

The Effect of Breast-feeding in Contraception which is a Method of Natural Family Planning

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Abstract

Background: Bongaarts's model of Ci calculation was used to calculate the contribution of breast-feeding to family planning.

Methods: This cross-sectional study was conducted in the area of İstanbul (TURKEY) Silivri Public Health Practice and Research Center between the dates of 20th May-1st October 2005. In this study whole under 1 year old babies, composed the sample (n=1247). Bongaarts model can be summarized as Total Fertility Rate (TFR)= TF x Ci x CA x CC x Cm and takes its bases from TF (total fertility). Ci is the Postpartum infekunditi index. $Ci = 20 \sqrt{18.5 + i}$ is calculated by this formula. The first menstruation period, after pregnancy ends, was taken as the value 'i'.

Results: The average age for the total 1247 mothers who contributed to this study was 26.7±5.2 (R: 16 – 50) yr. The women whose menstruation turned back (n=830), the average amenore period was found as 3.0±1.9 (1-12 months). Ci's average value was 0.94±0.07 (0.66-1.03) and a r= -0.08, P= 0.012 correlation was appointed between mother's age and Ci. 7.7% of participants (n: 96) used breast-feeding as a contraceptive method. These participants used breast-feeding as contraception for 16.9±14.5 wk.

Conclusions: Breast-feeding is a reliable and a positive affecting method of family planning for both improving the baby and mother's health. Furthermore also by affecting TFR over Ci, it provides a positive contribution to society health.

Keywords: Breastfeeding, Lactation, Amenorrhea, Postpartum amenorrhea, Contraception

Introduction

Like other countries, in Turkey there is a widespread belief that breast-feeding delays the next pregnancy. In Turkey 84% of fertile age women know breast-feeding as a family planning method and 16% of them use breast-feeding as a family planning method (1, 2). Beside countless contribution of breast-feeding to mother and child health, it affects infertility period after natal and extend natal intervals and reduces the fertility level. The effect of breast-feeding on fertility can change according to breast-feeding duration and frequency and the age when children begin to get supplementary food and liquids (3).

There are lots of factors affecting fertility in a society, such as the age of menarche, the age of marriage, infertility rate in society, the usage po-

sition of contraceptives, the abortion rate, the sexual act frequency and breast-feeding duration. The interruption periods of women fertility is ovulation or the postpartum period that continues till sexual act start and time between fertilization and natal. How longer the ovulation can be delayed at postpartum period, fertility rate can be controlled so that. Breast-feeding has an influence upon fertility with two ways. By repressing ovulation, it extends postpartum amenorrhea and after postpartum period ends it decreases conception probability of ovulation. Breast-feeding even by itself can be contraceptive rather than other preventing methods (4, 5).

To calculate breast-feeding contribution to family planning, Ci calculation is used in Bongaarts model (6, 7).

This study was done in Silivri Public Health Practice and Research Center Region, Turkey. This unit is the study and search region of Istanbul University's two Medicine Faculties. In this region population was 99.597 in the yr of 2005. Total consultation number was 249.825. Also approximately 600 intern doctors do rural physician and society health internships continuing for 8 wk. In this study investigation of breast-feeding situation and its effect on this region's family planning and calculation of Ci values were targeted.

Materials and Methods

This study was planned as cross-sectional from 20th May to 1st October 2005. Whole under 1 yr babies who were in the region tied to Silivri Public Health Practice and Research Center composed the study universe (n= 1247).

Midwives and nurses working in that region got a training in "Breast-feeding and its effect on family planning" issue endured for 1 h. During this training aims and rules of study were stated. In this way it was planned that, also health staff who were giving routine health service to this region, would take an effective duty and responsibility in this study.

Mothers who had a baby under 12 mo had been interviewed with multiple questions interview forms when they brought their children to health institutions with reasons of vaccination and consultation or at routine home visits. This form was prepared to query mothers' pregnancy and fertility stories, antenatal nursing, babies' feeding situations and their family planning method usages in the form of primary headlines. Before the interview brief information was given about study aims and an oral confirmation was taken from mothers.

Bongaarts model was utilized to calculate the contribution of breast-feeding to family planning function. Bongaarts developed a "Total Fertility Rate" model considering society marriage rate, postpartum infecundity, voluntary abortus and usage of contraceptive (6, 7).

It can be summarized as $TFR = TF \times Ci \times CA \times CC \times Cm$ and takes its roots from TF (Total Fertility). TF is a situation that is maximum and estimated

as 15.3 child when women are between 15-50 yr ages in a society and all of them married, none of them do breast-feeding and none of them uses contraceptive methods 8. And this formula can be summarized as

C_m (Marriage index)

$C_m = \frac{\sum \{m(a) * g(a)\}}{\sum g(a)}$ C_m is calculated by this formula.

$m(a)$: Marriage rates according to age.

$g(a)$: Fertility rate according to age.

2. CC (Index of Contraceptive usage):

$C_c = 1 - 1.08 * u * e$ is calculated by this formula.

Here,

u : Contraceptive usage rate at fertility age women.

e : Average efficiency of contraceptives.

1.08: Sterility correction factor.

3. CA: Abortion index.

4. C_i : Postpartum infecundity index. Changes between 0 and 1 values. If this index equals to 1 it means society don't do breast-feeding. Postpartum infecundity's fertility reducing effect equals to $(1 - C_i)$.

$C_i = 20 / (18.5 + i)$

Estimates of C_i index: The natal intervals are calculated as 20 mo at fertility age women in a situation when neither breast-feeding nor contraceptives used. When this calculation is done 1.5 mo anovulation, 7.5 mo conception, 2 mo spontane abortus and 9 mo pregnancy period is added. The foresighted 1.5 mo anovulation period can be extended or shortened which is affected from anovulation period, breast-feeding or late start of sexual act. Therefore the formula is accepted as $18.5 + i$ (breast-feeding or post-partum abstinence period, which one is longer). "i" equals to postpartum amenorrhea period. As culturally in some societies when no sexual act is taken before end of amenorrhea, postpartum equals to abstinens period. $C_i = 20 / (18.5 + i)$ is calculated by this formula. As C_i value decreases, society's TFR value will also decrease. Decrease of C_i is possible with increase of "i" variable which is the increasing period of postpartum amenorrhea or postpartum abstinence. Postpartum amenorrhea is related with lactation and extends as lactation duration lengthens (6, 8).

In study “i” value was taken as first menstruation time after natal period.

Given favorable statistical methods (mean, standard variation, frequency, Pearson correlation test and Student *t*- test) are evaluated with 11.5 SPSS program.

Table 1: Mothers’ socio-demographic characteristics and their nursing taken in antenatal period (n=1247)

Job	n	%
Working	66	5.3
Not working	1181	94.7
Education		
<i>Illiterate</i>	111	8.9
<i>Primary School</i>	754	60.5
<i>Secondary Education</i>	140	11.2
<i>High School</i>	182	14.6
<i>University</i>	60	4.8
The average age of menarche	13.2±1.2	
The average age of marriage	20.6±3.5	
The average number of pregnancy	2.1±1.4	
The average of living natal	1.8±1.1	
The average of alive child	1.8±1.0	
The average of abortion	1.5±1.1	
Alive Child Quantity		
One child	583	46.8
Two children	444	35.6
Three child	126	10.1
Four and over	94	7.5
Average period between 1-2 natal	4.7±2.6	
Average period between 2-3 natal	5.2±3.5	
Usage of vitamins at pregnancy	1053	84.4
Usage of ferrous medicine at pregnancy	974	78.1
Going control at pregnancy	1224	98.2
Staff who follow-up at pregnancy *		
Specialist medical	962	77.1
Midwives	480	38.5
Medical Practitioner	71	5.7
Nurse	65	5.2
Natal Place		
Private Hospital	674	54.0
Public Hospital	516	41.4
House	53	4.3
Primary Health Center	4	0.3
Natal Form		
Caesarean operation	642	51.5
Vaginal	605	48.5
Giving suck(mother milk) rate as first nutrition after natal	1149	92.1

*There are more than one appeal to units for pregnancy follow-ups.

Table 2: Family planning methods used by participants

Methods	n*	%
Coitus interruptus	460	36.9
Condom	259	20.8
IUD	134	10.7
Tubal ligation	93	7.5
Oral contraceptives	53	4.3
Monthly injections	39	3.1
Other (calendar, diaphragm. etc..)	11	0.08

* There are participants who used more than one family planning methods.

Table 3: Information resources of participants who expressed that breast-feeding prevents pregnancy

Resources	n	%
Relative	208	72.7
Midwives	37	12.9
Nurse	17	5.9
Doctor	11	3.8
Written media	7	2.4

Table 4: Studies related with LAM activities at distinct regions

Study/Date	n	Effectiveness (%)	Pregnancy
Şili*/1989	422	99.5	1
Equador */1993	330	99.8	2
Pakistan**/1995	391	99.4	1
Philippines**/1996	485	99.0	2
Multiple centered */1996	519	98.5	5

*Studies led by Institute for Reproductive Health

Results

The average age of 1247 mothers attended this study was 26.7 ± 5.2 yr (R: 16- 50). Other socio-demographic characteristics of participants were summarized in Table-1.

33.4% of the participants' menstruations had not started yet. (one of woman was hysterectomy). Postpartum amenore period average was found as 3.0 ± 1.9 (1-12 mo) for the women whose menstruations turned back (n= 830). 3.7 ± 2.0 (1-9) mo duration average was found for these mothers who feed their babies only with suck (water included). Ci was calculated for these women. Average Ci value was found as 0.94 ± 0.07 (0, 66-1.03) for 830 participants whose menstruation turned back. A correlation as $r = -0.08$, $P = 0.012$ was appointed between mother's age and Ci.

A correlation as $r = -0.215$, $P = 0.0001$ was appointed between breast-feed baby (water included) and Ci and a correlation as $r = 0.205$, $P = 0.0001$ was appointed between breast-feed and first menstruation.

Breast-feed (water included) duration average was found as 3.71 ± 2.0 mo for women who do not work and 2.71 ± 2.0 mo for women who work ($P = 0.065$).

For mothers who had natural childbirth, average only breast-feeding (water included) duration was found as 3.9 ± 1.9 mo, and for mothers who had a caesarean childbirth it was found as 3.5 ± 2.1 mo. Mothers who had a natural childbirth breast-fed their children for longer time which gives a statistically significant ($P = 0.002$), with respect to mothers who had caesarean childbirth.

Two hundred fifty mothers, whose Ci could be calculable, stopped giving suck to their children. For these 205 mothers "total giving suck time" was calculated as 4.97 ± 2.68 mo.

For mothers who gave their suck no longer to children, a correlation of -0.364 $P = 0.0001$ was calculated between mothers' suck giving duration and ci and another correlation of 0.365 $P = 0.0001$ was calculated between mothers' suck giving duration and first menstruation time.

** Study led by Family Health International

78.7% (n: 981) of 1247 participants were using family planning method. Methods, which were used by participants, are at Table 2.

22.9% (n: 286) of participants thought that breast-feeding might prevent pregnancy, 7,1% (n=89) of them expressed that they did not use contraception yet because of breast-feeding.

Two hundred and eighty six participants expressed that breast-feeding prevented pregnancy and their information resources are shown in Table 3.

7.7% (n: 96) of participants used breast-feeding as a contraceptive method. Breast-feeding was used as a contraceptive method for average 16.9 ± 14.5 mo by these participants. 37.5% of these participants used other family planning methods besides breast-feeding.

Discussion

In Ancient Egypt (B.C 1550) on Ebers papyrus it was described that the only way to feed babies is breast-feeding and babies should be fed with suck till 3 yr. The importance of mother's milk was emphasized in ancient Turks, Hinduism and Budism. According to Islam there is an uninterrupted continuity between feeding of baby with blood in mothers inside and after natal feeding with suck. "Mothers feed their babies for exactly 2 yr..." (Bakara-2:223); "...to carry children and lactation continues for exactly 30 mo..." (Ahkaf-46:15) (9).

Lactational amenore which extends breast-feeding time plays an important role in preventing fertility. Increasing prolactine hormon by frequent and exact breast-feeding directly makes an effect to hippocampus or over and represses ovulation. Even after menstruation turns back breast-feeding women have a lower probability of conception (10). Secretion of LH in a Pulsatil manner is affected clearly from breast-feeding women nipple's stimulant. It was thought that this is because of GnRH pulse productor in Hippotamus is affected from sucking function. According to one of study's results which were done in Scotland, it was believed that the contracep-

tive of breast-feeding was related with these swinging changes (11).

In our study it was found that women who had menstruations after natal, average menstruation period was as 3.0 ± 1.9 (1-12 mo). Albania study done by Khalil and his friends with 300 nurses, average lactational amenore period was found as 5.5 mo (12). In various studies done in recent years average amenore period changes between 9,4 and 14,6 mo (13-17).

In the World Health Organization's multiple centered study (5 were devepoled, 2 were developing countries) factors that affect lactational amenore period were examined (like breast-feeding duration, baby's illness, parity of woman, BMI of woman...). The strongest effect to lactational amenore declared as breast-feeding (18).

There are lots of studies which examine the effect of breast-feeding duration length on lactational amenorrhea period (19-23).

Labbok and his friends developed an algorithm in 1990 for those who want to use lactation amenorrhea method with the purpose of contraception. If the health staff, who give consultancy to breast-feeding women, will get positive

answers for all questions to this algorithm, it is thought that contraceptive effect would be 98%. When breast-feeding decreases 25%, fertility is expected to increase 2-16% (24-25).

In Bellagio City in Italy meeting of professionals in 1998, they developed 3 criteria for contraception by lactational amenore (LAM) method. 1) Postpartum amenore (postpartum before 56th day bleeding is no cared about), 2) First 6 mo period after natal 3) Only giving breast-feed to baby (or beside suck rarely given water or liquid foods). When these three conditions come together for first 6 mo contraception rate of LAM is 98% (26).

According to studies going through world's distinct regions by the Institute for Reproductive Health, LAM can be accepted as a trustworthy and effective contraceptive method in breast-feeding women (27) (Table 4).

LAM decreases TFR with effecting over Ci. In Table 5 we can see various countries' TRFs (28). According to TNSA 2003 TFR was calculated as 2.23 (1).

In Table 6, TFR and Ci of the various countries are listed (29).

Table 5: TFR values belonging to various countries

	Population of 2000 (x 1000)	TFR				Increase of TFR	Follow-up duration(year)	Increase per Decade
		Maximum	Year	Minimum	Year			
Turkey	66.668	6.90	1953	2.70	1998	4.20	45	0.93
Sri Lanka	18.924	5.98	1958	2.10	1998	3.88	40	0.97
Bangladesh	137.439	7.10	1963	3.80	1998	3.30	35	0.94
Malaysia	22.218	6.94	1958	3.26	1998	3.68	40	0.92
Indonesia	212.092	5.67	1958	2.60	1998	3.07	40	0.77
India	1.008.937	5.97	1953	3.32	1998	2.65	45	0.59
Pakistan	141.256	6.28	1978	5.58	1998	0.80	20	0.40
Nepal	23.043	6.06	1963	4.83	1998	1.23	35	0.35

Table 6: TFR and Ci values of various countries (29)

Countries and survey years	TFR	Marriage index	Contraception index	Ci	Abortion index	Fecundability	intrauterin mortality	sterility
Brasil (1991)	3.66	0.694	0.669	0.935	0.551	0.789	0.974	0.910
Burkina Faso (1993)	6.91	0.942	0.947	0.533	0.949	0.410	0.949	0.969
Cameroon(1991)	5.83	0.951	0.850	0.604	0.780	0.554	0.967	0.897
Colombia(1990)	2.86	0.696	0.658	0.901	0.452	0.688	0.989	0.939
Egypt(1988)	4.69	0.683	0.672	0.749	0.891	U	U	0.956
Egypt(1992-1993)	3.93	0.653	0.577	0.830	0.821	U	0.967	0.957
Indonesia(1987)	3.43	0.716	0.574	0.722	0.755	U	U	0.953
Indonesia(1991)	3.03	0.717	0.539	0.775	0.661	0.849	0.968	0.951
Jordan (1990)	5.57	0.604	0.724	0.885	0.941	U	0.979	0.960
Kenya(1988-1989)	6.71	0.771	0.824	0.683	1.011	U	U	0.972
Kenya(1993)	5.40	0.886	0.780	0.683	0.748	0.583	0.974	0.989
Namibia(1992)	5.37	0.875	0.786	0.746	0.684	0.582	0.969	0.966
Niger(1992)	7.38	0.967	0.976	0.583	0.861	0.691	0.959	0.981
Madagaskar(1992)	6.13	0.914	0.919	0.631	0.755	0.686	0.961	0.899
Malawi(1992)	6.73	0.918	0.928	0.658	0.785	U	0.959	0.989
Morocco(1997)	4.84	0.619	0.718	0.735	0.967	U	0.959	0.951
Morocco(1992)	4.04	0.612	0.662	0.760	0.856	U	0.969	0.958
Paraguay(1990)	4.70	0.830	0.753	0.866	0.568	U	0.981	0.951
Peru(1991-1992)	3.54	0.673	0.748	0.743	0.618	0.731	0.975	0.961
Rwanda(1992)	6.23	0.764	0.892	0.567	1.055	0.743	0.961	0.994
Senegal(1986)	6.62	0.857	0.942	0.576	0.930	U	U	0.948
Senegal(1992-1993)	6.03	0.853	0.952	0.610	0.795	0.401	0.965	0.976
Sudan (1989-1990)	4.96	0.628	0.935	0.617	0.894	U	0.956	0.956
Turkey(1993)	2.65	0.614	0.609	0.901	0.515	U	0.971	0.971
Yemen(1991-1992)	7.67	0.816	0.936	0.813	0.807	U	0.963	0.993
Zambia(1992)	6.47	0.935	0.943	0.662	0.723	0.625	0.960	0.986

In Yemen Ci was found as 0,703 in 1992 while it was 0,664 in 1997. TFR decreases from 7,700 to 0,703 (30). Ci was calculated as 0,901 in 1993 for Turkey and in our study was approximately 0.94.

Especially LAM is a trustworthy family planning method for developing countries in the cause of both baby and mother health improving and it

affects in a positive way. Moreover by affecting TFR over Ci, also provides a positive contribution to community health. Only 22.9% (n=286) of mothers in study group were thinking that breast-feeding may effect pregnancy. Greater part of these 286 women (%75.1) got this information from resources except health staff. That's why, we should not think that participants have a full

knowledge about Bellagio criterions. LAM should be added to routine health controls made in Antenatal periods and health trainings. Thus this will provide a situation that babies get mother milk for a longer period, systematic and an effective way, besides that it would be possible to decrease TFR over the effect of mother milk to fertility which has limitless benefits for both mother and baby health.

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