

## Development and Validation of Knowledge about Family Planning Questionnaire among Pakistani Females

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### ABSTRACT:

**Background:** Lack of knowledge about family planning is one of the primary hindrance in appropriate decision making about optimum birth spacing and use of contraception for ideal family size. Still, no local tool is available for assessing knowledge about birth spacing among females.

**Objective:** To develop and validate questionnaire of knowledge about family planning among Pakistani females

**Materials and Methods:** After the tool was developed using literature search, through expert opinion and personal observation, there were 7 items in the finalized tool. The questionnaire was subjected to Exploratory Factor Analysis (EFA) by collecting data from 35 participants. Face and

content validity was ensured and data was analyzed using SPSS version 23 and AMOS version 24. Sphericity, adequacy, Principal Component Analysis with Varimax rotation method was used for EFA. PLS software was used for Confirmatory Factor Analysis (CFA) conducted on 70 participants. Pathway analysis along with Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and other indices using PLS software. P-value<0.05 was considered significant.

**Results:** The Kaiser-Meyer-Olkin Measure was adequate (0.599; p-value<0.001), the eigenvalue of the significant factor was 3.196 with Cumulative Variance as 85.753. Whilst, Chronbach's alpha was 0.797. In CFA, the path diagram shows that the standardized regression weights were all > 0.5 and less than 1. (CMIN/ D.F) was 1.309 , and insignificant p-value i.e. > 0.212 (>0.05), the standardized Root Mean Square Residual (SRMR) was 0.0484, the root mean square error of approximation (RMSEA) was 0.067, the comparative fit index (CFI) was 0.983, the goodness-of-fit index (GFI) was 0.947 and the Tucker-Lewis index was 0.967. The values of Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) were 48.397 and 86.62. Hence, all the indicators were considered good as CMIN/DF between < 3, RMSEA < 0.08, CFI > 0.90, GFI > 0.85, TLI > 0.90

**Conclusion:** This study developed a validated and reliable questionnaire to assess the knowledge about family planning among females.

**Keywords:** Family Planning, Knowledge, Birth Spacing, Contraception, Pregnancy control, Provision, Accessibility

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## INTRODUCTION:

Family planning means the authority of a couple to decide how many children they want and at what time to establish their ideal family size.<sup>1, 2</sup> According to Sustainable Development Goals (SDG), it is mandatory to provide universal access to family planning services globally to ensure the well-being and overall health of individuals.<sup>3, 4</sup> However, due to lack of information and barriers in access to national strategies and programs, the marginalized communities of developing countries face problem in decision making and control of family planning.<sup>5, 6</sup>

Pakistan is also among these countries where healthcare system has not yet succeeded to achieve the desired ease in accessibility and implication of family planning.<sup>7, 8</sup> Although the concept of family planning and associated support system was initiated at national level in Pakistan in 1994 to improve the fetomaternal health, the effectiveness of the program is still questionable due to

lack of female authority in decision making and misinformation.<sup>9</sup> This has led to a slow decline of fertility rate with prevalence of contraceptive usage as 35%, fertility rate of 3.8% and unmet need of family planning at 20%.<sup>10</sup>

Literature has reported several studies to assess the knowledge of mothers regarding family planning and birth spacing, but most of these studies have used either qualitative methods or questionnaires that have not been validated for data collection and hence the level of knowledge reported remains inconsistent and vague.<sup>11, 12</sup> One comprehensive questionnaire developed and validated by Alina et al<sup>13</sup> is dedicated to assess knowledge of females regarding family planning, however, detailed information about construct validity via factor loading and item reduction is not available.

We aimed to develop and validate questionnaire of knowledge about family planning among Pakistani females. If found satisfactory, this questionnaire can be used as a standard tool for assessing knowledge of females regarding family planning in Pakistan.

## **MATERIALS AND METHODS:**

**Study Design:** Descriptive Study-Validation of Questionnaire

**Study Population and Setting:** All females fulfilling the inclusion criteria, in age range of 15-45 years from urban areas of Lahore were the target population for this study. Kline's rule was followed for selection of participants (5-10 subjects per item for exploratory factor analysis (EFA), 10-20 subjects per item for confirmatory factor analysis (CFA))<sup>14</sup>. As the number of items were 7 in the tool, in total, 70 females were included in the study who gave consent to participate. The data was collected in month of August 2020.

**Properties of Questionnaire:** Construction of an appropriately formulated questionnaire is the first and most important step.<sup>15, 16</sup> There were only few studies that assessed knowledge of females about family planning, and those two reported incomplete statistical evidence to support validation process of the tools so this questionnaire was solely made based upon general observation and consulting literature about important indicators to assess the knowledge about family planning<sup>13, 17</sup>. Moreover, expert opinion from relevant professionals, lady health workers, gynecologists and pediatricians was taken before constructing the tool. Finally, the questionnaire formulated had 7 items with 5 point Likert Scale based responses ranging from 1-5 where 1 showed strongly disagree and 5 strongly agree. The information was collected regarding women's knowledge about the term family planning, the risk associated with short or long inter-

pregnancy interval, and use of contraceptive methods. For assessing knowledge, it was assumed that higher the score, the better the knowledge.<sup>18, 19</sup>

**Ethical Statement:** The study was approved by Ethical Committee of Unisza, Malaysia (REC # UniSZA/UHREC/2019/115) and data collection permission was taken from Lady Aitcheson Hospital, Lahore, Pakistan. As such there are no ethical issues in this study. Data was taken after taking written informed consent from females and basic ethical concerns such as beneficence, non-maleficence, autonomy and justice was ensured.

**Data Collection:** The females willing to participate were briefed about the purpose of research and questionnaires were given to them after taking written consent. For EFA, the sample was selected as stated by Kline that a range of 2-5 samples per item are sufficient<sup>20</sup>. Since, total numbers of items in this study were 7, a sample of 35 subjects (5 per item) were selected.

**Analysis:** All data was entered, cleaned and analyzed in SPSS version 23. Kaiser-Meyer-Olkin (KMO) test was applied for factorability of data and Bartlett's test was also used to find significance of adequacy of sampling. In EFA, Principal Component Analysis (PCA) was used to see correlation and component matrix was made. For rotation and control of cross loading of items, varimax rotation method was used. Eigenvalues and communalities were reported for assessment of variance explained by items. Whenever wrong, poor, or cross-loading was detected among items, they were dealt by eliminating from questionnaire. After finalizing the questionnaire, Chronbach's Alpha was applied to see internal consistency. For CFA, data was entered and analyzed through PLS software. Model was made and various indices including Root Mean Square, Comparative Fit Index (CFI), Error of Approximation (RMSEA) and others were calculated. Moreover, the pathway analysis was also done to determine the role of three domains.

## RESULTS

**Content and Face Validity:** The first stage was to develop the questionnaire. For this purpose, extensive literature search was done, personal observation was taken into consideration and expert opinion from relevant professionals was also taken. The authors discussed each item statement and made sure no statement was a duplicate or asked for same information. In case of such statements, the questions were merged into one synonymic question. Also, consensus was developed for items with any controversy or confusion. The finalized tool had 7 items to assess knowledge about family planning among females. In order to ensure the language and content of questionnaire, it was pretested on 20 participants and found to be satisfactory. The questionnaire

contained 7 questions in three domains (benefits of family planning, provision of family planning and pregnancy control) were included.

### **Exploratory Factor Analysis (EFA) for knowledge about family planning questionnaire**

The mean age of females was  $29.71 \pm 4.71$  years with minimum and maximum age as 21 and 41 years. This questionnaire consisted of 7 items i.e. a woman may use a calendar method to avoid unprotected sexual intercourse during her fertile period, couples must use FP methods to avoid pregnancy, FP improves family standards of living, FP gives parents time to take care of children, FP methods must be cost effective, FP methods must be reachable to all couples and more children is not good for mother's health. On asking about a woman may use a calendar method to avoid unprotected sexual intercourse during her fertile period there were 8.6% females who were strongly disagreed (SD), 5.7% females didn't know (DK), 74.3% females were agreed (A) and 11.4% females were strongly agreed (SA).

When they were asked about "couples must use FP methods to avoid pregnancy" there were 5.7% females who were SD, 17.1% told that they don't know, 28.6% were agreed and 48.6% were strongly agreed. There were 5.7% females who were SD, 17.1% were disagreed (D), 8.6% didn't know, 51.4% were agreed and 17.1% were strongly agreed about FP improves family standards of living. There were 14.3% females who were SD, 17.1% were D, 8.6% DK, 54.3% were A and 5.7% were SA respectively regarding FP gives parents time to take care of children. When they were asked about FP methods must be cost effective there were 14.3%, 2.9%, 8.6%, 54.3%, 20.0% females were SD, D, DK, A and SA respectively. In response to FP methods must be reachable to all couples there were 14.3%, 8.6%, 8.6%, 57.1% and 11.4% females who were SD, D, DK and SA respectively. Moreover, there were 8.6% females who were SD, 22.9% were D, 14.3% didn't know, 48.6% were agreed and 5.7% were strongly agreed about More children is not good for mother's health.

The mean score for question about a woman may use a calendar method to avoid unprotected sexual intercourse during her fertile period was  $3.80 \pm 0.96$ , the mean response regarding couples must use FP methods to avoid pregnancy was  $4.20 \pm 0.93$  and mean score for FP improves family standards of living was  $3.57 \pm 1.14$ . The mean score for FP gives parents time to take care of children was  $3.20 \pm 1.23$ , the mean score for item FP methods must be cost effective was  $3.63 \pm 1.26$ , the mean score for FP methods must be reachable to all couples was  $3.43 \pm 1.24$  and mean response for more children is not good for mother's health was  $3.20 \pm 1.13$ .

**Principal Component Analysis (PCA) on Finalized Tool regarding birth space**

Using principal component analysis (PCA) of finalized tool no items were reduced, so for 7 items three components were made i.e.

1. **Benefits of family planning:** it contained 3 items i.e. FP improves family standards of living ( $3.57 \pm 1.14$ ), FP gives parents time to take care of children ( $3.20 \pm 1.23$ ) and More children is not good for mother's health ( $3.20 \pm 1.13$ ) with respective communalities as 0.880, 0.871 and 0.609. The respective Communalities were 0.939 and 0.949.
2. **Provisions of family planning:** It contained 2 items i.e. FP methods must be cost effective ( $3.63 \pm 1.26$ ) and FP methods must be reachable to all couples ( $3.43 \pm 1.24$ ).
3. **Pregnancy control by family planning:** It also contained 2 items i.e. a woman may use a calendar method to avoid unprotected sexual intercourse during her fertile period ( $3.80 \pm 0.96$ ) with 0.889 communalities and couples must use FP methods to avoid pregnancy ( $4.20 \pm 0.93$ ) with 0.866 communalities.

**VARIMAX method**

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was good i.e. 0.599 with significant p-value  $< 0.001$ . The eigenvalue of the significant factor was 3.196 with as 85.753.

**Reliability Analysis**

Finally, Chronbach's alpha was used to assess the reliability of the finalized tool termed "Knowledge about family planning" and was found to be 0.797. Hence the tool was reliable enough to measure the knowledge regarding family planning among pregnant females.

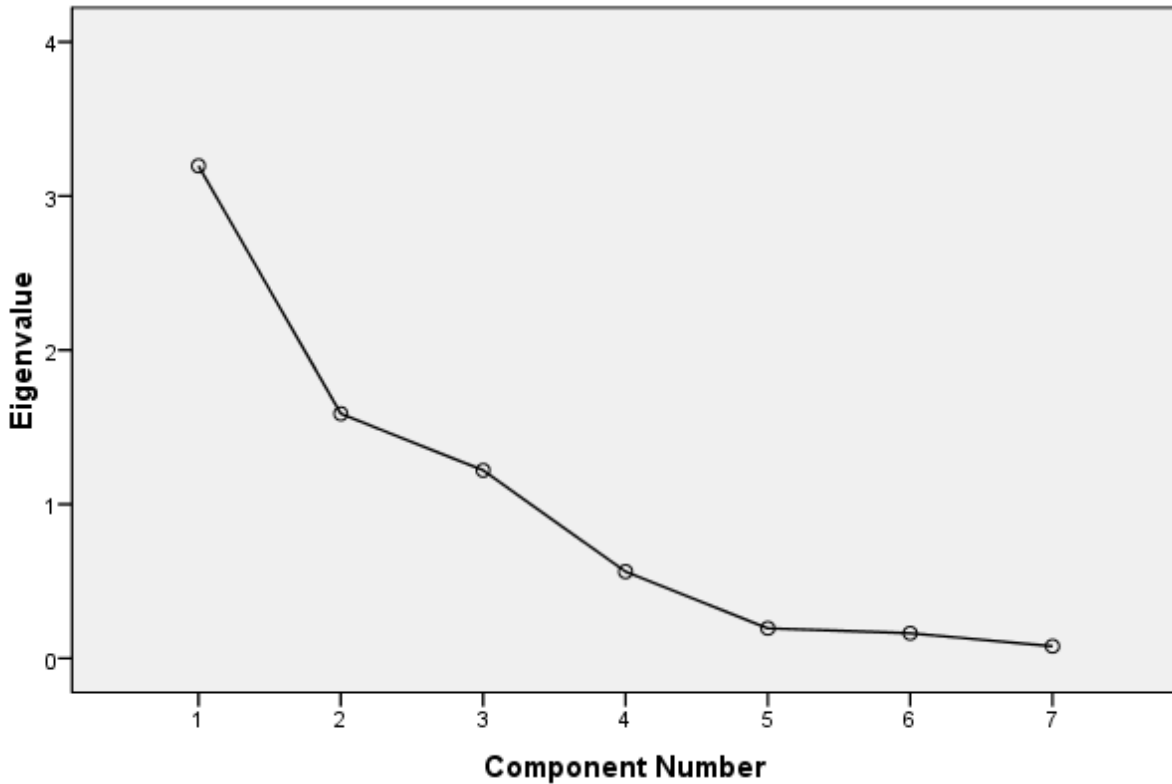
**Table -1: Descriptive statistics of age of females included in family planning study [n = 35]**

Age (years)	Mean	S.D	Minimum	Maximum	Range
	29.71	4.71	21	41	20

**Table-2: Results of Principal Component Analysis (PCA) of Finalized Tool regarding Family planning knowledge [n = 35]**

	Items	Mean± S.D	Communalities	Component Matrix
<b>Benefits of family planning</b>	FP improves family standards of living	$3.57 \pm 1.14$	0.880	0.885
	FP gives parents time to take care of children	$3.20 \pm 1.23$	0.871	0.867
	More children is not good for mother's health	$3.20 \pm 1.13$	0.609	0.748
<b>Provisions of family planning</b>	FP methods must be cost effective	$3.63 \pm 1.26$	0.939	0.953
	FP methods must be reachable to all couples	$3.43 \pm 1.24$	0.949	0.928

<b>Pregnancy control by family planning</b>	A woman may use a calendar method to avoid unprotected sexual intercourse during her fertile period	3.80 ± 0.96	0.889	0.931
	Couples must use FP methods to avoid pregnancy	4.20 ± 0.93	0.866	0.858



**Fig-1: Scree plot for family planning questionnaire [n=35]**

**Table-3: Statistical Measures of Finalized Tool**

Statistical Measures	Values
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.599
Bartlett's test of sphericity (p-value)	<0.001
Eigenvalue of the significant factor	3.196
Cumulative percentage of variance	85.753
Cronbach's Alpha	0.797



**Table-4: Reliability analysis of questionnaire used for knowledge about family planning [n=35]**

		<b>Cronbach's Alpha</b>
<b>Benefits of family panning</b>	FP improves family standards of living	0.874
	FP gives parents time to take care of children	
	More children is not good for mother's health	
<b>Provisions of family panning</b>	FP methods must be cost effective	0.769
	FP methods must be reachable to all couples	
<b>Pregnancy control by family planning</b>	A woman may use a calendar method to avoid unprotected sexual intercourse during her fertile period	0.741
	Couples must use FP methods to avoid pregnancy	
Overall		0.797

**Confirmatory Factor Analysis [n = 70]*****Descriptive Analysis***

The mean age of females was  $29.61 \pm 6.51$  years with minimum and maximum age as 18 and 45 years. The mean FP improves family standards of living was  $3.61 \pm 1.16$ , the average score for FP gives parents time to take care of children was  $3.36 \pm 1.20$ . The mean score for item, more children is not good for mother's health was  $3.14 \pm 1.12$ . Moreover, the mean FP methods must be cost effective, FP methods must be reachable to all couples and a woman may use a calendar method to avoid unprotected sexual intercourse during her fertile period and couples must use FP methods to avoid pregnancy  $3.59 \pm 1.11$ ,  $3.40 \pm 1.31$ ,  $3.33 \pm 1.29$  and  $3.74 \pm 1.151$ .

***Regression Weights***

The path diagram shows that the standardized regression weights were all  $> 0.5$  and less than 1. Under the domain of Benefits the standardized regression coefficient for item , FP improves family standards of living was 0.93, for FP gives parents time to take care of children was 0.73 and for item more children is not good for mother's health the standardized regression coefficient was 0.85. For Provisions domain, the standardized regression coefficient for item FP methods must be cost effective was 0.84 and for question FP methods must be reachable to all couples was 0.75. Under the domain of Pregnancy control the standardized regression coefficient for questions like a woman may use a calendar method to avoid unprotected sexual intercourse during her fertile period and Couples must use FP methods to avoid pregnancy was 0.96 and 0.62 respectively.



**Model fit summary**

The value for chi-square fit statistics/degree of freedom (CMIN/ D.F) was 1.309 with insignificant p-value i.e.  $>0.212$  ( $>0.05$ ), the standardized Root Mean Square Residual (SRMR) was 0.0484, the root mean square error of approximation (RMSEA) was 0.067, the comparative fit index (CFI) was 0.983, the goodness-of-fit index (GFI) was 0.947 and the Tucker-Lewis index was 0.967. The values of Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) were 48.397 and 86.62. Hence, all the indicators were considered good as CMIN/DF between  $< 3$ , RMSEA  $< 0.08$ , CFI  $> 0.90$ , GFI  $> 0.85$ , TLI  $> 0.90$ .

**Table -5: Descriptive statistics of age of females included in family planning study for Confirmatory factor analysis [n = 70]**

		Mean	S.D
	<b>Age</b>	<b>29.61</b>	<b>6.51</b>
<b>Benefits</b>	FP improves family standards of living	3.61	1.16
	FP gives parents time to take care of children	3.36	1.20
	More children is not good for mother's health	3.14	1.12
<b>Provisions</b>	FP methods must be cost effective	3.59	1.11
	FP methods must be reachable to all couples	3.40	1.31
<b>Pregnancy control</b>	A woman may use a calendar method to avoid unprotected sexual intercourse during her fertile period	3.33	1.29
	Couples must use FP methods to avoid pregnancy	3.74	1.151

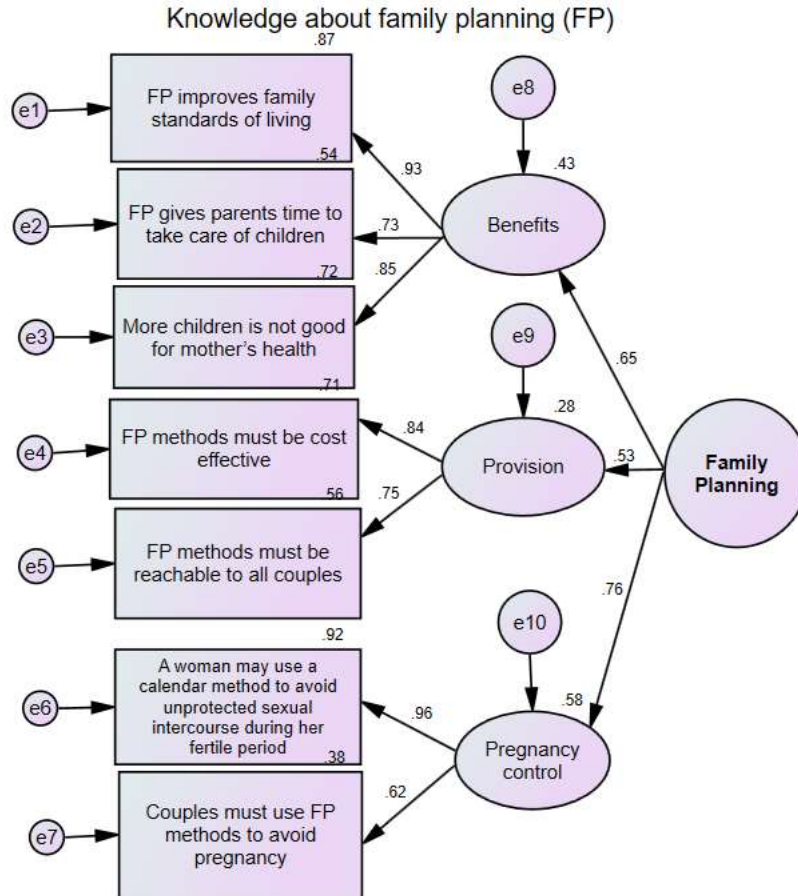


Fig-2: Path diagram about family planning knowledge [n = 70]

Table-6: Fit Indices of CFA Model [n = 70]

Model	CMIN/D.F	p-value	SRMR	RMSEA	CFI	GFI	TLI	AIC	BIC
	1.309	0.212	0.0484	0.067	0.983	0.947	0.967	48.397	86.62

**Discussion:** The annual population growth has been reported as 1.23% by The United Nations (UN) between the time periods of 2000-2010.<sup>21</sup> The Asian countries have topped the list with China being at top proceeded by India. However, due to timely and massive steps taken by Chinese government their population growth has significantly dropped down and it is estimated that India may surpass China and become most populous country by 2030.<sup>22</sup>

One of the most significant reasons for uncontrolled population growth is the lack of awareness and knowledge among partners or spouses which leads them to make unwise decisions about their family size.<sup>23</sup> Particularly, among females, the knowledge about birth spacing is very limited and is not focused upon due to societal pressures and taboo attached.<sup>24</sup> Studies have reported the knowledge about birth spacing being as much as 100% in US to as low as 23% in India,<sup>25</sup> However, these assessments have been made subjectively or as part of some bigger study question.

Despite of its significance, no validated proforma is available in Pakistan to measure knowledge about birth spacing, which is why we aimed to conduct this study. In this study, we designed and developed a questionnaire to assess the knowledge about birth spacing which was later validated using Explanatory Factor Analysis and tested for reliability using Chronbach's Alpha. The Face validity of the questionnaire showed adequate understanding of the language and content used in questionnaire. Moreover, initially 6 items were included among which 2 were having an issue of cross loading and were subsequently deleted. The remaining four items were found to be significantly validated as well as reliable to be used in final version of tool.

The limitation of this study is, however, that the data was collected only from one setting. It is therefore recommended for other researchers to use the tool on community based and large populations for confirmatory analysis.

**CONCLUSION:** This study developed a validated and reliable proforma to assess the knowledge about family planning among females.

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