DRC. *Cult Health Sex* 2017;19:1011–23.
- Schrumpf LA, Stephens MJ, Nsarko NE, et al. Side effect concerns and their impact on women's uptake of modern family planning methods in rural Ghana: a mixed methods study. *BMC Womens Health* 2020;20:57.
- Schwarz J, Dumbaugh M, Bapolisi W, et al. "So tha"s why "m scared of these methods": locating contraceptive side effects in embodied life circumstances in burundi and eastern democratic republic of the congo. *Soc Sci Med* 2019;220:264–72.
- Dumbaugh M, Bapolisi W, van de Weerd J, et al. Evaluating the comparative effectiveness of different demand side interventions to increase maternal health service utilization and practice of birth spacing in South kivu, Democratic Republic of Congo: an innovative, mixed methods approach. *BMC Pregnancy Childbirth* 2017;17:212.
- Ali M, Azmat SK, Hamza HB, et al. Are family planning vouchers effective in increasing use, improving equity and reaching the underserved? an evaluation of a voucher program in Pakistan. *BMC Health Serv Res* 2019;19:200.
- Casey SE, Tshipamba M. Contraceptive availability leads to increase in use in conflict-affected democratic republic of the congo: evidence from cross-sectional cluster surveys, facility assessments and service statistics. *Confl Health* 2017;11:2.
- Ali M, Farron M, Ramachandran Dilip T, et al. Assessment of family planning service availability and readiness in 10 African countries. *Glob Health Sci Pract* 2018;6:473–83.
- Kabagenyi A, Reid A, Ntozi J, et al. Socio-cultural inhibitors to use of modern contraceptive techniques in rural Uganda: a qualitative study. *Pan Afr Med J* 2016;25:78.
- Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 1991;50:179–211.
- Armitage CJ, Conner M. Efficacy of the theory of planned behaviour: a meta-analytic review. *Br J Soc Psychol* 2001;40(Pt 4):471–99.
- Godin G, Kok G. The theory of planned behavior: a review of its applications to health-related behaviors. *Am J Health Promot* 1996;11:87–98.
- Ayodele O. The theory of planned behavior as a predictor of HIV testing intention. *Am J Health Behav* 2017;41:147–51.
- Banas K, Lyimo RA, Hoppers HJ, et al. Predicting adherence to combination antiretroviral therapy for HIV in Tanzania: a test of an extended theory of planned behaviour model. *Psychol Health* 2017;32:1249–65.
- Gilissen J, Pivodic L, Gastmans C, et al. How to achieve the desired outcomes of advance care planning in nursing homes: a theory of change. *BMC Geriatr* 2018;18:47.
- Brein DJ, Fleenor TJ Jr, Kim S-W, et al. Using the theory of planned behavior to identify predictors of oral hygiene: a collection of unique behaviors. *J Periodontol* 2016;87:312–9.
- Rhodes RE. Will the new theories (and theoreticians!) please stand up? A commentary on sniehotta, presseau and araujo-soares. *Health Psychol Rev* 2015;9:156–9.
- Sniehotta FF, Presseau J, Araujo-Soares V. Time to retire the theory of planned behaviour. *Health Psychol Rev* 2014;8:1–7.
- Head KJ, Noar SM. Facilitating progress in health behaviour theory development and modification: the reasoned action approach as a case study. *Health Psychol Rev* 2014;8:34–52.
- Ajzen I. The theory of planned behaviour is alive and well, and not ready to retire: a commentary on sniehotta, presseau, and araujo-soares. *Health Psychol Rev* 2015;9:131–7.
- Conner M. Extending not retiring the theory of planned behaviour: a commentary on sniehotta, presseau and araujo-soares. *Health Psychol Rev* 2015;9:141–5.
- Bapolisi WA, Ferrari G, Blampain C, et al. Impact of a complex gender-transformative intervention on maternal and child health outcomes in the eastern Democratic Republic of Congo: protocol of a longitudinal parallel mixed-methods study. *BMC Public Health* 2020;20:51.
- Bapolisi WA, Ferrari G, Bisimwa G, et al. Gendered determinants of food insecurity in ongoing regional conflicts, North and South kivu, the Democratic Republic of Congo. *Agric & Food Secur* 2021;10.
- Hardee K, Patterson KP, Schenck-Fontaine A, et al. Family planning and resilience: associations found in a population, health, and environment (Phe) project in Western Tanzania. *Popul Environ* 2018;40:204–38.
- Noar S, Morokoff P. The relationship between masculinity ideology, condom attitudes, and condom use stage of change: a structural equation modeling approach. *International Journal of Men's Health* 2002;1:43–58.
- Dumbaugh M, Bapolisi W, Bisimwa G, et al. Navigating fertility, reproduction and modern contraception in the fragile context of south kivu, democratic republic of congo: "les enfants sont une richesse." *Cult Health Sex* 2019;21:323–37.
- Wulifan JK, Brenner S, Jahn A, et al. A scoping review on determinants of unmet need for family planning among women of reproductive age in low and middle income countries. *BMC Womens Health* 2016;16:2.
- Schreiber JB, Nora A, Stage FK, et al. Reporting structural equation modeling and confirmatory factor analysis results: a review. *Educ Res J* 2006;99:323–38.
- Ministère du Plan et Suivi de la Mise en œuvre de la Révolution de la Modernité (MPSMRM). *République Démocratique du congo enquête Démographique et de santé (EDS-RDC) 2013-2014*. Rockville, Maryland, USA, 2014.
- Ntambue AM, Tshiala RN, Malonga FK, et al. Use of modern contraceptive methods in the democratic republic of the congo: prevalence and barriers in the health zone of dibindi, mbuji-mayi. *Pan Afr Med J* 2017;26:199.
- Kandala N-B, Lukumu FK, Mantempa JN, et al. Disparities in modern contraception use among women in the Democratic Republic of Congo: a cross-sectional spatial analysis of provincial variations based on household survey data. *J Biosoc Sci* 2015;47:345–62.
- Casey SE, Gallagher MC, Dumas EF, et al. Meeting the demand of women affected by ongoing crisis: increasing contraceptive prevalence in North and South kivu, Democratic Republic of the Congo. *PLoS One* 2019;14:e0219990.
- Rattan J, Noznesky E, Curry DW, et al. Rapid contraceptive uptake and changing method mix with high use of long-acting reversible contraceptives in crisis-affected populations in chad and the democratic republic of the congo. *Glob Health Sci Pract* 2016;4 Suppl 2:S5–20.
- Castro Martín T. Women's education and fertility: results from 26 demographic and health surveys. *Stud Fam Plann* 1995;26:187–202.
- Azmat SK, Ali M, Ishaque M, et al. Assessing predictors of contraceptive use and demand for family planning services in underserved areas of punjab province in pakistan: results of a cross-sectional baseline survey. *Reprod Health* 2015;12:25.
- Solanke BL. Factors influencing contraceptive use and non-use among women of advanced reproductive age in Nigeria. *J Health Popul Nutr* 2017;36:1.
- van de Walle E. Fertility transition, conscious choice, and numeracy. *Demography* 1992;29:487–502.
- Ajou University, Kim J. Female education and its impact on fertility. *Izawol* 2016;228.
- Brinton MC, Oh E. Babies, work, or both? highly educated women's employment and fertility in East Asia. *American Journal of Sociology* 2019;125:105–40.
- Carolyn C, Manoel B. *Education and fertility: panel evidence from sub-saharan africa department of economics working paper series*. South Africa: University of Pretoria, 2015.
- Sedgh G, Hussain R. Reasons for contraceptive nonuse among women having unmet need for contraception in developing countries. *Stud Fam Plann* 2014;45:151–69.
- Muanda M, Gahungu Ndongo P, Taub LD, et al. Barriers to modern contraceptive use in kinshasa, DRC. *PLoS One* 2016;11:e0167560.
- Izale K, Govender I, Fina J-P, et al. Factors that influence contraceptive use amongst women in vanga health district, democratic republic of congo. *Afr J Prim Health Care Fam Med* 2014;6:E1–7.

- 45 Kaniki FR. Factors influencing the use of modern contraceptive methods among rural women of child bearing age in the Democratic Republic of the Congo. *J Family Med Prim Care* 2019;8:2582–6.
- 46 Mpunga D, Lumbayi JP, Dikamba N, *et al.* Availability and quality of family planning services in the Democratic Republic of the Congo: high potential for improvement. *Glob Health Sci Pract* 2017;5:274–85.
- 47 Hillhorst D, Bashwira MR. *The women's movement in south kivu, DRC: A civil society analysis*. Special Chair Humanitarian Aid and Reconstruction, 2014.
- 48 Warren N, Alvarez C, Makambo MT, *et al.* “ before the war we had it all ”: family planning among couples in a post-conflict setting. *Health Care Women Int* 2017;38:796–812.
- 49 Matungulu CM, Kandolo SI, Mukengeshayi AN, *et al.* Determinants of contraceptive use in mumbunda health zone in lubumbashi, democratic republic of congo. *Pan Afr Med J* 2015;22:329:329..
- 50 Mtenga SM, Pfeiffer C, Tanner M, *et al.* Linking gender, extramarital Affairs, and HIV: a mixed methods study on contextual determinants of extramarital affairs in rural Tanzania. *AIDS Res Ther* 2018;15:12.
- 51 Adanikin AI, McGrath N, Padmadas SS. Power relations and negotiations in contraceptive decision-making when husbands oppose family planning: analysis of ethnographic vignette couple data in Southwest Nigeria. *Cult Health Sex* 2019;21:1439–51.
- 52 Shakya HB, Dasgupta A, Ghule M, *et al.* Spousal discordance on reports of contraceptive communication, contraceptive use, and ideal family size in rural India: a cross-sectional study. *BMC Womens Health* 2018;18:147.