

Pattern and determinants of contraceptive usage among women of reproductive age in the United Arab Emirates

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ABSTRACT

Introduction: Women in the UAE and Muslim countries are a largely understudied population with significant disparities in knowledge to most basic health concerns and family planning. Our objective was to identify UAE contraceptive knowledge similarities and variances to other world regions, and to inform efforts to improve contraceptive care at Arab world and Muslim countries. **Methods:** Structured questionnaire consisting of socio-demographic characteristics, knowledge, beliefs and attitudes related to contraception methods. **Results:** The use of effective contraception methods was associated with higher educational levels of UAE national women who desired to conceive. These women had knowledge of contraception that was associated with an identified impact of their spouse on their choice of contraception. Religion plays an essential role in knowledge on the risk of contraception and safe type of contraceptive methods in the UAE. Statistically significant predictors of having knowledge on different methods of contraception were nationality, $P < 0.002$; education level, $P < 0.03$; number of marriages $P < 0.002$; monthly income, $P < 0.04$; and the number of children, $P < 0.015$. **Conclusions:** Our results demonstrate that higher education and communication of the benefits and risks of different types of contraceptive methods are needed to improve the use of contraception in the UAE population. We recommend additional training in this area for healthcare providers. The involvement of the spouse in the mutual understanding of contraception and its choice coupled with third party insurance coverage may decrease knowledge and utilization gaps further assisting in providing a best contraceptive method.

Keywords: Contraception, family planning, United Arab Emirates, women health

Introduction

Women in the United Arab Emirates (UAE) and Muslim countries are a largely understudied population with significant disparities in knowledge to most basic health

concerns and family planning. We aimed to investigate variations in contraceptive preferences, beliefs and behaviors affecting fertility, as well as factors associated with the use of contraception among women of reproductive age in UAE. Our objective was to identify UAE contraceptive knowledge similarities and variances to other world regions and to inform efforts to improve contraceptive care at Arab world and Muslim countries.

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Contraceptives are family planning methods which can assist individuals in managing their fertility, birth spacing and number of children.^[1,2] To aid optimal child growth and to prevent adverse pregnancy outcomes, a time of two years is recommended between births.^[1] Contraceptive choice may be influenced by socio-demographic factors. This might vary over one's lifetime due to changes in relationships and pregnancy intentions.^[3,4] It has been suggested that the concept of choice is 'gendered, classed, aged, cultured, and available only in accordance to ability and access',^[5] which is also relevant to contraceptive choice and use.

The Centers for Disease Control and Prevention (CDC) have categorized the most commonly used methods of contraception by their level of effectiveness.^[6] Sterilization is the most effective method followed by two types of long-acting reversible contraception (LARC); the contraceptive implant, and intrauterine devices. Methods with mid-range effectiveness require daily use, during intercourse, injectable contraceptives (e.g. Depo-Provera[®]), the oral contraceptive pill, and vaginal rings. The least effective methods include condoms, withdrawal, and fertility-awareness-based methods.^[7] Injectable contraceptives do not require daily administration or use before, during or after sexual intercourse.

United Arab Emirates (UAE) is a young country and the authorities are encouraging child birth, while at the same time promoting the safe use of contraception for individual and family needs. United Arab Emirates health authorities have made considerable improvements with regards to the availability of contraceptive measures in both the public and private sectors.^[8] The estimated prevalence of contraceptive use in the UAE among married women aged 15-49 years old was 27.5%^[9] in 1995 and has increased to 41% by 2001.^[10] The reasons behind using specific type of contraception among UAE women is not understood at this time and we were interested in finding out why.

We aimed to investigate variations in contraceptive preferences as well as the beliefs and behaviors that affect fertility. We also needed to understand the factors associated with the use of specific types of contraception among women of reproductive age in the UAE. We identified a need to contribute to the broader literature on reproductive health disparities in the Arab world and Muslim countries, and specifically wanted to inform efforts to improve the understanding and use of contraceptives.

Methods

Study design

This cross-sectional survey was conducted from May to September 2018.

Study procedure

Participants for the study were recruited from primary healthcare centers, and other places such as shopping malls, areas of work

and other social centers using convenience sampling. Participants living in UAE that were interested in participation and willing to provide a written informed consent were selected for the study. Our participants were assured of the confidentiality of the information provided and protection of their rights to privacy, mandated by the research ethics guidelines of the human research ethics committees. The inclusion criteria restricted participants to be women of reproductive age 18-49 years, having appropriate cognitive skills, and an ability to read and understand English or Arabic (e.g., the local language). Both UAE citizens (nationals) and expatriates were included in the study. Women with impaired cognitive ability who were unable to give consent were excluded.

Survey design (Evaluation tools)

A structured questionnaire was designed and developed by a multidisciplinary team and a thorough review of the literature identified relevant studies.^[11-15] The evaluation tool was then pre-tested among 20 adults to assess the ease of understanding and time required for completion. The bilingual questionnaire used in Arabic and English is represented in APPX I. The survey consisted of four functional domains (socio-demographic characteristics, knowledge, beliefs, and attitudes related to contraception methods). The demographic data included age, nationality, marital status, educational level, occupation and religion. Extra marital relations were not discussed due to the difficulties in collecting these data in an Islamic culture. The survey definition of "using contraception" was "any use of a method with the aim of controlling birth." The definition of "current or recent user" was the use of contraception in the previous 12 months only and the "previous user" was "before the last 12 months".

The questionnaire included questions about the participant's reproductive history, past and current use of any birth control method, if any, along with the importance they attached to various features of different techniques and their opinions about the mechanisms of action of birth control methods. Women that were using a contraceptive method were asked if a physician suggested it or if they requested it and if they discussed the choice with their partner. Contraception use was divided into three levels: highly effective (implant, IUD, male sterilization, female sterilization), medium effective (injection, patch, rings, and diaphragm), and less effective (condom, withdrawal, sponge, calendar, and spermicide). The participant's knowledge about the risks of contraception was divided into good (if all the risks were selected), fair (if some dangers were selected) and weak (if none of the above was selected). Questionnaires were administered during face-to-face interviews after informed consent was granted and conducted in Arabic or English by physician researchers.

Data analysis and statistics

All collected data were entered into SPSS version 22 (IBM Corp., Released 2011, Armonk, NY, US) for statistical analysis. We computed descriptive statistics for all socio-demographic

variables. The overall response to each item of the survey was recorded as a percentage of the total response. The percentage differences in the total responses were determined using the Chi-square test and statistical significance recorded for non-parametric data. For all analyses, alpha (α) was set at 0.05 with a power of 80%. We also used logistic regression models to determine which demographic, knowledge and attitudinal characteristics were associated with the type of contraception used on an effectiveness prospective. Factors that were significantly associated were included in the regression model and the relationship summarized with adjusted odds ratios.

We used receiver operating characteristic (ROC) curves to summarize the discrimination ability of the multiple logistic regression model. We desired to assess the efficacy of the binary classification algorithm and to identify the optimal threshold based on our tolerance for false negatives and desire for true positives. We identified the area under the ROC curve (AUC) that demonstrates the probability that the model correctly ranks the pairs of observations. Thus, the area under the curve can range from one, corresponding to perfect discrimination, to 0.5, corresponding to a model with no discrimination ability.

Ethics statement

The study was approved by the institutional review boards of Dubai Health Authority, Dubai (Approval # DSREC-03/2018-01). Participants were not compensated. All participants gave written informed consent before participation. An aggregate reporting of data assured to enhance confidentiality and accurate reporting by the respondents. The return of the completed survey also guaranteed the anonymity of participation constructs to an administrator; independent and blinded to the study hypothesis. A code linking respondents to their surveys was kept isolated from the investigators.

Results

Of the 1520 women we contacted, 722 were willing to participate in the study and gave informed consent (response rate of 47%). The majority of our respondents were 18-29 years of age and were UAE nationals who were Muslims, had college degrees or a higher degree certificate, married (age of marriage between age 20-25 years), and with at least 1-3 pregnancies [Table 1]. The majority of women surveyed had heard about contraception methods (638, 91%), used family planning (357, 51%), were willing to use contraception (285, 42%), and their last pregnancy was planned (389, 56%).

When asked about the source of contraceptive methods, a slight majority identified recommendation by a gynecologist or family doctor (392, 54%) with contraception counseling given in prenatal clinic to less than half of the participants (308, 43%). In addition, most of the women mentioned that their husbands have an impact on the choice of contraception (519, 77%), whereas religion and culture do not (447, 75%; and 441, 74% respectively). The main reason for not using contraceptive methods among

surveyed women was their belief that it fails in preventing pregnancy (211, 52%). Our participants identified the most common type of contraception method was withdrawal (201, 28%), followed by the use of an intrauterine device (168, 23%), with the use of condoms last (168, 23%) [Figure 1]. Interestingly, the majority of the participants (209, 40%) did not involve themselves in any family planning or contraceptive use after their last pregnancy [Table 2]. Our questionnaire revealed a reduced level of knowledge on the benefits and risks of using contraception with a lack of education on emergency contraceptive usage. In spite of the lack of knowledge in this area, the majority of participants (555, 80%), felt that family planning and contraception counseling is essential [Table 3].

We found a significant difference in a desire to conceive between different age groups ($P < 0.0001$) and the number of children ($P < 0.001$) as well as UAE nationals compared to non-UAE national ($P < 0.0001$). Of women that stated they were more willing to conceive, the majority of were in the age group 40-54 and were UAE national women with only one child. We identified a significant association of contraceptive use with a woman's age and the number of her children in participants that had a history of using a family planning method. Women under 20 years of age (70/117, 60%; $P < 0.01$) and women that had four or more children (103/169, 61%; $P < 0.03$) had the highest percentage of using family planning. Captivatingly, we have found that planning for pregnancy was more frequent in non-Muslim women (39/50, 78%; $P < 0.006$) that had College and higher degrees (317/533, 59%; $P < 0.008$) when compared to Muslim women.

UAE nationals (417/437, 95%; $P < 0.002$), women with higher education (507/538, 94%; $P < 0.03$) and higher income (57/58, 98%; $P < 0.04$), as well as women with only one marriage (596/640, 93%. $P < 0.002$), and those with more than 25 years at first marriage 9171/180, 95%; $P < 0.01$) were significantly associated with having heard about contraceptive methods. We also found

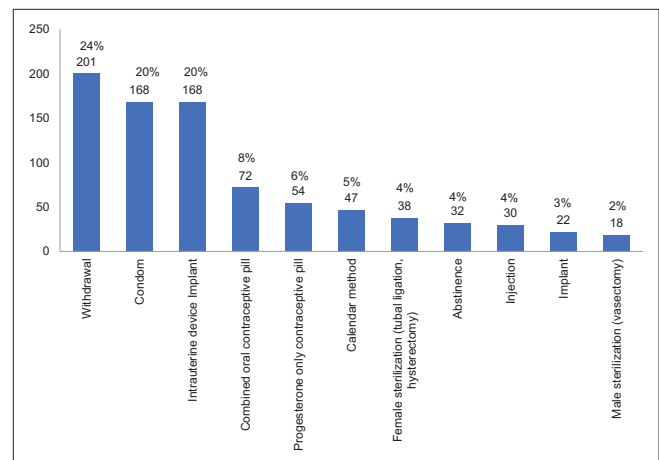


Figure 1: Pattern of contraceptive usage among women of reproductive age in the United Arab Emirates. More than one option was chosen by participant

Table 1: Descriptive demographic characteristics of participants (n=722)

Variable, n (%)					
Age (Years)	18-29	30-39	40-54		
	441 (64)	95 (14)	156 (22)		
Nationality	UAE	Non-UAE			
	443 (62)	267 (38)			
Religion	Muslim	Christian/Jewish/other			
	661 (93)	52 (7)			
Emirates Residing in	Abu Dhabi	Dubai	Sharjah	Northern emirates	
	138 (19)	295 (42)	121 (17)	156 (22)	
Education level	High school or less		College/higher degrees		
	168 (24)		546 (76)		
Husband's Education level	High school or less		College/higher degrees		
	228 (32)		477 (68)		
Marital status	Married	Divorced/Widowed			
	673 (95)	35 (5)			
Number of marriages	1	≥2			
	649 (93)	51 (7)			
Age at first marriage, years	less than 20	20-25	≥25		
	120 (17)	399 (57)	181 (26)		
Number of pregnancies	None	1-3	4-5	≥6	
	48 (7)	415 (58)	163 (23)	83 (12)	
Number of children	None	1	2	3	>4
	76 (11)	133 (19)	184 (26)	145 (20)	172 (24)
Work status	Employee	Retired	Student	Housewife	
	401 (56)	19 (3)	42 (6)	251 (35)	
Monthly income, AED	Less than 20,000	20,000-40,000	More than 40,000		
	348 (53)	251 (38)	58 (9)		
Health Insurance Coverage	Uninsured	Insured			
	141 (20)	573 (80)			

that women with 4 or more children (166/171, 97%, $P < 0.01$) were more likely to have heard about contraception than those who had fewer children.

The knowledge of the various types of contraception available with associated risks and safety were analyzed in regards to different sociodemographic characteristics of our participants with significant results presented in tabular format [Table 4].

We examined all of the variables in our survey and ran multiple logistic regression models that included all variables in all possible combinations to identify variables that might be statistically significant predictors of various outcomes. Variables that were not found to be statistically significant predictors of an outcome were omitted from that model and then subjected to analysis to ascertain their relationships. We fitted a multiple logistic regression model that demonstrated all of the statistically significant predictors of a subject having a desire to conceive (nationality, number of marriages, number of pregnancies and number of children). The likelihood-ratio (LR) was significant with a Chi-squared (5) = 97.12, $P < 0.0001$. We also fitted a hierarchical regression model of the same statistically significant predictors of a desire to conceive and found it to be highly statistically significant for all predictors.

We desired to explore predictors of those women that did not desire to conceive. We therefore fitted a multiple logistic

regression model that demonstrated all of the statistically significant predictors of a subject that did not have a desire to conceive (nationality, number of marriages, number of pregnancies and number of children). The likelihood-ratio (LR) Chi-squared (5) = 99.33, $P < 0.0001$ was slightly higher than the LR of the subjects that did desire to conceive (97.12). Differing from the previous model examining those subjects that desired to conceive, two predictors (number of marriages, $P < 0.1$ and number of pregnancies, $P < 0.4$) were not statistically significant in the no desire to conceive model. However, when we fitted a hierarchical regression model of the same predictors of a desire to conceive, there was high statistically significant predictors of all of the variables seen in the desired to conceived group except that the number of marriages was no longer statistically significant ($P < 0.2$). The number of pregnancies was found to be a statistically significant predictor of not desiring to conceive ($P < 0.0005$) by the hierarchical regression model.

We then fitted a multiple logistic regression model that demonstrated all of the statistically significant predictors of subjects that had used family planning methods in the past. We found several (age at first marriage, number of pregnancies and the number of children) that proved statistically significant. However, the number of pregnancies was not statistically significant ($P < 0.7$) in the general model. We then fitted a hierarchical regression model of these same predictors that

Table 2: Contraception characteristics of women participants (n=1000). * Female sterilization: tubal ligation, hysterectomy

Variable, n (%)					
Desire to conceive	Yes	No	Unsure		
	292 (42)	232 (33)	173 (25)		
Used family planning	Yes	No			
	357 (51)	342 (49)			
Willing to use contraception	Yes	No			
	285 (42)	402 (58)			
last pregnancy planned	Yes	No			
	389 (56)	305 (44)			
Ever heard about Contraception methods	Yes	No			
	638 (91)	64 (9)			
How did you know about Contraception	Gynecologist/ family doctor	Health publication	Friends	Media	Lectures/conferences
	392 (54)	169 (23)	403 (59)	206 (28)	54 (8)
Where contraception counseling was given	Prenatal clinic	Postnatal ward	Well-baby clinic	Family clinic	Lactation clinic
	308 (43)	260 (36)	42 (6)	204 (28)	65 (9)
Your Husband has an impact on your contraception preference	Yes	No			
	519 (77)	152 (23)			
Religion plays an important role in your choice of contraception preference	Yes	No			
	153 (25)	447 (75)			
Culture play an important role in your choice of contraception preference	Yes	No			
	159 (26)	441 (74)			
Reasons NOT to using contraception	It is against religious teachings	Because most contraceptive methods fail	Relatives and friends do not approve of birth control	It is against the ethical values of marriage	
	63 (16)	211 (52)	42 (10)	90 (22)	
Type of contraception you are currently using	Female sterilization*	Injection	Male sterilization (vasectomy)	Condom	
	36 (5)	30 (4)	18 (2)	168 (23)	
	Intrauterine device	Combined oral contraceptive pill	Calendar method	Progesterone only contraceptive pill	
	Implant			54 (7)	
	168 (23)	72 (10)	47 (6)		
	Abstinence	Implant	Withdrawal		
	32 (4)	22 (3)	201 (28)		
Reasons for choosing a particular contraception method	Recommendation of physicians	Inconvenience of other methods	Complication of other methods	Advice of friends or relatives	
	186 (36)	91 (18)	61 (12)	33 (6)	
	Contraindication to other methods		Personal choice	Failure of other methods	
	20 (4)		115 (22)	10 (2)	
You obtained contraceptives from	Government facilities		Private facilities		
	120 (30)		277 (70)		
Time of starting family planning after the last pregnancy	≤6 wk	7 wk to 6 mo	>6-12 mo	>12 mo	Did not use any
	114 (22)	88 (17)	47 (9)	61 (12)	209 (40)

demonstrated that all predictors were highly statistically significant in this role, including the number of pregnancies ($P < 0.01$). This hierarchical model also demonstrated high statistical significance for all associated predictors that we have previously described.

Those women that did not involve themselves in any family planning in the past were also placed in a multiple regression model to identify what variables might be predictive of this phenomena revealing a likelihood-ratio (LR) Chi-squared (3) =20.34, $P < 0.0001$. Further examination revealed that two predictors were statistically significant (age at first marriage, $P < 0.01$ and the number of children, $P < 0.03$) while the

number of pregnancies was not ($P < 0.7$). We also fitted a hierarchical regression model of the same statistically significant predictors of a desire to conceive and found it to be highly statistically significant for all predictors including the number of pregnancies ($P < 0.1$).

A woman's education level ($P < 0.008$) and religion (0.006) were statistically significant predictors of planning of their last pregnancy with a likelihood-ratio (LR) Chi-squared (3) =21.25, $P < 0.0001$ for this multiple logistic regression model. We included the age at first marriage in the analysis but it was not a significant predictor of planning of the last pregnancy ($P < 0.1$).

Table 3: Contraception knowledge of women participants (n=722). * Female sterilization: tubal ligation, hysterectomy

Variable, n (%)						
Which of the following are the benefit of using contraceptive methods for	for permanent birth control after completing the family instead of birth spacing only	for treatment of gynecological diseases in unmarried women	for birth spacing only	to protect against sexually transmitted disease	Sterilization as a method of birth control without medical indications	for birth control before the first pregnancy
	391 (54)	152 (21)	111 (15)	93 (13)	68 (10)	48 (7)
Contraception increases the risk of	Higher blood pressure	Weight gain	Fertility delay	Mood swing	Pelvic infection	Cancer
	242 (34)	262 (36)	229 (32)	173 (24)	91 (13)	102 (14)
	Ectopic pregnancy	Heart attack and stroke	All of the above	None of the above		
	46 (7)	38 (5)	173 (24)	46 (6)		
Safest contraception method is	Female sterilization		Intrauterine device	Implant	Condom	Injection
	70 (11)		167 (25)		295 (45)	26 (4)
	Combined oral contraceptive pill		Male sterilization		Progesterone only contraceptive pill	
	41 (6)		38 (6)		20 (3)	
Discussion about contraception with spouse is embarrassing	Agree	Disagree				
	179 (26)	512 (74)				
Ever heard about emergency contraception	Yes	No				
	209 (30)	489 (70)				
Emergency contraception works as abortive method	Yes	No	I don't know			
	59 (8)	111 (16)	524 (76)			
Emergency contraception is only affective if used less than 24 hours after unprotected intercourse	Yes	No	I don't know			
	143 (21)	77 (11)	475 (68)			
Family planning & contraception counseling is important	Yes	No	I don't know			
	555 (80)	58 (8)	82 (12)			

We also fitted a hierarchical regression model that demonstrated that the age of the first marriage was also not statistically significant as a predictor in this model ($P < 0.1$) but the woman's education level ($P < 0.001$) and religion ($P < 0.004$) were. Women that did not plan their pregnancy were found to be associated with statistically significant predictability of education level ($P < 0.008$) and religion ($P < 0.006$). The likelihood-ratio (LR) Chi-squared (3) = 21.25, $P < 0.0001$ was calculated for this multiple logistic regression model.

Some women had heard about different methods of contraception. These women had numerous statistically significant predictors (nationality, $P < 0.002$; education level, $P < 0.03$; number of marriages $P < 0.002$; monthly income, $P < 0.04$; age at first marriage, $P < 0.01$ and the number of children, $P < 0.01$). The likelihood-ratio (LR) Chi-squared (9) = 93.00, $P < 0.00001$ was calculated for this multiple logistic regression model. We also fitted a hierarchical regression model that revealed high statistical significance in all of the previous predictors plus having a residence in an Emirate ($P < 0.0004$). Interestingly, marital status was a statistically significant predictor as was hearing about different methods of contraception in the hierarchical model ($P < 0.01$), but not in the general multi logistic regression model.

Women that had not heard about different methods of contraception had several statistically significant predictors (nationality, $P < 0.002$; education level, $P < 0.03$; number of marriages, $P < 0.002$;

monthly income, $P < 0.04$; age at first marriage, $P < 0.01$; and the number of children, $P < 0.01$). The likelihood-ratio (LR) Chi-squared (9) = 93.00, $P < 0.00001$ was calculated for this multiple logistic regression model. We also fitted a hierarchical regression model that revealed a high statistical significance in all of the previous predictors plus marital status ($P < 0.01$), residing in an Emirate ($P < 0.0004$) and the number of children ($P < 0.01$).

We used receiver operating characteristic (ROC) curves to summarize the discrimination ability of the multiple logistic regression model. We desired to assess the efficacy of the binary classification algorithm and to identify the optimal threshold based on our tolerance for false negatives and desire for true positives. The area under the ROC curve (AUC) demonstrates the probability that the model correctly ranks the pairs of observations. A model with discrimination ability has an ROC curve which goes closer to the top left hand corner of the plot, whereas a model with no discrimination ability has an ROC curve close to a 45-degree line. Thus, the area under the curve can range from 1, corresponding to perfect discrimination, to 0.5, corresponding to a model with no discrimination ability [Figures 2 and 3].

Discussion

This study demonstrates that approximately half (357, 51%) of our participants have used a contraceptive method during their lifetime. This is higher than the approximately 45% of

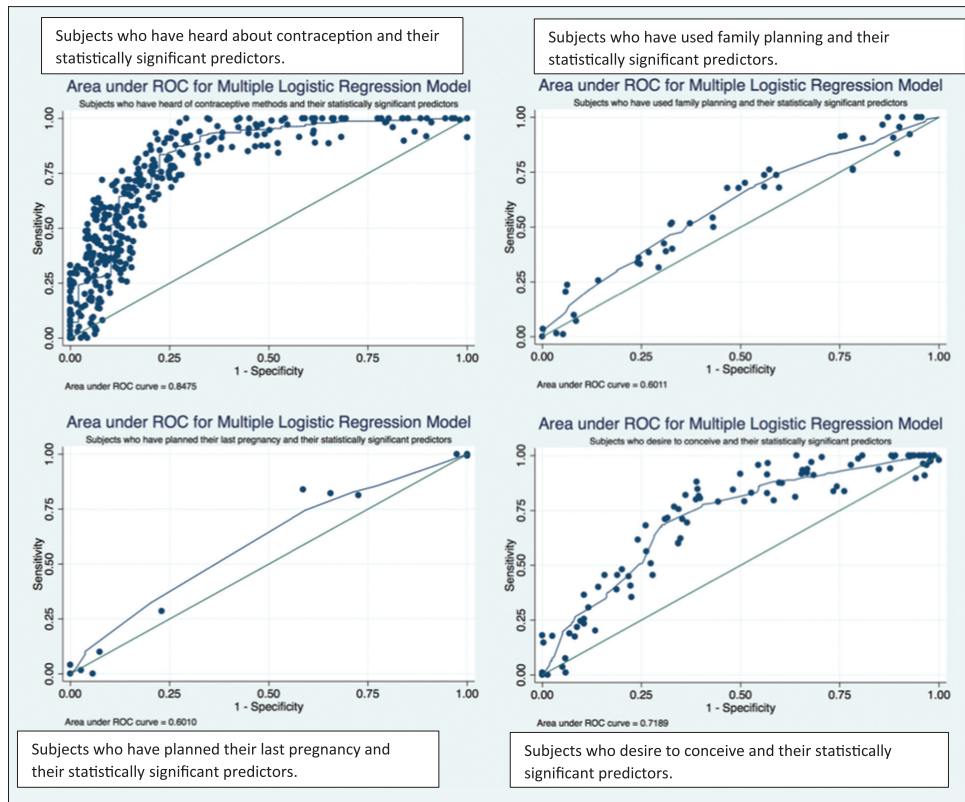


Figure 2: A fitted logistic model of subjects that have heard of contraceptive methods and their statistically significant predictors had the highest discrimination values (AUC = 0.8475), followed by the fitted logistic model of subjects that desired to conceive and their statistically significant predictors (AUC = 0.7189)

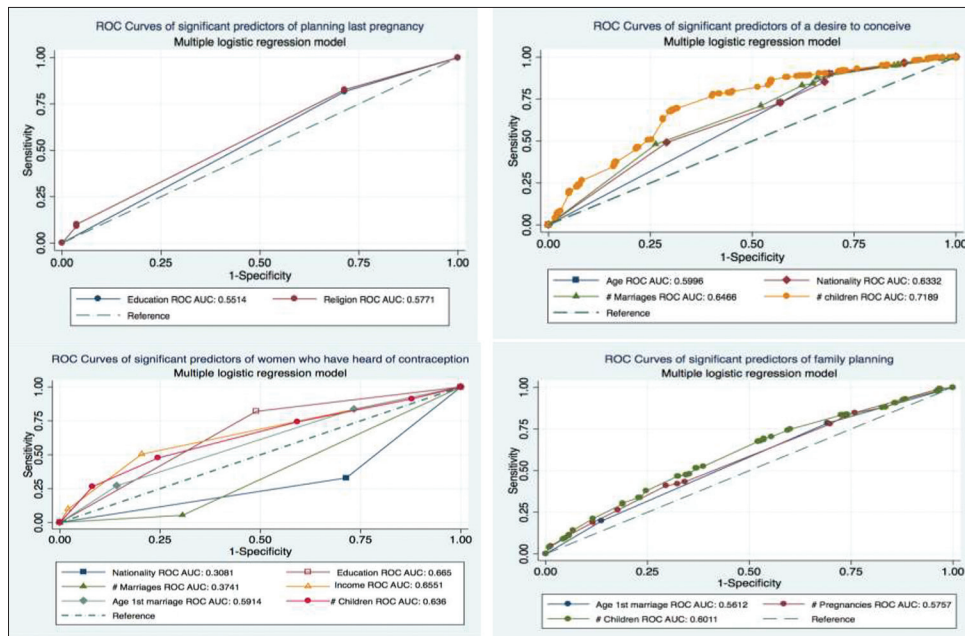


Figure 3: ROC Curves of significant predictors of planning last pregnancy, a desire to conceive, heard about contraception, and family planning are presented

married women of childbearing age that use contraception globally.^[16]

Worldwide usage of contraception is affected by finances, social and religious system and availability. The UAE use

of contraception is low compared to the 98% of sexually active women in the USA that have used a contraceptive method (including 62% of women that use contraceptives during the times that they are of the age where they might have children).^[17]

Table 4: The relationship between sociodemographic characteristics and use of different methods of contraception among women in UAE (n=722). *p<0.05, significance determined using Montecarlo 2 tailed significance at 95% CI. Only significant results are presented

	Desire to conceive			P
	Yes	No	Unsure	
Age:				0.021
18 - 29	206	100	120	
30 - 39	48	26	21	
40 - 54	29	94	26	
Nationality:				0.027
UAE	200	127	105	
Non-UAE	90	103	66	
Number of marriages:				0.002
1	281	200	156	
≥2	8	26	15	
Number of pregnancies:				0.0001
None	25	8	11	
1- 3	199	113	94	
4- 5	48	63	49	
6 or more	19	44	19	
Number of children:				0.0001
None	42	14	15	
1	81	22	27	
2	75	67	41	
3	60	40	41	
4& more	34	86	49	
Have you used any family planning method before				
	Yes	No		
Age at first marriage, years:				0.004
less than 20	70	47		
20-25	209	184		
more than 25	77	101		
Number of pregnancies:				0.001
None	14	30		
1- 3	201	208		
4- 5	93	68		
6 or more	48	32		
Number of children:				0.0001
None	28	43		
1	55	77		
2	88	96		
3	82	57		
4& more	103	66		
Was your last pregnancy planned				
	Yes	No		
Education level				0.002
High school or less	72	87		
College and higher degrees	317	216		
Religion				0.001
Muslim	349	292		
Christian/Jewish/others	39	11		
Age at first marriage, years:				0.04
less than 20	53	62		
20-25	225	165		
more than 25	105	73		

Contd...

Table 4: Contd...

	Have you ever heard about Contraception methods		
	Yes	No	
Nationality			0.0001
UAE national	417	20	
Non-UAE	217	42	
Residing in which emirates			0.0001
Abu Dhabi	134	4	
Dubai	268	18	
Sharjah	106	14	
Northern Emirates	124	28	
Education level			0.0001
High school or less	129	33	
College and higher degrees	507	31	
Husband's Education level			0.001
High school or less	190	34	
College and higher degrees	442	29	
Marital status			0.0001
Married	612	52	
Divorced/Widowed	24	10	
Number of marriages			0.0001
1	596	44	
2 or more	34	16	
Monthly income, AED			0.0001
Less than 20,000	298	46	
20,000-40,000	236	9	
More than 40,000	57	1	
Age at first marriage, years:			0.01
less than 20	103	16	
20-25	358	35	
more than 25	171	9	
Number of children			0.0001
None	61	9	
1	115	18	
2	161	21	
3	134	8	
4& more	166	5	

We realize that the use of contraception in family planning is universal, but with great changes of knowledge and availability of methodology becoming availability. For instance, women in Sub-Saharan Africa had a contraceptive utilization of only 5% in 1991 that has risen to approximately 30% in 2006 and continues to rise,^[18] the same pattern has been detected in Iran^[19] and Bangladesh.^[20]

It was encouraging to realize that majority of women we surveyed had heard about contraception methods (638, 91%) yet we found a significant lower rate of utilization that the 2017 report from Ajman that demonstrates the rate of using contraception among women in UAE to be 62%.^[21] However, we desired to compare the 51% of UAE women that have used contraception in our study to the population use in other Muslim majority countries. The United Nation (UN) reported significant variability in contraceptive use across predominately Muslim nations with a rate of 38% in Pakistan, 60% in Egypt, 39% in Saudi Arabia, 68% in Morocco, 62% in Bahrain, 48% in Qatar, and 62% in Indonesia.^[9,22] We realize that contraceptive utilization varies across nations, but it also fluctuates widely across racial and religious groups.^[23]

In this study, we found that the majority of women (247, 56%) were using less effective methods of contraception (condom, withdrawal, sponge, calendar, and spermicide) than methods readily available. We are concerned that UAE national women that desire to conceive and have higher educational level and contraceptive knowledge were more likely to use less effective methods of contraception, in spite of support and discussion with their spouse [Table 4]. Our findings conflict with published reports that demonstrate a use of less effective methods when a woman has a lack of partner involvement in contraceptive decision making.^[24] However, a recent report from Australia revealed that women with higher education are more likely to use less effective contraception methods.^[25] We were able to identify knowledge gaps in certain groups of women specific to contraception. We found that the majority of young participants (less than 29 years) that were Muslim UAE nationals fell into a knowledge gap category. They were associated with women whose last pregnancy was planned or those that started family planning in less than 6 weeks of pregnancy. There was clear identification of groups of women that did not have enough knowledge on emergency pregnancy had fair knowledge on the risk of contraception that we have described in tabular format [Table 4]. A poorer knowledge of contraception types, use and safety was associated with certain groups of women and described in tabular format [Table 4].

Nationality was an important influencing factor on choice of contraception (e.g. highly, medium, or less effective); and was associated with a difference on knowledge on the risk of contraception. Different studies showed the same ethnicity difference; proposed explanations for racial/ethnic disparities in contraceptive use include differential access to contraception^[26] or knowledge about birth control methods.^[27] While a number of studies have found reduced knowledge among minority women,^[27-29] knowledge alone does not appear to account for differences in contraceptive use patterns by race/ethnicity.^[29]

Furthermore, another factor that seems to play an essential role in knowledge on the risk of contraception and safe type of contraceptive methods was the woman's religion. Several investigations have identified that Muslim women are likely to have a lower approval rate for contraceptive use.^[30-32] Our analysis reveals a significant association between knowledge affecting the use of safe types of contraceptive practice and the source of information is also important (higher levels of knowledge among women who received information from local governmental facilities) and was reported before in another study.^[31] Furthermore, the husband's influence on the use of contraception was significantly associated with a woman's contraceptive knowledge of contraception use and safety. Our findings in this area reflect similar findings of other investigations.^[32-34]

This investigation evaluates the knowledge, attitude, and practice of using contraception among women in the United Arab Emirates. Our results demonstrate that increased education and communication of the benefits and risks of different types of contraceptive methods

are needed to improve the use of contraception in the UAE. We suggest that the initiation of campaigns and educational programs, both for healthcare providers and the public may positively affect the populations understanding of family planning and contraception use. We feel that additional training for doctors in the primary healthcare sector should be available to increase the provider's knowledge of different contraceptive methods and emergency contraception. We expect that this training will be transferred to the patient population and society at large. Contraceptive counseling is associated with empowerment of women to make informed decisions of their personal and family health specific to family planning. This investigation suggests that contraceptive providers' knowledge should be enhanced, and information about the mechanisms of action of the methods should be provided to all patients, both men and women. Finally, improved education, partner involvement in counseling, and coverage of all contraceptive methods by health insurance may help in providing the best contraceptive method for each couple.

Limitations

This study has several limitations. It only focused on women in some familiar places in the UAE. It may not be generalized to all target populations, especially the target women who did not attend these familiar places might have different preference on this regards. Women who were less educated were not willing to participate in the study, which may affect the results of the study. Therefore, the results of this study should be interpreted with caution. This study used a cross-sectional design; thus, it only speculated on the causal relationship between the variables. It used convenience sampling so that the results might be unrepresentative of the population being studied. However, despite these limitations, the results of this study provide a basis for further planning future in-depth research before developing educational materials and planning training-based interventions for further boosting the implementation of the different contraceptive methods among women in UAE.

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Conflicts of interest

There are no conflicts of interest.

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