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Misconceptions and Unmet Need for Modern Contraception among Cambodian Females: A Mix Methods Study

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Abstract: (1) Background: Women using unreliable traditional contraception need to be included in the proportion of women having an ‘unmet need for modern contraception’ instead of the current classification which presumes they have a ‘met need’. (2) Methods: Mix methods research design comprising initial quantitative analyses utilizing data from the nationally representative 2014 Cambodian Demographic and Health Survey (CDHS) for 4823 Cambodian, sexually active females aged 15–29 years. Then a qualitative phase explored knowledge about the menstrual cycle and misconceptions about modern contraception with 30 females aged 15–29 years in urban Cambodia using semi-structured interviews, transcribed verbatim with quality checks. Purposive and snowball sampling strategies were used until data saturation was reached. Inductive thematic data analysis was conducted; (3) Results: Unmet need for modern contraception increased to 25.4% when traditional contraception users were included. The qualitative themes show women have a lack of information about the menstrual cycle and misconceptions about modern contraception which contributed to increased use of traditional contraception; (4) Conclusion: Major drivers of increased unmet need for modern contraception include lack of literacy, misconceptions and low autonomy to choose modern contraception. Cambodia needs to endorse a policy shift to implement targeted, countrywide sexual and reproductive health literacy and family planning services.

Keywords: adolescents; unintended pregnancies; contraception failure; abortion, induced; family planning services; sexual and reproductive health

1. Introduction

The indicator of unmet need for modern contraception is an important step towards acquiring universal health care and plays an important role in achieving the sustainable development goal (SDG) 3 for individual’s wellbeing and health, and SDG 5 for women’s empowerment and gender equality by 2030 [1]. The SDGs are a set of 17 goals and 169 targets put forth by the United Nations (UN) in 2015 for global sustainable development by 2030 [2]. The SDGs 3 and 5 put emphasis on human rights, improved women’s autonomy and gender equality, and the right to access sexual and reproductive health (SRH) and modern contraception [3]. The inclusive definition of SRH refers to the complete physical and social wellbeing of body and mind in sexuality and all matters relating to sexual and reproductive system [4]. Demand satisfied by modern contraception methods (DSMC) is indicator

3.7.1 for the target 3.7 of the SDG 3 [2] and its calculation depends on the correct estimation of unmet need for modern contraception.

Unmet need for contraception refers to the proportion of sexually active women 15–49 years (childbearing age) who do not want to become pregnant but are not using any modern or traditional contraception methods [5]. This paper focuses on contraception for the sole purpose of pregnancy prevention. There are different contraception methods that fall into two main categories of modern and traditional contraception. The modern methods include hormonal and barrier methods (condoms) and surgical intervention methods for females (tubal ligation) and males (vasectomy) [6,7]. The hormone-based methods include oral contraceptive pills, progestin only pills, emergency pills, injectable contraceptives, and subdermal implants and intrauterine contraception devices (IUCDs) as long acting reversible contraceptive devices (LARCs) [6,7]. The traditional contraception methods include behavioural practices such as periodic abstinence method, calendar method, withdrawal or pull out method (coitus interruptus), and other traditional methods such as tinctures and herbs [8].

The Cambodian National Institute of Statistics reports that two-thirds of the unintended pregnancies occur in women using traditional contraception methods [7]. The 2014 Cambodian Demographic and Health Survey (CDHS) indicates that 12% of women aged 15–49 years had at least one abortion in their lifetime. Fifty-three percent of women had the abortion within the first eight weeks of pregnancy [7].

Our study's focus is on Cambodian sexually active female adolescents and women aged 15–29 years as the negative repercussions of unsafe sex, and high unmet need for modern contraception in females are serious in terms of the risk of having sexually transmitted infections (STIs), unintended pregnancies or induced abortions [9–11].

The correct calculation of unmet need for modern contraception is pertinent to identify and target females who are at-risk of having unintended pregnancies [12] for improving the SRH parameters and reducing poverty in a country. We propose a mix methods approach to calculate the unmet need for modern contraception using the 2014 CDHS dataset and qualitatively exploring the misconceptions about modern contraception methods in Cambodian sexually active adolescent girls aged 15–19 years and women aged 20–29 years.

Aim

Using mix methods research to calculate unmet need for modern contraception by utilizing the cross-sectional dataset from the 2014 CDHS and employing semi-structured interviews to explore the misconceptions about modern contraceptives among women aged 15–29 years in Cambodia.

2. Materials and Methods

This study employed a sequential explanatory mix methods design with the initial quantitative phase followed by the qualitative phase [13]. Both the phases were integral to the study to minimize the weaknesses that could occur in a single research method. All the necessary steps were taken to inculcate internal and external validity and accuracy of findings in the quantitative phase, and to introduce rigor and a reflexive approach in the qualitative phase [13]. The final stage included integrating the results from both phases.

2.1. Ethics

For the quantitative study, deidentified data from 2014 CDHS was accessed which is freely available from the DHS program website [14]. Approval for analyses of the 2014 CDHS dataset was obtained from the MEASURE Head office for the DHS program [14], and an ethics exemption was obtained from the Deakin University Human Research Ethics Committee, Victoria, Australia (project no 2018-157). The Cambodian National Ethics Committee for Health Research at the Ministry of Health gave permission for utilizing the 2014 CDHS dataset for analyses [15]. For the qualitative study, Deakin University Human Research Ethics Committee approved the high risk human research

ethics application (DUHREC 2018-218) on 6 September 2018 and the Cambodian Ministry of Health National Ethics Committee for Health Research (NECHR 313) approved it on 31 December 2018.

2.2. Quantitative Methods

The initial phase included cross-sectional analytical study using data from the latest 2014 CDHS [7]. The 2014 CDHS is the fourth, nationally representative survey conducted in Cambodia [7]. The study includes 4823 Cambodian (urban and rural), sexually active females aged 15–29 years. The checklist for Strengthening of the Reporting of Observational studies in Epidemiology (STROBE) statement was used to report the cross-sectional study [16]. The 2014 CDHS is the fourth nationally representative DHS in Cambodia and covers multiple provinces which make up the 19 sampling domains [7]. Two-stage stratified sampling and probability systematic sampling were used to collect data and interviews were conducted with 17,578 women and 5190 men aged 15–49 years [7]. The methodology details are already mentioned by Rizvi et al. (2019) [9]. There were no missing values as the females who gave a positive response or answered the question ‘age at first sex’ were classified as sexually active, either single, married, or in-union. The calculation of Demand Satisfied for Modern Contraception (DSMC) is as follows; Modern contraception prevalence rate (mCPR)/(mCPR + unmet need for modern contraception) \times 100 [17]. The mCPR is calculated as the proportion of women 15–49 years using modern contraception / total number of women 15–49 years \times 100 [17].

Stata 15 SE (StataCorp, College Station, TX, USA) was used for descriptive, bivariate and binary logistic regression analyses. A p -value <0.05 was considered statistically significant. Pearson’s chi square tests were used for bivariate analyses for determining the degree of association between unmet need for modern contraception and the individual categorical variables. Survey weights were applied to adjust for survey cluster sampling and Adjusted odds ratios (AOR) with 95% confidence interval (CI) were reported for binary logistic regression analyses. Hosmer-Lemeshow’s goodness of fit test was applied as the post-estimation diagnostic test [18].

2.3. Standard DHS Approach for Calculating Unmet Need for Contraception

The standard definition of unmet need refers to the proportion of women aged 15–49 years (married or sexually active) who do not want to become pregnant but are not using any modern or traditional contraception methods [5]. A set of 15 different questions from the DHS makes up the complex calculation of unmet need [5].

2.4. Rationale for Including Cambodian Females Aged 15–29 Years

The Lancet Commission in 2018 reports that adolescent girls and young women compared to older women use short-term, irregular modern contraception leading to higher rates of method failure resulting in unintended pregnancies [4].

Cambodia has a huge proportion of young people aged 10–24 years, making up 32.1% of the 14.7 million population [19]. The mean age of marriage for Cambodian young women is 21 years [7]. Considering the increased prevalence of unintended pregnancies among Cambodian females aged 15–29 years [9], it is necessary to gain perspective and compare the SRH issues and contraception use dynamics in the adolescent girls, female youth, and women in their late twenties.

2.5. Summary of Our Proposed Categories for Unmet Need for Modern Contraception

We posit that women currently using traditional methods need to be included in the category of having unmet need for modern contraception. Figure 1 (flow chart) presents a summary of our proposed categories for calculating unmet need for modern contraception, drawing from the categories put forth by Bradley et al. (2012) [5] and Sinai et al. (2017) [20].

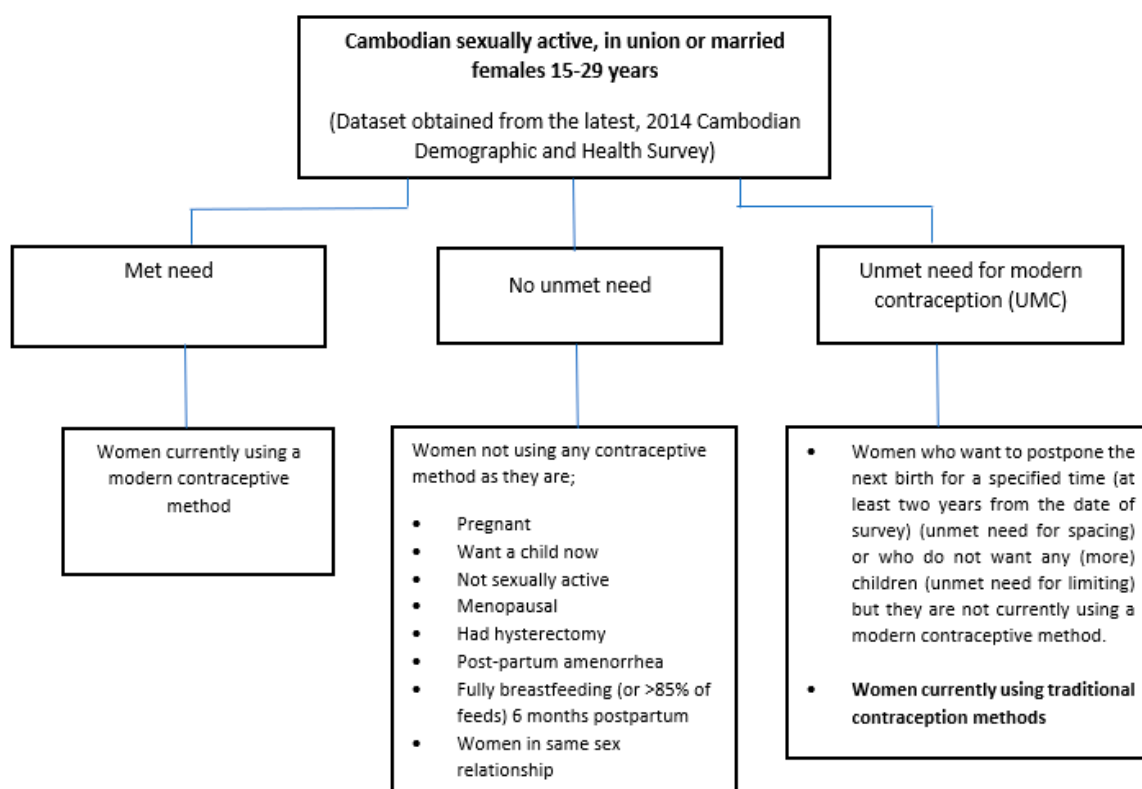


Figure 1. Calculating unmet need for modern contraception in Cambodian females 15–29 years.

3. Results

3.1. Quantitative Statistical Analyses

The total sample size includes 4823 participants, including 1329 (27.5%) urban and 3494 (72.4%) rural females aged 15–29 years. The sample shows 44.6% of females with primary education, 40.4% with secondary education and 10.1% with no education. The descriptive analyses show that of the total sample of 4823 females, 91.2% were already married at the time of the 2014 CDHS and 67% were currently employed. Of the total sample, 21.5% had a history of terminating a pregnancy or abortion. The social and demographic characteristics of the participants are presented in Table 1.

Table 1. Sociodemographic characteristics of participants aged 15–29 years (N = 4823).

Variable	Frequency (N)	Percentage (%)
Age		
15–19 years	512	10.6
20–24 years	1893	39.2
25–29 years	2418	50.1
Marital status		
Single	47	0.9
Married	4401	91.2
Living with partner	49	1.0
Widowed	74	1.5
Divorced	218	4.5
Separated (No longer living together)	34	0.7

Table 1. Cont.

Variable	Frequency (N)	Percentage (%)
Educational level		
Higher	230	4.8
Secondary	1950	40.4
Primary	2154	44.6
No education	489	10.1
Wealth status		
Richest	1224	25.4
Richer	917	19.0
Middle	815	16.9
Poorer	910	18.9
Poorest	957	19.8
Current employment		
Yes	3231	67.0
No	1592	33.0
Current contraception use		
Modern methods	1706	35.4
Traditional methods	658	13.6
No contraception use	2459	51.0
Traditional method use		
Withdrawal method	561	11.7
Periodic abstinence	84	1.8
Other traditional/folk methods	13	0.3
Modern methods use		
Oral pills	824	17.1
Injections	429	8.9
IUCD	190	3.9
Norplant	129	2.6
Condoms	110	2.3
Female sterilisation (tubal ligation)	24	0.5
Non-use of contraception methods	2459	50.9
Reason of last contraceptive discontinuation <i>n</i> = 1654 (34.3%)		
Became pregnant	217	4.5
Wanted to become pregnant	790	16.4
Husband disapproved	16	0.3
Health concerns/side-effects	292	6.1
Issues of accessibility or availability	13	0.3
Wanted more effective method	82	1.7
Inconvenient to use	127	2.6
Infrequent sex, or difficult to get pregnant or marital dissolution	61	1.3
Other	52	1.1
Missing	3173	65.7
Total	4823	100
Ever told about family planning at the health facility		
Yes	1230	25.5
No	1379	28.5
Total	2609	54.1
Ever had a terminated pregnancy		
Yes	1037	21.5
No	3786	78.5
Total	4823	100
Ever heard about HIV and sexually transmitted infections		
Yes	4699	97.4
No	124	2.6

Table 1. Cont.

Variable	Frequency (N)	Percentage (%)
Person to decide for respondent's healthcare		
Respondent alone	1816	37.6
Together	2240	46.4
Husband alone	355	7.4
Someone else in the household (mother-in-law or parents-in-law)	37	0.8
Total	4448	92.2
Missing	375	7.8
Difficulty in getting to the health facility		
Yes	1663	34.5
No	3160	65.5
Participant heard family planning on radio in the last few months		
Yes	1775	36.8
No	3048	63.2
Participant heard family planning on television in the last few months		
Yes	2378	49.3
No	2445	50.7

The hormone-based modern contraception methods include combined oral contraceptive hormonal pills for continued daily use, emergency contraceptive pill (morning after pill) or ulipristal (once only), long acting reversible contraceptives (LARCs) including intrauterine contraceptive devices (IUCDs), hormonal injectables, and subdermal implants [8]. The barrier methods include male and female condoms. The surgical methods include non-reversible, permanent modern contraceptive methods including female and male sterilisation. The traditional contraception methods include periodic abstinence method, calendar method, withdrawal or pull out method and other traditional methods such as tinctures and herbs [8]. There are missing values of 375 women in the variable "person to decide for respondent's health care" in the dataset.

3.2. Multiple Independent Variables

The following independent categorical variables were identified in the literature as likely predictors of unmet need and are included in the bivariate analyses using chi-square tests as well as the binary logistic regression model. The independent categorical variables included; three age groups in years (15–19, 20–24, 25–29), area of residence (rural and urban) and parity. The Table 2 shows significant likelihood of unmet need for modern contraception in the urban women, hence the second qualitative phase was carried out in the urban Cambodian women in Phnom Penh and Siem Reap.

Table 2. Bivariate analyses and binary logistic regression analyses showing factors influencing unmet need for modern contraception in sexually active Cambodian females aged 15–29 years.

Factors Influencing Unmet Need for Modern Contraception	Unmet Need for Modern Contraception (Chi-Square)	Unmet Need for Modern Contraception (Binary Logistic Regression Analyses)
	<i>p</i> -Value (N = 4823)	Adjusted Odds Ratio (AOR), 95% Confidence Interval (CI) with <i>p</i> -Values (N = 4823)
Age Group		
15–19 years	<i>p</i> = 0.1	1.1 (0.8–1.6), <i>p</i> = 0.300
20–24 years		
25–29 years (base)		
Region		
Urban	<i>p</i> = 0.001	1.8 (1.5–2.2), <i>p</i> = 0.001
Rural (base)		
Parity		
1–2 children	<i>p</i> = 0.001	2.3 (1.7–2.7) <i>p</i> = 0.001
3 or more children		
No children (base)		

Model I: Number of strata = 38; Number of primary sampling units (PSUs) = 608; Number of observations = 4446; Degree of freedom (df) = 570, F = 4.47, Prob > F = 0.000, *p*-value significant (shown in bold) if *p* < 0.05. Hosmer–Lemeshow goodness of fit test for logistic model: F (9562) = 0.5, Prob > F = 0.8. Data used from 2014 Cambodian Demographic and Health Survey (CDHS) [7].

3.3. Bivariate and Binary Logistic Regression Analyses

The results from bivariate analyses (Table 2) show that residing in the urban region and parity were significantly ($p < 0.01$) associated with unmet need for modern contraception. Binary logistic regression analyses also showed significantly increased likelihood of unmet need for modern contraception in women residing in the urban region (AOR 1.2, 95% CI 1.5–2.2) and women with increased numbers of children (parity) (AOR 3.2, 95% CI 2.3–4.6) (Table 2).

3.4. Knowledge of Contraception Methods and Menstrual Cycle

Amongst the participants, 99.7% could name two or three modern and traditional contraception methods. However, 76.5% females either had no understanding or incorrect information about their menstrual cycles and ovulation days. At the health facility, only 25.5% participants were told about family planning methods.

3.5. Contraceptive Prevalence Rate (CPR)

The total contraceptive prevalence rate for both traditional and modern methods was 49%. Modern contraceptive prevalence rate (mCPR) was 35.3% and traditional contraceptive prevalence rate was 13.7%. The mCPR was low in the female adolescent aged 15–19 years (17.7%) compared to the 33.2% amongst 20–24-year-old young women, and 40.8% in 25–29-year-old women. A total of 6.1% females discontinued the contraception method due to perceived side-effects or health concerns.

3.6. Revised Calculation of Unmet Need for Modern Contraception

The revised calculation for unmet need for modern contraception follows the same standard DHS definition [5], except for one difference which is the inclusion of the 13.7% of women using traditional contraception. The calculated unmet need was 11.7% when the standard definition was used, and our revised unmet need for modern contraception was 25.4%. The revised unmet need for modern contraception was 22% in adolescent girls aged 15–19 years, 25% in young women aged 20–24 years and 26.2% in women aged 25–29 years.

Comparison of the standard unmet need as revised by Bradley et al. at DHS [5] and our proposed unmet need for modern contraception is shown in Figure 2.

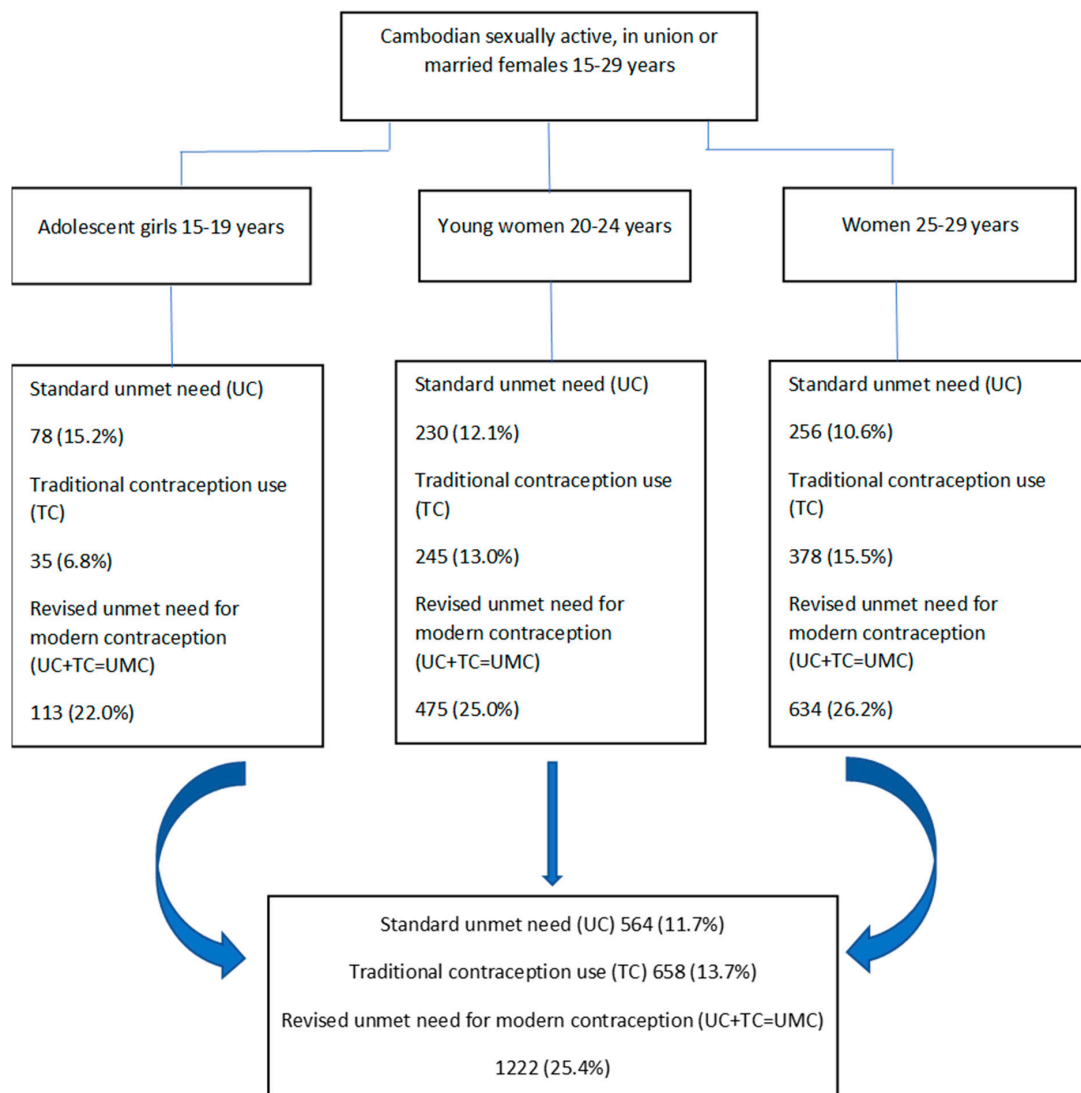


Figure 2. Calculation of Standard unmet need for contraception (UC) and revised unmet need for modern contraception (UMC).

3.7. Demand Satisfied for Modern Contraception (DSMC)

The demand satisfied for modern contraception (DSMC) was 58.1% amongst Cambodian females aged 15–29 years. The adolescent girls 15–19 years had the lowest DSMC with a prevalence of 44.6% compared to 57% DSMC in the young women 20–24 years and 70% DSMC amongst women 25–29 years.

3.8. Qualitative Methods

The second phase included a qualitative descriptive study, conducted in January–April 2019, that employed semi-structured interviews using an interview guide with 30 adolescent girls and women aged 15–29 years in urban Cambodia. Based on the quantitative results (phase one), the qualitative phase explored Cambodian women’s knowledge of their menstrual cycle, and misconceptions about modern contraception. This study adhered to the 32-item checklist of the consolidated criteria for reporting qualitative research (COREQ) guidelines [21].

The qualitative research was conducted in Phnom Penh and Siem Reap Province. Phnom Penh is a thriving business center and attracts migrants from the rural provinces for education or employment opportunities [22]. There are young women working in small businesses, private homes, offices, markets, bars, the tourism industry, as beer promoters [22] and in the entertainment industry. Siem Reap

provincial township is a tourist attraction with associated tourism industries including the Angkor Wat temples that are the main stimulus for the local economy.

Study flyers were distributed with an explanatory statement in the local Khmer language at different locations in Phnom Penh and Siem Reap. These locations included popular marketplaces, university campuses and offices, as well as retail shops, beauty salons, karaoke bars, local hotels and tourism sites, and the garment factories on the outskirts of Phnom Penh. The study details and contact phone number of the bilingual Cambodian female research assistant (RA) was provided on the flyers in the Khmer language so that potential participants could contact the RA for details. This recruitment method was deemed appropriate as young women did not feel pressured or coerced to participate, and their privacy was maintained [23].

The selection criteria for recruitment included women aged 15–29 years, regardless of their employment, religion, ethnicity, level of literacy or marital status. The participating women could be single, sexually active in a current relationship, divorced, married with or without children, or currently pregnant. The participants included those females born in Phnom Penh or Siem Reap, or urban-urban or rural-urban migrants who were living, working or studying in Phnom Penh or Siem Reap.

Data collection was conducted by the first author with the help of the bilingual research assistant (RA) and two local Cambodian female transcriptionists. Purposive and snowball sampling were used to select the 30 participants to ensure maximum variation sampling. The participants or in some cases, their guardians (some adolescent girls were aged 15–17 years) were also given a plain language statement and consent (PLSC) form in the Khmer language. Informed verbal consent was obtained from the participants prior to commencing the interviews that were digitally recorded [23]. The interviews were one-off and lasted for 45–60 min (eight were conducted in English and 22 in the Khmer language). All participants were given a code to maintain their anonymity. Details of psychological and SRH counselling services in Phnom Penh and Siem Reap were provided to the participants at the start of the interviews. The participants were offered member checking but only three accepted the offer and they were emailed their transcript. Rigor was maintained by employing member checking, maximum variation sampling strategy, and 20% of the transcripts (six transcripts) were randomly selected and underwent a quality control check. Reflexivity was maintained by articulating researcher's positionality, and acknowledging her gender, culture, professional history, interest in women's reproductive health, and approach to presenting the results [24]. The researcher's medical and public health professional background was helpful as the participants were more amenable to talk about themselves and their SRH issues.

3.9. Qualitative Data Analysis

The 30 interview transcripts were analyzed manually. After the transcription and translation of the interviews from Khmer into the English language, the researcher immersed herself into the transcriptions several times and classified the data into various categories and codes. An inductive thematic analysis of the data was performed using the reduction and transformation of data technique [25,26]. The data reduction process included selective transformation of data in the interview transcriptions. Categories were made, and codes were generated leading to identification of themes [25,26].

3.10. Qualitative Results

Of the 30 participants, eight were single and not sexually active and 22 were sexually active, of which 12 were married and 10 were in a sexual relationship. Table 3 shows participants' sociodemographic information.

Table 3. Participants' sociodemographic information for the qualitative study.

Id No	Age in Years	Education Status	Job Description	Place of Residence	Relationship Status	Current Contraception Method Used/Desire for Future Contraception
P01	19	1st year university	Student full time	Phnom Penh	Single (not sexually active)	-
P02	17	Year 11	Student full time	Phnom Penh	Single (not sexually active)	Interested in subdermal implant in future
P03	18	Year 12	Student and part time work at a beauty salon	Phnom Penh	Single (not sexually active)	Interested in subdermal implant if in a steady relationship
P04	16	Year 10	Student full time	Phnom Penh	Single (not sexually active)	Interested in subdermal implant in future
P05	18	Year 11	Student full time	Phnom Penh	Single (not sexually active)	Interested in subdermal implant in future
P06	23	Bachelor Degree	Junior manager environment	Phnom Penh	Sexually active (has a partner currently)	Partner using withdrawal method
P07	26	Year 6	Garment factory worker	Phnom Penh	Married (1 month)	Not using any contraception as husband wants to have a baby
P08	24	Year 5	Shop keeper	Phnom Penh	Married (3 years)One child 2 years old	Initially, withdrawal method used, then switched to oral tablets after first child (unintended pregnancy)
P09	25	Year 6	Garment factory worker	Phnom Penh	Married (6 years)One child 5 years old	Initially, calendar method used for a few months, then withdrawal method used. After first child (unintended pregnancy), she switched to IUCD for 3 months, then switched to oral tablets
P10	19	1st year university	Student full time	Phnom Penh	Sexually active (has a partner for previous 4–6 months)	Partner using withdrawal method, she is interested in subdermal implant
P11	17	1st year university	Student full time	Phnom Penh	Single (not sexually active)	Interested in subdermal implant in future
P12	20	2nd year university	Student full time	Phnom Penh	Sexually active (has a partner for previous 3–4 months)	Initially, calendar method used for one month, then withdrawal method
P13	25	Year 12	Housewife	Phnom Penh	Married (7 years), Married at 18 years, One child 5 years	Husband using withdrawal method; she is interested in either IUCD or subdermal implant but not available at the health centre or pharmacies

Table 3. Cont.

Id No	Age in Years	Education Status	Job Description	Place of Residence	Relationship Status	Current Contraception Method Used/Desire for Future Contraception
P14	20	2nd year university	Part time cashier in a mini mart	Phnom Penh	Single (not sexually active)	-
P15	27	Year 12	Part time shop worker	Phnom Penh	Married 8 years 2 children; 6 years and 3.5 years	Initially, withdrawal method used, then switched to IUCD for 3 months but due to heavy bleeding in periods, shifted to oral tablets after second child (unintended pregnancy)
P16	22	Bachelors in Information Technology	Administration and finance assistant	Phnom Penh	Married (1 month)	Husband sometimes uses withdrawal method and wife is using calendar method
P17	23	Year 8	Housewife	Siem Reap Province	Married 4 years 1 child 1 year old	Initially, calendar method for a few months, then withdrawal method
P18	24	Year 7	Housewife	Siem Reap Province	Married 5 years 2 children 4 years and 1.5 years old	Initially, withdrawal method used, then switched to oral tablets after second child (unintended pregnancy)
P19	26	Year 7	Part time shop worker	Phnom Penh	Married 7 years 2 children 6 years and 2 years	Initially, withdrawal method used, then switched to oral tablets after second child (unintended pregnancy)
P20	25	Bachelors Psychology	Govt officer (full time job) Ministry of Social Affairs	Phnom Penh	Married 2 months (Husband was boyfriend for 4–5 years)	Husband sometimes uses withdrawal method; she also uses calendar method
P21	24	Bachelors Information Technology	Disability Action Council (Disability services officer)	Phnom Penh	Married 2 years (Husband was boyfriend)	Oral contraception pills
P22	23	Bachelors (TESOL)	English teacher	Siem Reap	Married 1 month (Husband was boyfriend for 4 years)	Initially, calendar method for a few months, then withdrawal method
P23	22	Year 5	Garment factory worker	Phnom Penh	Widow Engaged now (sexually active with partner)	Initially, calendar method for a few months, then withdrawal method
P24	20	Year 10	Shop worker	Phnom Penh	Boyfriend and is sexually active Sexual debut at 19 years	Partner using withdrawal method
P25	21	Year 12 diploma community college	Works in a family owned business and	Phnom Penh	Single (not sexually active)	-
P26	25	Masters (USA) on scholarship	Product specialist at a telecom company	Phnom Penh	Sexually active (she has a partner for the past 2 years), Sexual debut at 21 years with 1st boyfriend. Second partner since age 22	Partner using condoms She is interested in subdermal implant in future.

Table 3. Cont.

Id No	Age in Years	Education Status	Job Description	Place of Residence	Relationship Status	Current Contraception Method Used/Desire for Future Contraception
P27	25	Bachelors (overseas) Currently doing Masters in Business administration	Program manager	Phnom Penh	Sexually active; she has had two boyfriends, the last one 6 months ago.	Second (current partner) using withdrawal method First partner used condoms Interested in subdermal implant in future and can not find any subdermal implants at the pharmacy
P28	18	Year 2	Helper in a beauty salon in Boeng Kang Kong 2	Phnom Penh	Sexually active, and had sexual debut 3–4 months ago	Partner using withdrawal method
P29	19	Year 5	Cold drinks cart seller	Phnom Penh	Sexually active and has a boyfriend	Partner using withdrawal method
P30	19	1st year university	Student	Phnom Penh	Sexually active and she has a boyfriend	Initially, calendar method for few months, then withdrawal method used, then condom use and is interested in subdermal implant

4. Major and Minor Themes

4.1. Lack of Knowledge about Menstrual Cycle

All participants were shown an image of the menstrual cycle and asked to indicate the safe days and unsafe days (ovulation) for a woman if she is sexually active without using any contraception. Twenty-four out of the 30 adolescent girls and women, whether single, married or in union, had no idea about the ovulation period or unsafe period during their menstrual cycle when a woman might get pregnant if she had sex without using any contraception.

“Yes, if the woman sleeps with a man, she is safe after the periods, umm . . . from day eight”. (P9, 25 years, married)

“She is not safe during these days (she can become pregnant) . . . the 5 days before the bleeding and during the bleeding days”. (P12, 20 years, sexually active)

4.2. Misconceptions about Modern Contraception

4.2.1. Fear of Health Side-Effects with Oral Pills

The participants were concerned about the perceived health side-effects of hormone-based contraception such as the oral pills which included headaches and weight loss. They were also concerned about heavy menstrual bleeding associated with the use of an IUCD.

“I can see how the body changes (weight loss) and headaches . . . Some of my friends gave me information and told me what is inside of the prescription for oral pills, and I have already decided not to use it”. (P6, 23 years, sexually active)

4.2.2. Fear of IUCD as Foreign Object

Some women believed that the IUCD was a ‘foreign object’ and it could potentially cause harm inside a woman’s body or it could perforate their abdomen. Most young women showed interest in using subdermal implants as LARCs in the future but not IUCDs. Two married women had used IUCDs for a few months, but they shifted to oral contraception pills. Their fears of using IUCDs were reinforced by their own negative experiences or of friends or a family member.

“For coil (IUCD), some people (women) will lose weight or get sick, too much bleeding. The coil is not safe, it can get out in my body and maybe badly affect my stomach, I will get sick and thin”. (P09, 25 years, married with one child)

4.2.3. Fear of Infertility with Hormone-Based Modern Methods

Adolescent girls and women feared the loss of subsequent fertility which was explicitly associated with the use of hormone-based contraception methods including oral pills or injections.

“After they (women) use it (oral pills) for a long time and when they want to have a baby, they cannot have it”. (P12, 20 years, sexually active)

“Pills can cause a woman not to have a baby forever, so not good for her”. (P1, 19 years, single and not sexually active)

“I will wait to use the injection or (oral) pills once I get one baby. Afterwards, I will use the pills, because if we use it right before having baby, then baby is delayed. However, if we use it after we had a baby, it is ok”. (P14, 20 years, not sexually active)

4.3. Use of Withdrawal Method by Partners and Husbands

Fourteen of the 22 sexually active women reported that their partners or husbands preferred to use the withdrawal method of traditional contraception (coitus interruptus or pull out method). Women received the information about the withdrawal method from their partners or husbands at the time of sexual initiation, whether within or out of marriage. Their partners or husbands themselves received the information from unreliable sources such as friends and colleagues. These women had low autonomy for choosing a contraception method. In many cases, it was the partner or the husband who chose a contraception method, and it was mostly the withdrawal method.

“My boyfriend is using natural method (withdrawal). He wants it this way as he says it is safe”. (P10, 19 years, sexually active)

5. Discussion

Unmet need for modern contraception increases to 25.3% once the current users of traditional contraception methods are included in the calculation. Women using unreliable traditional contraception need to be included in the proportion of women having an ‘unmet need for modern contraception’ instead of the current classification which presumes they have a ‘met need’. Cleland et al. and Sinai et al. also suggest that users of traditional contraception methods should be categorized as non-users of modern contraception [20,27]. This suggestion is based on the assumption that users of traditional methods either lack access to modern contraception, or do not have information about the modern method alternatives [27].

As shown in our quantitative findings, it is concerning that 76.5% of females did not understand their menstrual cycle or the days on which they are most likely to ovulate. This was supported by the qualitative finding that most women did not know about the correct ovulation period (unsafe period) when shown an image of the menstrual cycle. This is why the mix methods research can yield rigorous data. It brings to our attention the fact that these women were not capable of determining their ovulation days and could not effectively use the calendar rhythm method (traditional contraception method). Another study reports that female adolescents and youth often use the rhythm method as traditional contraception, but this method becomes unreliable as adolescent girls usually have irregular menstrual cycles and lack of SRH literacy [28].

There are some internet based and mobile app- based fertility tracking methods as natural or fertility awareness-based methods (FABMs) to prevent pregnancy which have emerged in recent years [29]. The FABMs are only effective if women observe and record the fertility biomarkers and follow the evidence-based protocols [29]. Women solely relying on the app-based fertility tracking without the mandatory training for using the method are still at risk of having unintended pregnancies [29]. The fertility awareness-based methods such as FABMs can have merit if the patient and clinician are properly educated and the healthcare providers guide the women about the various effective contraception choices. However, in Cambodia, using the calendar based traditional method might not be an effective method of contraception (abstinence from sex during ovulation days) among the adolescent girls and women. The low SRH literacy and lack of knowledge of their menstrual cycle, coupled with low formal education levels and reduced autonomy puts these traditional method users at-risk of having unintended pregnancies and abortions.

The qualitative complementary results indicate perceived fear of modern methods. These misconceptions seem to be the driver of low use of modern methods, hence the increased unmet need for modern contraception among adolescent girls and women aged 15–29 years. The perceived health side-effects of some modern methods include headaches and infertility caused by oral pills and injections, and weight loss, heavy bleeding or injury in the abdomen due to the invasiveness of IUCD as a foreign body. The lack of knowledge and communication about SRH and contraception is pervasive in the Cambodian society among youth and women. Adolescent girls and women fear the health side-effects of modern methods and often switch to traditional methods. In our sample of

sexually active females from the 2014 CDHS, 13.7% were using traditional contraception methods. The females using traditional contraception methods are at an increased risk of having unintended pregnancies or induced abortions as a consequence of high failure rates.

The qualitative results resonate well with the quantitative findings and point at the method related misconceptions, reflecting a dearth of SRH literacy and youth-friendly family planning services in Cambodia. This highlights a need to educate and train the healthcare personnel to deliver person-centered, effective communication about the range of choices and the mechanism of action of modern contraceptives. This in turn could mitigate and dispel any contraception related qualms, fears, and anxieties in adolescent girls and women.

Our quantitative results show that among the modern contraception users, adolescent girls aged 15–19 years are the most vulnerable group with the lowest DSMC. Our results also show increased unmet need for modern contraception in adolescent girls and women with multiparity. The main reason is the cultural trend for young females to be get married early as adolescents (child brides) and youth in their twenties [10]. One in every four Cambodian women are married before they turn 18 years, and 50% of the women in Cambodia are married by the age 20.5 years [7]. We posit that these young married women face social pressure to prove their fertility. In the absence of any effective contraception use, these women have early and repeat pregnancies, many of which are unintended pregnancies, and this theory has been supported by results from another study in Cambodia [9]. Cambodian adolescent girls, and younger women either do not use contraception, or switch from short-term, hormone-based modern methods such as oral pills or injections to traditional methods due to hearsay from friends, and misconceptions about the perceived side-effects of modern contraception [30]. The United Nations for Population Fund (UNFPA) advise breaking the cycle of unintended and adolescent pregnancies by effectively reducing child marriage and improving the female youth and women's accessibility to SRH and modern methods of family planning [31].

The quantitative results showed a significant increase in the unmet need for modern contraception in the urban Cambodian women. In this age of urbanization and globalization, many young women migrate from the rural areas to urban areas for education and employment, with Phnom Penh and Siem Reap amongst the biggest draw cards for economic reasons. There are multiple garment factories in the peri-urban areas of Phnom Penh, where young rural women find employment [32]. We posit that the young females usually reside in the low socioeconomic, peri-urban areas with limited access to SRH and family planning services. Additionally, a review of literature from Cambodia showed increased rural to urban migration with many female youth finding employment in the entertainment industries [11,33]. These female youth face multiple barriers in accessing SRH services including personal, financial, literacy or information, communication, and cultural barriers [11,33].

The qualitative findings indicate 14 out of the 22 sexually active or married females reported their partners or husbands were using the withdrawal method. The withdrawal method has a high failure rate and does not prevent STIs, including human immunodeficiency virus (HIV), or unintended pregnancies [27,28,34,35]. Most of the females' partners tended not to use condoms as a show of tenderness, affection and mutual trust with their female partner or wife, or due to their desire to have sex in a natural way. This poses a danger to their female partners in terms of unintended pregnancies, abortions, and STIs. In a study in the United States, 31% of female youth aged 15–24 years reported their male partners were using the withdrawal method [36] and of those young women, 21.4% experienced an unintended pregnancy, and 7.5% reported having used an emergency contraception pill due to the pregnancy risk [36]. We recommend raising the SRH literacy amongst the youth, women and men in Cambodia by planning and implementing a national SRH literacy program. The policy implications are presented in Table 4.

Table 4. Policy implications.

<p>What we already know</p> <ul style="list-style-type: none"> • The Cambodian National Institute of Statistics reports show that many adolescent girls and young women aged 15–24 years use traditional contraception methods and perceive themselves as having met need for contraception. • The failure of traditional contraception methods can lead to unintended pregnancies and induced abortions. • The unmet need for modern contraception is an important indicator in the correct calculation of demand satisfied for modern contraception (DSMC) which is an indicator 3.7.1 for the target 3.7 of the sustainable development goal (SDG) 3.
<p>What this paper adds</p> <ul style="list-style-type: none"> • The revised calculation shows higher unmet need for modern contraception in Cambodian females aged 15–29 years which is concerning as it is a significant public health issue. • The revised calculation can help to identify and target women at-risk of unintended pregnancies and induced abortions. • The majority of Cambodian adolescent girls and women do not have knowledge about their menstrual cycle. Misconceptions and fear of the hormone-based modern contraceptives are prevalent and are based on limited or incorrect information.
<p>What are the policy implications?</p> <ul style="list-style-type: none"> • There is a need for a holistic policy shift in Cambodia to address the misconceptions for modern contraceptives by having a culturally acceptable and robust SRH literacy program with concurrent increase in the supply of modern methods. • An improved modern contraception prevalence rate is vital as part of the Family Planning Initiative 2020 in Cambodia that will result in a decrease in unintended pregnancies and abortions.

6. Limitations

The quantitative and some of the qualitative data is self-reported and there is a chance of recall bias. The study's focus is on Cambodian sexually active female adolescents and women under 30 years of age in heterosexual relationships. The negative repercussions of unmet need for modern contraception in this group of females are serious in terms of the risk of having unintended pregnancies or induced abortions. However, the results from this study may not apply to women over the age of 30 years. This paper solely discusses the use or non-use of contraception for pregnancy prevention but does not cover emergency contraception. Although women may report currently using a modern contraception method, the indicator for DSMC is unable to confirm whether they are using the modern method correctly and consistently.

The second phase was a qualitative cross-cultural study that was conducted in Cambodia by a non-Khmer speaking expatriate researcher. Several steps were taken to address any cross-cultural language issues by employing a bilingual female RA and two transcriptionists who were fluent in the Khmer and English languages. Additionally, discussions around the positionality of the researcher and the RA were held with the participants and all interviews except eight (conducted in English) were conducted in the Khmer language with verbatim translation into English. Some issues related to women's fear of the invasiveness of contraceptive methods regarding IUCDs were explored however more in-depth qualitative research is warranted. Future quantitative and qualitative research is needed with males and females in the same age groups to obtain additional information about the misconceptions identified in this study and high unmet need for modern contraception.

7. Conclusions

The unmet need for contraception as calculated by the standard definition shows an underestimated percentage of Cambodian females who are in need of effective modern contraception. Traditional contraception methods are not effective for consistently preventing pregnancy. We need a revised definition where women using traditional contraception methods are categorized as having

unmet need for modern contraception. Major drivers of increased unmet need for modern contraception include low formal literacy, misconceptions about modern methods and low autonomy to choose modern contraception. It is imperative to design and implement a targeted countrywide SRH literacy and family planning program with a focus to decrease the unintended pregnancies, induced abortions and STIs.

7.1. Recommendations

7.1.1. Sexual and Reproductive Health Literacy Program

These findings also support a multipronged and targeted SRH literacy program in Cambodia, with a concurrent increase in the provision of modern contraception methods among the Cambodian male and female youth and men and women and to be inclusive of all persons, regardless of their sex or gender identity, ethnicity and abilities.

7.1.2. Focus on Acceptability, Affordability and Availability of Modern Contraceptives

An ongoing effort is recommended to reduce the misconceptions and myths about the perceived side-effects of hormone-based modern contraception methods. There is a need to remove barriers at the user and supply side for the provision of modern contraception methods including oral pills, subdermal implants, IUCDs (hormonal and copper IUCDs) and condoms. Condoms could be made available via vending machines as also suggested earlier in another study in Cambodia [37]. There is a need to ensure the availability of modern contraceptives through government approved voucher schemes with subsidized rates at all the private clinics and health facility centers.

7.1.3. Modern Contraception Information via the Internet and Social Media

An awareness campaign for SRH and modern contraception methods could be delivered in the form of mobile-phone text messages and on social media and Facebook as part of a sponsored family planning program supported by the Cambodian Government.

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