1. Introduction

In recent days, more than in the past, improving access to family planning has become an international goal. Since Cairo ICPD in 1994, access to contraception is presented as a right, men, and women's right to decide freely on the number and the spacing of their children. However, access to family planning was not mentioned in the first iteration of the Millennium Development Goals, and MDG 5 (increasing maternal health) was among the less successful goals. To hasten progress, the London Summit in 2012 and the ensuing FP2020 initiative aimed at: "*expanding access to family planning information, services, and supplies to an additional 120 million women and girls in the world's poorest countries by 2020*" (Choi et al. 2016a, p.145). The Sustainable development goals (SDGs) 3.7 and 5.6 continue to stress the importance of access when asking for "*universal access to sexual and reproductive health-care services, including for family planning*" and "*universal access to sexual and reproductive health and reproductive rights*," respectively, by 2030 (United Nations 2017).

What is access to family planning? Once women or couples express a demand for pregnancy avoidance and their risk of unintended pregnancy is established, current human-rights based contraceptive guidelines indicate that health staff should aim at delivering to these individuals a modern method (either medical or natural such as LAM or cycle beads). Women/couples are free to choose among these methods, and to decline the service offered (WHO 2014). Accessibility of contraceptive services is the degree to which women and couples with a demand for pregnancy avoidance obtain a medically approved form of contraception, whether obstacles come from the supply side or the demand side (refusal to use). Lots of scholars have studied access to health care and family planning services, especially in the developing world (Cates and Burris 2010; Cochrane and Guilkey 1991; Dennis and Grossman 2012; Ravindran and Fonn 2011; Skiles et al. 2015; Welsh et al. 2006). Research findings show that the availability of services is an essential factor of contraceptive use (Skiles et al. 2015). The lack of physical access may drive users to rely on a limited number or less efficient contraceptive method (Jacobstein and Stanley 2013; Tibaijuka et al. 2017). But other research shows that lots of women are blocked by cognitive and psychosocial (bad information, opposition, fear) obstacles to contraceptive use (Choi et al. 2016b).

However, few attempts have been made to understand and collect information on those obstacles in sub-Saharan Africa and in other low-contraceptive prevalence and high unmet need regions (Wood et al. 2020). Some past studies have analyzed the relation between women's empowerment and sexual and reproductive health outcomes (Crissman et al. 2012; Sedlander et al. 2018), or between autonomy, decision making, and contraceptive use (Al Riyami et al. 2004; Bamiwuye et al. 2013; Ghose et al. 2017). Some other have concerned various forms of approval and contraceptive use (Anguzu et al. 2014; Armstrong et al. 1995; Rossier 2007).

The literature shows three main frameworks used to approach access to health (Bertrand et al. 1995; Penchansky and Thomas 1981; UNCESCR 2000). These three approaches considered six dimensions of access to contraception: "cognitive accessibility, psychosocial accessibility, geographic accessibility, service availability/quality, administrative accommodation and affordability" (Choi et al., 2016, p. 148). These six different aspects of access can be categorized into two perspectives: demand for modern contraception side and supply side (in situations when women or couples do not want pregnancy and could conceive). In a demand-side perspective, we find the issues of cognitive and psychosocial accessibility, while the four other dimensions fit into supply aspects (Choi et al., 2016). While good attention has been given to supply-side dimensions, especially financial and logistical barriers to contraceptive use in the international FP programs arena (Seiber and Bertrand 2002) less is known about how individuals perceive contraception issues and how these considerations weigh on their decisions (Dehlendorf et al. 2020). Indeed, cognitive and psychosocial accessibility got less attention with a scarcity of data and studies on them, even though it had been shown that these dimensions become the bottleneck, especially when contraceptive methods are more available (Lesthaeghe and Vanderhoeft 2001). Psychosocial accessibility remains largely undefined under a "cultural /social" blanket, which includes items as diverse as gender inequality, socially disapproved sexual activity, fears of side effects, or religious opposition to fertility regulation. Besides, there is confusion on the definition of these dimensions of accessibility, with terms such as "beliefs" “attitude,” or “subjective costs” of fertility regulation taking central stage, but with a variety of operationalizations. This probably dates back to the framework of Easterlin: “*the costs of fertility regulation include* *subjective costs ("attitudes") as well as the time and money necessary to learn about and use specific techniques ("[other problem of] access")*" (Easterlin 1975, p.57).

In what follows, we propose to make progress on the definition and measurement of cognitive and psychosocial access first by detailing the concept of attitude and beliefs as used in the contraceptive literature. Then we will propose a new, more comprehensive framework for the cognitive and psychosocial dimensions of accessibility, including several sub-dimensions, before reviewing questions used so far to capture them in data collection.

2. Constructing a new framework

The main frameworks we use to understand the concept of attitude are those from Kothandapani (1971), Paul (1990), Ajzen (2005), Kincaid's (2000). The review of this concept leads us to four subdimensions of cognitive and psychosocial accessibility.

2.1 The concept of attitude and its subdimensions

In a study from the 1970s, Kothandapani (1971) tested the hypothesis of three dimensions that compose the concept of attitude and that influence the use of contraception: an affective component that concerns the feeling for the object, a cognitive dimension that involves beliefs about the object, and a behavioral dimension about the intention to act. He used four different measures constructed by the following methods: Thurstone Scale (Method of Equal-Appearing Intervals), Likert Scale (Method of Summated Ratings), Guttman Scales (Scalogram Analysis), and Gulljord Self-Rating Scale. At the end of the study, he confirmed the tripartite classification of attitude in the three dimensions above, and that the "intention to act" is the best predictor (Kothandapani 1971).

In one of his articles, Paul (1990) used Fishbein's approach, which dates back to the 1960s but had been little used in family planning research. Paul (1990) distinguishes between intention concerning contraception in general and intention toward specific contraceptive methods. However, unlike the previous approach used by Kothandapani, where the intention to act was part of the attitude, here, attitude is seen as a determinant of intention. He noticed that: "*attitude toward contraception, in general, global motivation, and method-specific attitude were the three important determinants of the intention to use birth control pills in the area*" (Paul 1990, p.137). Here, the "*attitude towards contraception in general*" was measured by three variables, sexual morals, feeling guilty, and removal of worries about becoming pregnant. The "global motivation" is measured through the approval of the husband, friends, and religion. The "method-specific attitude" is about fears of side effects, method reliability, and convenience to use (Paul 1990).

Ajzen (2005) defines attitude as "*a disposition to respond favorably or unfavorably to an object, person, institution, or event*" (Ajzen, 2005, p. 3). He also notes that attitude is a hypothetical construct that cannot be directly observed and must be inferred from measurable responses (Ajzen 2005). Based on research by authors such as Allport (1954), McGuire (1965), and Hilgard (1980), Ajzen notes that there are three categories of measures of attitudes: cognition (belief about the object), affect (feelings toward the object), and conation (behavioral intentions), that are documented using verbal and non-verbal responses (Ajzen, 2005). According to his definition of attitude, we found that the three dimensions coincide with those tested by Kothandapani (1971). The theory of planned behavior, based on Ajzen's model, has since then been used to study reproductive behaviors (Rossier and Bernardi 2009); this model stipulates that intention towards a behavior is based on three elements: the person's attitude towards that behavior, the attitude of those around him or her (subjective norm), and the person's perception of his or her ability to implement it (perceived behavioral control). In this iteration of the model, affects and beliefs have been put on the side, but motivation is more detailed, as this dimension is captured not only by intention (to use contraception) but also by self-assessed ability to succeed (which we will call "contraceptive agency").

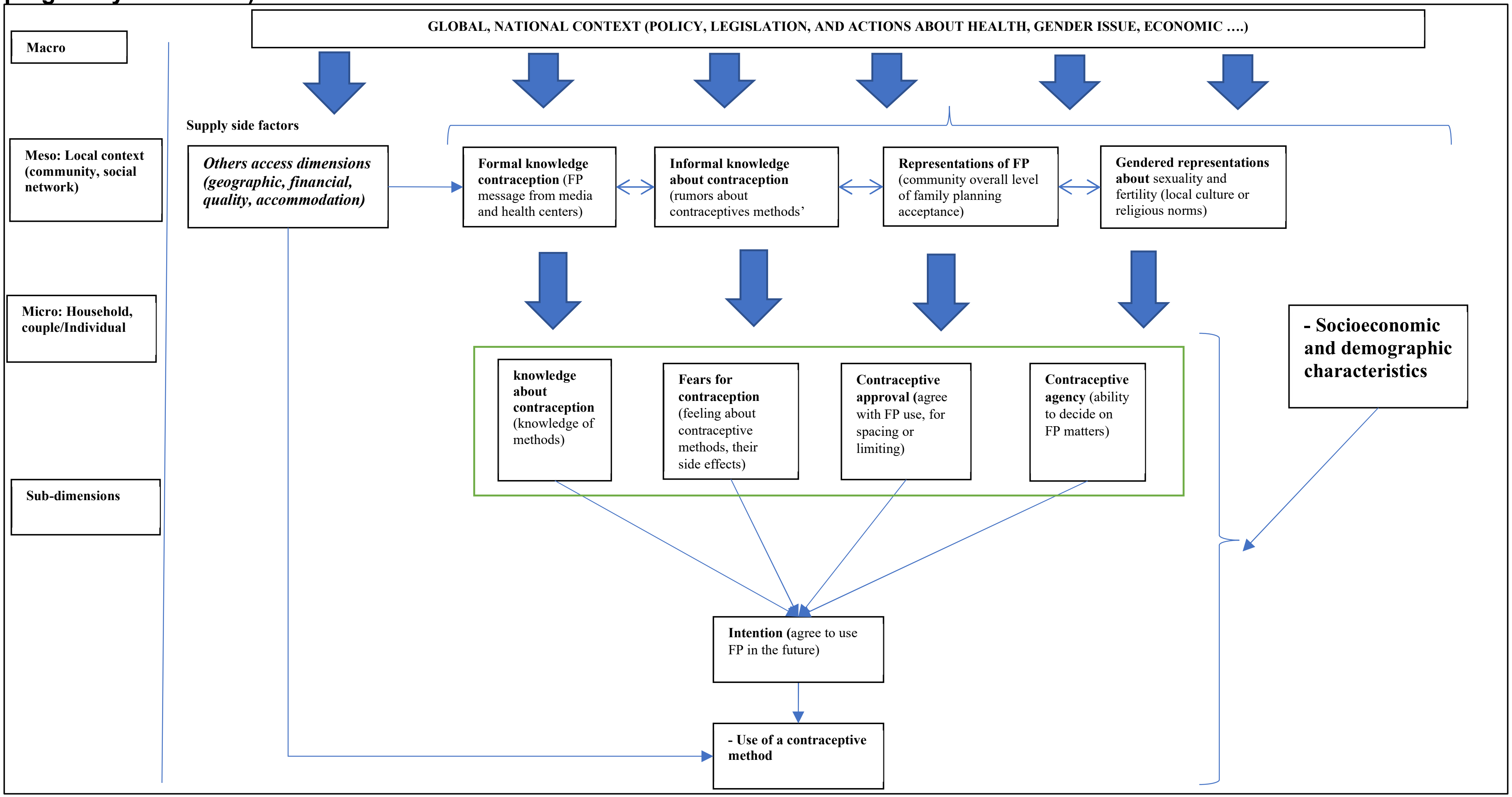
Other frameworks relate attitudes, intention, and behaviors towards contraception. In a study in Kenya and Nigeria, Babalola, John, Ajao, & Speizer, (2015) used Kincaid's (2000) framework that presents a strategic model used for behavior change communication. They described attitudes as resulting from beliefs and values (operationalized together as myths and rumors). In this model, attitudes are thus made of cognition/knowledge/beliefs as well as of approval/norms/values which, in combination with other social (other people's attitudes) and emotional factors, cause intention, which in turn drives behavior (Babalola et al. 2015).

In sum, the umbrella concept of attitude covers at least four dimensions: "knowledge" (beliefs, cognitive elaborations linked to socially shared representations which may be modified by scientifically based knowledge), "affect" (emotional, fears), "approval" (positive or negative valuation, linked to social shared norms and values), and "contraceptive agency" (-perceived- ability to do so). We kept these subdimensions of cognitive and psychosocial access in our framework, which we explain next.

2.2 Framework to measure cognitive and psychosocial accessibility

Our framework (see Figure 1) states that formal (scientific, globalized) knowledge/morality about contraception penetrates individuals' networks and social environment following efforts from contraceptive supply actors in the country. But the local socio-cultural representations about reproduction (shared visions on sexuality, fertility, gender relations, medicine,...) tend to inform a local morality towards FP (measured as community approval to use contraception for births spacing and limiting) along local meanings(rumors, informal knowledge) about contraception (Rutenberg and Watkins 1997). Those four contextual (meso level) dimensions will interact to shape cognitive and psychosocial accessibility of contraception at the individual level. Classically (dimension five in Choi et al. (2016), the "cognitive" dimension of contraceptive accessibility refers to individuals' access to scientific / local knowledge and includes individuals' awareness of contraceptive methods, their sources of supply, their side effects, and how to deal with side effects as learned in their environment from formal sources. This dimension is also influenced by local knowledge coming in as information received from informal sources. Therefore, the "knowledge" component of psychosocial accessibility reflects both formal contraceptive information and local information / visions. The other three subdimensions of attitudes, namely "fears/emotions", "approval", "contraceptive agency "are similarly shaped by both local meanings and moralities as well as by national and globalized knowledge and models of conduct.

Conceptual framework cognitive and psychosocial accessibility to contraception (at risk people with a demand for pregnancy avoidance)



2.3 Measuring the four dimensions of individual -level cognitive and psychosocial access and representations about reproduction

In what follows, we examine how each of these four dimensions has been measured in existing surveys so far, especially in recent contraceptive survey questionnaires. We focus on two surveys that collect contraceptive data on an international level: DHS and the PMA2020 survey. When identifying gaps in these questionnaires to measure our dimensions, we search other past surveys that have attempted to measure them. With the help of our researchers involved in those surveys, we got questionnaires from the survey Hope Niger 2014 (Peytrignet 2019), and from WGE-Nigeria (Moreau et al. 2020), as well as the Round 6 of PMA2020/Uganda that were used to extract relevant questions that complete the measurement of cognitive and psychosocial dimensions. In doing so, we wanted to use already tested questions.

Contraceptive knowledge

DHS and PMA2020 Burkina currently measure contraceptive knowledge by asking question about the knowledge of specific contraceptive methods. Contraceptive knowledge goes beyond having heard of specific contraceptive methods and should include knowledge/awareness of side effects attached to each method. Therefore, in addition to the core PMA question about knowledge of modern methods, we asked questions about knowledge of some specific type of side effects. These new questions come from Round 6 of PMA2020 of Uganda (table 2). The questions were also the bases we used to ask question about fear of side effects.

Fear of side effect

DHS and PMA2020 Burkina do not directly collect information about fear of side effects. The question about reasons for non-use allows knowing those that are not using because of fear of side effects. This question concerns non-users and cannot measure this dimension well, as it is not possible to know the level of fear nor the fear of specific side effects. Therefore, following the questions asked about knowledge of side effects, we asked women if they are concerned with the side effects they know.

Approval of contraception

The last Burkina Faso DHS (in 2010) asked only question about the husband's approval of family planning while the previous one (in 2003) asked also about the respondent's own approval. The Burkina PMA survey does not ask about contraceptive approval. Consequently, we added five questions to measure approval by distinguishing between different life situations, before marriage, to space, to limit (Rossier 2007).

Contraceptive agency

Here our definition of contraceptive agency concerns the ability of a woman to decide, negotiate, and act alone or jointly (negotiation) with others towards a contraceptive behavior. The questions to measure this dimension are not in the Burkina DHS and PMA2020 core survey questionnaire. Indeed, the DHS questionnaire asked some questions about women's general empowerment on household decision-making, violence perception, and discussion about family planning. There are two questions in the HIV/AIDS section of the Burkina DHS female questionnaire concerning the ability of the respondent to refuse sex or to ask her husband/partner to use a condom if she wants. Those questions relate to HIV prevention and cannot be used to measure contraceptive agency.

In the following table, we summarize how these dimensions by recent contraceptive data sources. Then we highlight the remaining gaps, which we tried to address.

Table 1: State of the 4 dimensions in current contraceptive data sources

Dimensions	Type of data collected by DHS female questionnaire	PMA2020BF core female questionnaire	Limitations
Contraception knowledge	To all women: Type of contraceptives known	To all women: Type of contraceptives known	- No question about awareness of side effects,
Fear of side effects	To non-users: the response category "Interferes with body's normal processes," "Inconvenient to use" and "Side effects/health concerns" of question on reasons for non-use.	To non-users: the response category "Interferes with body's normal processes," "Inconvenient to use" and "Side effects/health concerns" of question on reasons for non-use.	- There is no question for users about fear of side effects. - It is not possible to know the exact side effects feared by women
Approval of contraception	To all women - About her partner approval in 2010 and about respondent and partner in 2003.	No question on contraceptive approval.	Do not allow to know: - No question about respondent's own approval, - No question about respondent's approval in different situations like spacing, limiting, or use by non-married people
Contraceptive agency	There is a question addressed: - to all woman: discussion about family planning with a partner about empowerment and autonomy in general. - to users: main responsible for the choice of the methods used.	There is a question addressed: - to all woman about discussion on family planning with a partner - to users about main responsible for the choice of the methods used.	No specific question about ability to decide in family planning matters (ability to discuss, negotiate and decide on childbearing and PF)

To contribute to overcoming these limits of current surveys in measuring cognitive and psychosocial accessibility, we propose the following table of questions. We slightly modified some of the questions used to fit our survey. These modifications concerned most of the time the response categories and some reformulation.

Table 2: Questions and response items

Dimensions and questions	Target population	Sources of the question	Number of items
Contraceptive knowledge			
1. Have you ever heard of female sterilization? 2. Have you ever heard of male sterilization? 3. Have you ever heard of the contraceptive implant? 4. Have you ever heard of the IUD? 5. Have you ever heard of injectable? 6. Have you ever heard of the (birth control) pill? 7. Have you ever heard of emergency contraception? 8. Have you ever heard of condoms? 9. Have you ever heard of female condoms? 10. Have you ever heard of the diaphragm? 11. Have you ever heard of foam or jelly as a contraceptive method? 12. Have you ever heard of the standard day method or Cycle Beads? 13. Have you ever heard of the Lactational Amenorrhea Method or LAM? 14. Have you ever heard of the rhythm method? 15. Have you ever heard of the withdrawal method? 16. Have you ever heard of any other ways or methods that women or men can use to avoid pregnancy?	All women	PMABF core female questionnaire	16 Yes-no responses
Fear of side effects			
- What side effects did you experience (or heard about)? (multiple choice response) 1. Less bleeding or no bleeding ; 2. Heavier bleeding ; 3. Irregular bleeding ; 4. Spotting ; 5. Uterine cramping/ Lower abdominal pain 6. Weight gain ; 7. Weight loss ; 8. Facial spotting ; 9. Headaches 10. Infection ; 11. Nausea/vomiting ; 12. Increased menstrual cramping 13. Delayed return to fertility; 14. Lowered sex drive ; 15. Vaginal dryness ; 16. Infertility/sterility ; 17. Method gets lost inside body 18. General body weakness ; 19. Diarrhea ; 20. Other	All women who have you experienced (or heard about) any side effects of a contraceptive method	Adapted from PMA2020 Uganda Round 6	20 Multiple choice categories
What side effects are you concerned about? (multiple choice response: List of side effects : The possible response categories were those selected in the previous question)	All women who have you experienced (or heard about) any side effects of a contraceptive method	Adapted from PMA2020 Uganda Round 6	Multiple choice categories
Approval			
AC1. Do you agree with couples who use a method to avoid a pregnancy? (R: Strongly disagree, disagree, Indifferent, agree, strongly agree)	All women who know FP	Adapted from 2003 DHSBF	1 Likert-scale response
AC2. Does your partner/husband agree with couples who use a method to avoid a pregnancy?	All women who know FP and are in a union	Adapted from 2010 DHSBF	1 Likert-scale response
AC3. Do you agree with a "single" man or a woman who use contraception to avoid a pregnancy?	All women who know FP	Adapted from 2014 Hope survey in Niger	1 Likert-scale response
AC4. Do you agree with a couple who use contraception to try to space the births of their children?	All women who know FP	Adapted from 2014 Hope survey in Niger	1 Likert-scale response
AC5. Do you agree with a couple who use contraception to try to limit the number of children they will have?	All women who know FP	Adapted from 2014 Hope survey in Niger	1 Likert-scale response
Contraceptive agency			
AFC1. You cannot (could not) delay or stop having children even if you wanted to as this would deteriorate my relationship with your husband/partner.	Women in union	PMA2020-WGE Nigeria	1 Likert-scale response
AFC2. You feel (would feel) safe to discuss with your husband/partner about when to start having children/another child.	Women in union	PMA2020-WGE Nigeria	1 Likert-scale response
AFC3. Once you have a second child, you can decide when to have another one.	All women	PMA2020-WGE Nigeria	1 Likert-scale response
AFC4. You are (would be) able to negotiate with your husband/partner when to stop having children.	All women	PMA2020-WGE Nigeria	1 Likert-scale response
AFC5. You are (would be) able to choose what to do about family planning without taking into account what your husband/partner tells you to do.	Women in union	PMA2020-WGE Nigeria	1 Likert-scale response
AFC6. There would be (could be) a conflict in your relationship if you used family planning.	Women in union	PMA2020-WGE Nigeria	1 Likert-scale response
AFC7. You feel (would feel) safe discussing family planning with your husband/partner.	Women in union	PMA2020-WGE Nigeria	1 Likert-scale response
PMA: Performance monitoring and accountability; DHS: demographic and health survey; WGE: Women and Girls Sexual and Reproductive Health Empowerment. Hope Survey: Hope Consulting 2014 Survey in Niger			

4.3. Testing the questionnaire: data, methods

We added the selected questions to the 6th round of PMA2020 (Zimmerman et al. 2017) questionnaire in Burkina Faso. These data were collected on the PMA2020 platform in Burkina Faso, during December 2018 and January 2019. We interviewed 2,763 households (98.4% response rate) and 3329 women (97.7% response rate) in 83 enumeration areas (PMA2019/Burkina Faso Round 6 Indicators | PMA Data n.d.).

We use the scale validation technique to select measures (observables indicators or items) to construct each latent dimension (non-observable). Items are 5-Likert scale or dichotomous responses to questions we asked to capture different psychosocial dimensions. We use *validscale*, a command from Stata to test the level of validity, reliability, convergence, and divergence of the latent dimensions and items (Perrot et al. 2018). This Stata module uses Classical test theory (CTT) and structural equation modeling (SEM) to produce confirmatory factor analysis (CFA). For the structural equation modeling, the module proposes estimations with maximum likelihood, maximum likelihood with missing values, and asymptotic distribution-free. The maximum likelihood approach is not advised for confirmatory factor analysis with categorical items, instead, we can use weighted least squares (WLS), aka asymptotic distribution-free (ADF) in Amos (Brown 2006). However, WLS does not perform well with small samples or more complex models (Brown 2006). Based on the common criteria, our sample is large enough to allow a fit with ADF method.

The internal consistency of a set of items indicates the extent to which the items measure the same content (Perrot et al. 2018; Wells and Wollack 2003). It is often measured by the Cronbach's coefficient alpha that varies from 0 to 1. Generally, a coefficient superior to 0.7 is acceptable, while a coefficient below 0.5 is considered unacceptable (De Vaus 2002; Nikiema et al. 2012). The command proposes three options for items' composition (unweighted mean, unweighted sum, or standardization between 0 and 100). It also allows us to compute the scores of each dimension using another complex method (like PCA) and bring it in the command.

We create the dimensions using the option "*compscore (sum)*" which adds the values of the non-missing codes to compute the dimension. After creating the scores, *validscale* tests their consistency with the items used. We put in the code all the items which measure the dimensions, and we group them in the partition option of *validscale*. For each dimension, the results contain the Cronbach's scale reliability coefficient alpha and the Loevinger's *H scalability coefficients*. The Loevinger's *Hj* is also calculated for each item *j* in the dimension, the minimum value and the corresponding item are displayed. If this value is less than the threshold value, we can decide to take out this item, to have more consistency between the remaining items and the dimension. Then, we make another iteration, until the Cronbach's alpha is greater than 0.7 or the Loevinger's H is greater than 0.3. We also compute Ferguson's delta that is the ability of the index of scale discrimination (Hankins 2007).

4.4. Dimensions' validation and links amongst items

3.1.1. **Dimensions' validation**

We produced the distribution of the scores of all the dimensions. Another graph presents the relations between items as bi-plots and from which we can see the correlations between items in the same dimension. As we did not ask each question to all the respondents, some dimensions will only be available for some categories of women. We use each question and its response to create an item used in the validation process. For multiple response questions (knowledge of methods, knowledge about side effects, fear of side effects) we transformed each response into a separate item. Table 1 shows the results of the validation process for the two dimensions based on Likert-scale responses.

We did not need to validate the first two dimensions, as they are the numbers of methods known or the number of side effects feared. The dimension *contraceptive knowledge* is the number of modern methods knows. For that, we use all the 13 sorts of modern methods in the questionnaire (n = 3329; 100.0%). We did not construct a dimension with questions we asked about side effects, but we used these questions to adjust the dimension on fear of side effects. Indeed, the question about fear of a particular side effect concerned those who know that side effect. Therefore, we used the proportion of side effects feared among the side effects known to measure the level of fear of side effects. This dimension concerned all the women who are aware of at least one side effect of contraception (n= 2036; 61.2%).

Contraceptive approval was captured through five questions, but only three seem to fit in the construct of this dimension. Among the two items we dropped, one was about the perception of the approval of the respondent's partner (question AC2); which understandingly taps into another construct. The second was about her approval of FP use by men or women who are not in a couple (question AC3). That variable was not consistent with the dimension by causing a reduction in the Cronbach's alpha. This question may measure the respondent's attitude towards premarital sexuality rather than towards FP. Once only three variables were retained, Cronbach's alpha could not reach 0.7, However, we think that level 0.65 can be acceptable, given the high value of H (0.45) and Delta (0.90) are above the thresholds. This dimension concerned all women that know at least one contraceptive method (n=3247; 97.5%).

For *contraceptive agency* (7 questions), only two items (AFC1 and AFC5) did not fit this dimension. The first question concerns the ability of the respondent to stop childbearing alone without considering the impact on the relationship with her partner. The second considers a decision on FP use or not, regardless of the partner's opinion. These two questions were referring explicitly to another dimension. Although, as the item about negotiation to stopping childbearing (AFC4) fits the dimension, we can say that the decision to stop childbearing is not yet in women's abilities. Most of the items in that dimension concerned women in a union, and only two concerned all the respondents. Therefore, we have computed the agency dimension only for women in a union and who know contraception (n= 2191; 65.8%).

Table 3: Validity and reliability test on the constructed latent dimensions

Dimensions	**N**	Number of items kept?	Cronbach's alpha (. >=0.7)	Loevinger's H (. >=0.3)	Ferguson's delta (. >=0.9)
Family planning approval	3247	3	0.65	0.45	0.90
Contraceptive agency	2191	5	0.71	0.38	0.95

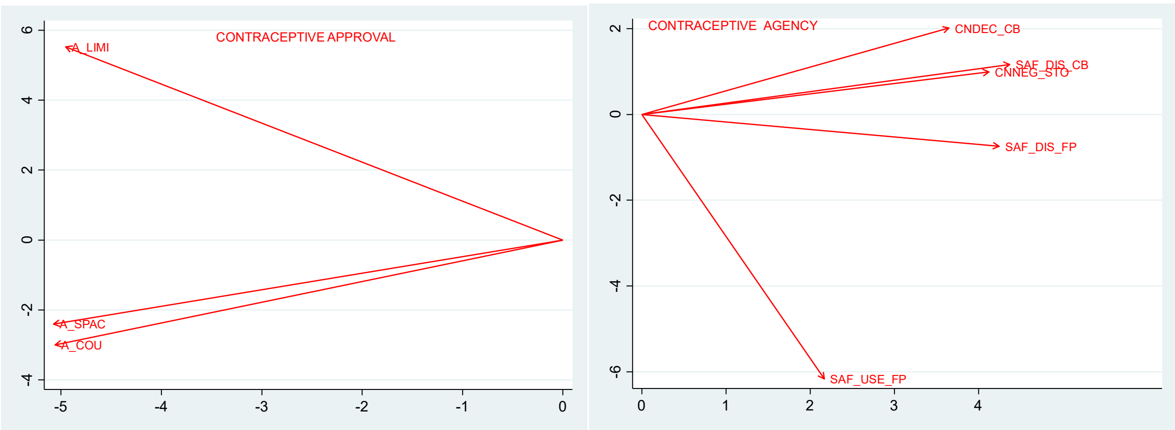
Table 4: Sample distribution for items used in the dimensions.

		Item's codes						
Item's questions by dimension	**Item's name**	**Missing /NA**	**0**	**1**	**2**	**3**	**4**	**5**
Contraceptive knowledge (13 items)								
Have you ever heard of female sterilization?	F_STER2	0	1,854	1,475	-	-	-	-
Have you ever heard of male sterilization?	M_STER2	0	2,467	862	-	-	-	-
Have you ever heard of the contraceptive implant?	IMPL2	0	280	3,049	-	-	-	-
Have you ever heard of the IUD?	IUD2	0	1,539	1,790	-	-	-	-
Have you ever heard of injectable?	INJ2	0	298	3,031	-	-	-	-
Have you ever heard of the (birth control) pill?	PILL2	0	303	3,026	-	-	-	-
Have you ever heard of emergency contraception?	EMER2	0	2,282	1,047	-	-	-	-
Have you ever heard of condoms?	M_COND2	0	332	2,997	-	-	-	-
Have you ever heard of female condoms?	F_COND2	0	1,053	2,276	-	-	-	-
Have you ever heard of the diaphragm?	DIAP2	0	2,696	633	-	-	-	-
Have you ever heard of foam or jelly as a contraceptive method?	FOAMJ2	0	2,791	538	-	-	-	-
Have you ever heard of the standard day method or Cycle Beads?	BEAD2	0	1,619	1,710	-	-	-	-
Have you ever heard of the Lactational Amenorrhea Method or LAM?	LAM2	0	2,837	492	-	-	-	-
Fear of side effects (19 items)								
1. Less bleeding or no bleeding	F_BLD_L	1,655	1,447	227	-	-	-	-
2. Heavier bleeding	F_BLD_M	1,292	1,462	575	-	-	-	-
3. Irregular bleeding	F_BLD_IRR	1,685	1,427	217	-	-	-	-
4. Spotting	F_SPOT	2,029	1,256	44	-	-	-	-
5. Uterine cramping/ Lower abdominal pain	F_UT_CRAM	1,892	1,286	151	-	-	-	-
6. Weight gain	F_WGT_GAIN	1,641	1,464	224	-	-	-	-
7. Weight loss	F_WGT_LOSS	1,747	1,408	174	-	-	-	-
8. Facial spotting	F_FAC_SPOT	2,121	1,206	2	-	-	-	-
9. Headaches	F_HDCH	1,763	1,375	191	-	-	-	-
10. Infection	F_INFEC	2,072	1,224	33	-	-	-	-
11. Nausea/vomiting	F_NAUSE	2,013	1,256	60	-	-	-	-
12. Increased menstrual cramping	F_MR_CRAM	2,094	1,219	16	-	-	-	-
13. Delayed return to fertility	F_FERT_DLAY	1,831	1,297	201	-	-	-	-
14. Lowered sex drive	LIBID	2,123	1,205	1	-	-	-	-
15. Vaginal dryness	VAG_DRY	2,122	1,202	5	-	-	-	-
16. Infertility/sterility	F_INFERT	1,648	1,251	430	-	-	-	-
17. Method gets lost inside body	F_MET_LOSS	1,775	1,283	271	-	-	-	-
18. General body weakness	WEAKNS	1,757	1,328	244	-	-	-	-
19. Diarrhea	F_DIARH	2,123	1,200	6	-	-	-	-
20. Other	F_OTHER	1,862	1,284	183	-	-	-	-
Approval (3 items)								
AC1: Do you agree with couples who use a method to avoid a pregnancy?	A_COU	82	-	171	421	68	1,690	897
AC4: Do you agree with a couple who use contraception to try to space the births of their children?	A_SPAC	82	-	70	161	21	1,653	1,342
AC5: Do you agree with a couple who use contraception to try to limit the number of children they will have?	A_LIMI	82	-	223	536	72	1,601	815
Reproductive agency (5 items)								
AFC2: You feel (would feel) safe to discuss with your husband/partner about when to start having children/another child.	SAF_DIS_CB	1,140	-	98	365	37	1,258	431
AFC3: Once you have a second child, you can decide when to have another one.	CNDEC_CB	82	-	180	772	101	1,656	538
AFC4: You are (would be) able to negotiate with your husband/partner when to stop having children.	CNNEG_STO	82	-	186	577	76	1,782	626
AFC6: There would be (could be) a conflict in your relationship if you used family planning. (codes reversed)	SAF_USE_FP	1,140	-	243	800	41	767	338
AFC7: You feel (would feel) safe discussing family planning with your husband/partner.	SAF_DIS_FP	1,140	-	92	281	14	1,288	514

4.4.1. Links between items in the same dimension

After the validation of dimensions, we can go further to study the contributions of items in the construction of the dimension. The graphical approach is better as it allows seeing items that close in meaning and those that are apart. Graph 1 portrays the relations among items of the two dimensions validated. The items on approval show different types of approval of contraception. Indeed, the approval of FP use for spacing and by couples are more correlated than FP use for limiting childbearing. Therefore, the most common approval depicts more approval for spacing and does not yet include limiting well. For agency, the items, being able to discuss/negotiate childbearing/FP are more correlated. However, being able to decide FP use alone “without considering what the partner thinks” seems to be different from the four other items. Therefore, the active component of the agency dimension does not clearly appear as that of discussion and negotiation which items are very close.

Figure 1: Link between items in the same dimension



4.4.2. Correlation between dimensions

Here we study the correlation between dimensions. As our four dimensions are continuous variables, we use pairwise correlation. This procedure has an option that shows the number of observations used for the correlation between two variables.

Table 5: Correlations between the four dimensions

	Contraceptive knowledge	Fear of side effects	Contraceptive approval	Contraceptive agency
Contraceptive knowledge	1 3329			
Fear of side effects	-0.1189* 2036	1 2036		
Contraceptive approval	0.2362* 3247	-0.0874* 2036	1 3247	
Contraceptive agency	0.1721* 2191	-0.0947* 1459	0.3740* 2191	1 2191
*: Signicant at 0.5%				

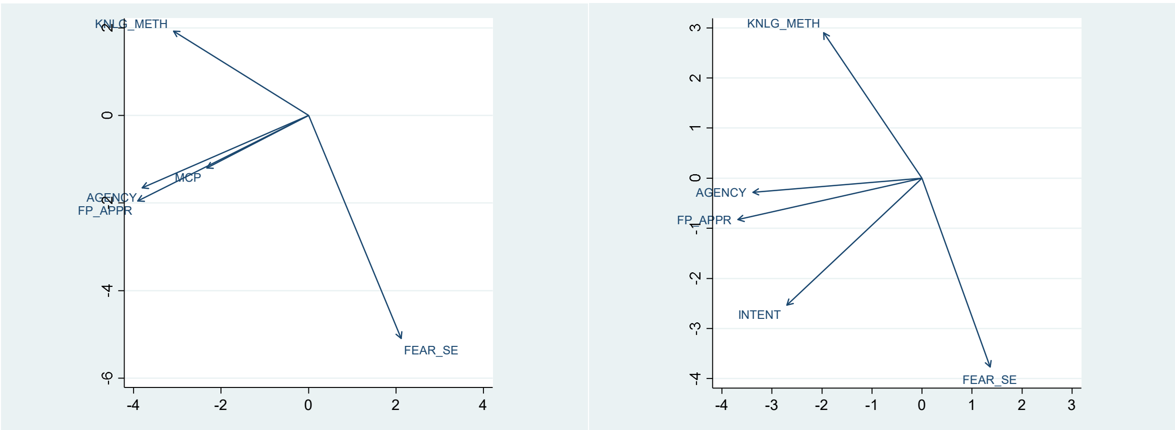
Table 5 shows the pairwise correlation between our four dimensions. The diagonal numbers are the sample size concerned by the corresponding dimension. The smallest sample is that of the dimension of fear of side effects (questions asked those who know at least one side effect). The same applies to the agency, where three of the five questions concerned married women only. Consequently, the calculation of the correlation between these two dimensions used only half of the total sample (married women, who know at least one side effect).

From the results, we notice that fear of side effects has negative and significant correlations with contraceptive knowledge (-0.1189), contraceptive approval (-0.0874), and contraceptive agency (-0.0947). The high level of negative correlation is between fears and knowledge, which proves that contraceptive knowledge explains almost 12% of the fear of side effects.

Nevertheless, the correlations between contraceptive knowledge, approval, and agency are all positive. These positive correlations between the dimensions of contraceptive agency, approval, and knowledge are not surprising because they show that these dimensions increase and decrease together. The highest correlation coefficient is that between contraceptive agency and approval (0.37). The correlation between contraceptive knowledge and contraceptive approval (0.24), on one hand, and between contraceptive agency and contraceptive knowledge, on the other, are significant.

The following graphs emphasized the negative correlation between Knowledge and fears that drive the Y-axes while the dimensions like agency and approval drive the X-axes. Intention to use is more related to contraceptive approval and agency than to fear of side effects. Comparing the two graphs, we noticed that contraceptive use is closer to contraceptive agency and approval (in the first graph) than intention (in the second graph).

Figure 2: Link between dimensions and contraceptive use and intention to use



In summary, dimensions like agency, knowledge of methods, approval are all significantly correlated on the one hand. On the other hand, fears of side effects are significantly negatively correlated to contraceptive agency and contraceptive knowledge.

4.5. Discussion

The literature review of the concept of access shows that the six meanings linked to this concept go well beyond supply-side factors. More importantly, the demand-side dimension of access to contraception (cognitive and psychosocial). However, we found only a few studies that focused on the dimensions of cognitive and psychosocial access. Unlike those studies, our goal was to draw a comprehensive picture of all subdimensions of demand-related accessibility.

To identify these dimensions, we detailed the different facets of the concept of "attitudes" with which research on demand-side obstacles to contraceptive use had started, following Easterlin (1973); this concept has continued to frame the (small) stream of studies into the year 2000s (ref). We identified four dimensions tackled by various studies and frameworks under the umbrella concept of attitudes: knowledge, fears, approval, and agency. While some questions from the DHS and the PMA2020 female questionnaire tried to capture subdimensions like contraceptive knowledge, approval, and reproductive agency (although very partially for some subdimensions like approval of partner and agency only through discussion with a partner), the subdimension about fears is not in the picture. Indeed, a part of the response category "fears of side effects" of the question on reasons for non-use, there is no other data concerning that concept. Using questions already tested in DHS and PMA questionnaires, completed by questions from two recent reproductive and health surveys the authors have been involved in, we developed a complete set of questions to measure these four dimensions (n= 15 questions, of which 1 already in DHS or PMA). We added two questions about side effects. The first concerns the knowledge of side effects, which was used to adjust data collected for the second which is about the fear of side effects. By asking questions about fears of side effects to all the respondents, we went further than most of the past studies by making it possible to know the type and the level of fears by the status of contraceptive use. We also added specific questions to capture the level of approval of contraception use by non-married, for spacing, and for limiting childbearing. We considered seven questions to inform about women’s ability to discuss, negotiate, and decide about childbearing and contraceptive use.

The validation was straightforward for most subdimensions where just one or two items needed to be removed because they tapped into another construct; The Cronbach index and other indicators lead us to validate with ease four dimensions, including two that were counts of items. In the process, we have considered as valid only fears cited by those who know the corresponding side effect. The proportion of side effects feared among side effects known was considered instead of a simple count of side effects feared. This measure is an adjustment that allows comparison between individuals with different levels of knowledge.

The main limitation is not being able to improve the dimension of contraceptive knowledge. Even though almost every woman knows at least one modern method, our dimension based on the number of modern methods knows seemed relevant in differentiating women. However, assessing the level of knowledge about methods and side effects would have improved the measurement of that dimension. We have collected information on side effects awareness to adjust the measurement of fear towards side effects but could not use it otherwise.

The results show that in the country, common approval of contraceptives for couples aligns more with birth spacing than with births limiting. This relation tends to confirm that most of the individuals are not yet ready for limiting childbearing as we see in data on unmet need for limiting (INSD & ICF, 2012; *PMA2019/Burkina Faso Round 6 Indicators | PMA Data*, s. d.). This low tendency of women to limit birth seems to be related to a lack of ability to do so. The item about the ability to stop childbearing / to use FP without worrying about deterioration of the relationship did not fit the women contraceptive agency dimension. We conclude that the consistent part of women contraceptive agency is more composed of the ability to discuss and negotiate about childbearing/Contraceptive use, than their ability to decide alone. The only decision item that fits in the women's agency concerns delaying the next birth once she has already one.

The correlations between our dimensions are almost intuitive and awaited. Indeed, it appeared that fear of side effects goes in the opposite direction of the other three (knowledge, approval, and agency). At this stage, as correlation is not causation, we cannot derive valid conclusions, but, following the logic of an intervention, we can imply that an increase in the levels of approval, knowledge, and agency may yield in a decrease in fear of side effects, or the other around.

4.6. Conclusion

The literature, synthesizing decades of work on contraceptive accessibility, recently highlighted six dimensions of contraceptive accessibility, among which two concern contraceptive demand-side factors. Those two dimensions (called cognitive and psychosocial accessibility, Choi et al. (2016)) are the least informed in older and more recent studies, even though their current relevance has been stressed, as supply-side obstacles have been gradually removed in countries with low contraceptive prevalence. To fill the gap and starting with the concept of "attitudes" used in this area of research, we conceived a comprehensive framework that details "cognitive and psychosocial obstacles to contraception" into four subdimensions, also identifying questions used in large international surveys over the years to measure them, modified or completed at minima to live up to the underlying conceptual constructs. We then went forward and collected data using this complete set of questions on cognitive and psychosocial obstacles to contraceptive use in Round 6 of PMA2020 in Burkina Faso. We were able to validate, after some further minimal simplification, this module, obtaining a set of 40 items which, in our view, measure correctly the different dimensions of cognitive and psychosocial challenges for all women or women in union.

Nevertheless, this study shows that our dimensions as defined and validated portray most of the features in the context. It shows that birth limitation is not sufficiently comprised in both women's contraceptive approval and agency, at least for married ones. The partner opinion is relevant in most women's decisions, especially concerning stopping childbearing or contraceptive of contraception. Even if this part is descriptive, it suggests that giving more decision power to women about contraceptives and childbearing will enhance their contraceptive agency and approval. In addition, giving more information to reduce fears about side effects can also improve contraceptive approval.

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