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THE EFFECT OF SHORT INTER PREGNANCY INTERVAL ON PRETERM LABOUR AND SMALL GESTATIONAL AGE INFANT

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Summary

The effect of interpregnancy interval (I.PI) on birth weight and gestational age of infant was investigated in this prospective study among 250 post delivery women at Basrah Maternity and Child Hospital from the period of 1st December 1999 to 1st September 2000. Seventy five (30%) were found to have I.P.I. < 6 months, 84 (33.6%) of 6-12 months and 91 (36.4%) were found to have >12 months. Preterm rate in study group was 18/250(7.2%) with a high incidence among women with short I.P.I (16%) in comparison to other two groups, this difference was statistically significant. Small for gestational age (S.G.A) were 15/250 (6%) with a significant association among short I.P.I (12%). Women with short I.P.I were younger (21-30) years (56%), of low parity (p1-2) (56%) while high parity group (p5-6) have long I.P.I (17.5%). Women with short I.P.I were of low social class, (40%) of women with <6 months I.P.I. were illiterate. It can be concluded that short I.P.I (<6months) was associated with a significant increase risk of preterm labour and S.G.A. This risk should be taken into account when planning a new pregnancy.

Introduction

Interpregnancy interval means the time elapsed between the birth of first child in the pair (index child) and the conception of the following child (outcome child)[1]. I.P.I. differs in different ethic groups and in different education levels of the parents [2]. However, short I.P.I. is commonly seen among women in developing countries because of the desire of parents for large family, lack of health education and lack of availability of different contraceptive methods[3,4]. These women are usually younger and less educated[5].

Short I.P.I. have multiple adverse effect on the mother and her fetus, which includes:

- Ability of mother to re-establish a proper hormonal balance mainly oestrogen and progesterone [6,7].
- Ability to recover from nutritional depletion after the previous pregnancy mainly iron deficiency anaemia, this will lead to enter the next pregnancy with low iron, vitamins and mineral[6,8].

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- It is considered as one of the risk factors for prematurity, low birth weight and impaired fetal growth, these are associated with an increase perinatal mortality rate because of neonatal mortality largely depends on birth weight and gestational age[9-12]. So to minimize this risk and to achieve reproductive health, we need to put the mother in a state of complete physical, mental and social well-being, these need education about sexual and reproductive health, information and education about means of fertility regulation includeing provision of different contraceptive methods. So these components of reproductive health care increase the orientation of the mother about using different types of contraceptive methods according to her needs and safety of the method used[13].

The aim of the study was to investigate the association of short I.P.I. with preterm birth and S.G.A, also to evaluate the relation of short I.P.I. with selected socio-demographic factors (age, parity and social class).

Patients and Methods

A prospective study was carried out on a total of 250 women, who delivered at Basrah Maternity and Child Hospital from the period of 1st December 1999 to 1st of September 2000, were randomly selected from labour ward. All high risk mothers were excluded and all women selected were apparently healthy and had no past medical or obstetrical problems as judged by their regular antenatal visits or by asking the mother through special questionnaire designed for the purpose of this study. We considered adequate antenatal care as those pregnant women who consulted antenatal clinic >4 times at different stages of the pregnancy, those who had 1-4 visits were considered as inadequate antenatal care and rest are cases without antenatal care visit[16]. The social level classified according to maternal education level and occupation. All mothers who were delivered by caesarian section were excluded from this study. Estimation of gestational age of outcome child by last menstrual period (L.M.P.) and /or result of U/S examination. Assessment of neonatal outcome made by pediatrician on duty. All multiple birth, still birth and abortion of index child were excluded in our study. I.P.I. was categorized by estimation the time elapsed between the birth of first child in the pair (index child) and the conception of the following child (outcome) child (L.M.P. and U/S). The resulting interval was categorized as follows <6 months, 6-12 months and >12 months.

The X2 (chi squared) test was used as a test of significance. Difference were regarded significant when p. value <0.05.

Results

During the period of the study, the data of 250 cases had been collected and analyzed. Seventy five women (30%) were found to have I.P.I.< 6 months, 84 (33.6%) were found to have I.P.I. 6-12 months and 91 (36.4%) were found to have I.P.I >12 months . Women with short I.P.I. (<6 months) were younger than those with 6-12 month I.P.I and >12 month I.P.I. (56%) of women who have < 6 months I.P.I were between (21-30) years age, compared to (52.3%) with 6-12 months I.P.I and (47.2%) with > 12 months I.P.I. (3%) of women who had < 6 months I.P.I were above 40 years, while (5.9%) with 6-12 inonths I.P.I and (6.5%) with > 1.2 months I.P.I were above 40, the difference was statistically not significant (Table I).

The relation of parity at index child with I.P.I. is shown in Table II, where 56% of women who had<6 months I.P.I were of low parity (P1-2), while 40.4% with 6-12 months interval and 43.9% with > 12 months interval were of low parity, the difference was statistically not significant. Four percent of women who had <6 months I.P.I were (P5-6) in comparison to 15.3% with 6-12 months I.P.I and 17.5% with > 12 months I.P.I were (P5-6), the difference was statistically significant. So women with short I.P.I were of low parity. Short I.P.I were more prevalent among women of low social class as indicated indirectly by low education and occupation. Forty percent of women with < 6 months I.P.I were illiterate in comparison to 11.9% with 6-12 months interval and 13.1% with> 12 months interval were illiterate, the difference was statistically significant as shown in Table III. Four percent of women with <6months I.P.I. were highly educated in comparison to 11.9% with 6-12 months interval and 22.6% with >12 months interval were highly educated, the difference was statistically significant (Table III). Sixty four percent of women with <6 months I.P.I. were housewives in comparison to 89.2% with 6-12 months interval and 53.8% with >12 months interval were housewives, the difference was statistically significant (Table III). Thirty six percent of women with <6 months I.P.I. were employed while 10.7% with 6-12 months interval and 46.2% with >12 months interval were employed. The difference was statistically significant (Table III).

Age (Y)	< 6 months		6-12 months		>12 months		Total		P value
	No.	%	No.	%	No.	%	No.	%	
<20	15	20	17	20.2	12	13.1	44	17.6	0.7209 NS
21-30	42	56	44	52.3	43	47.2	129	51.6	0.9827 NS
31-40	15	20	18	21.4	30	32	63	25.2	0.1147 NS
>40	3	4	5	5.9	6	6.5	14	5.6	0.678 NS
Total	75	30	84	33.6	91	36.4	250	100	

NS: Not Significant

Table I. Relation of the age of the mother with interpregnancy interval

Parity	< 6 months		6-12 months		>12 months		Total		P value
	No.	%	No.	%	No.	%	No.	%	
1-2	42	56	34	40.4	40	43.9	116	26.4	0.775 NS
3-4	27	36	25	29.7	26	28.5	78	51.2	0.771 NS
5-6	3	4	13	15.4	16	17.5	32	12.8	0.0008 S
>6	3	4	12	14.2	9	9.8	24	9.6	0.12233 NS
Total	75	30	84	33.6	91	36.4	250	100	

S. Significant

NS: Not significant

Table II. Relation of parity at index child with interpregnancy interval.

Variables level of education	< 6 months		6-12 months		>12 months		Total		P value
	No.	%	No.	%	No.	%	No.	%	
Illiterate	30	40	10	11.9	12	13.1	52	20.8	0.0074 S
Primary	24	32	25	29.7	15	16.4	64	25.6	0.3297 NS
Intermediate	9	12	15	17.8	16	17.5	40	16	0.43112 NS
Secondary	9	12	24	28.5	21	23	54	25.6	0.060 S
Higher	3	4	10	11.9	27	29.6	40	16	0.0002 S
Mothers occupation									
Housewife	48	64	75	89.2	49	53.8	172	68.8	0.05 S
Employed	27	36	9	10.7	42	46.2	78	31.2	0.00028 S

S: Significant

Table III. Relation of the level of maternal education and mother occupation with different inter pregnancy interval.

Eighteen out of 250 (7.2%) were preterm. Sixteen percent of babies delivered after I.P.I. <6 months were preterm in comparison to 4.7% of preterm babies were delivered after 6-12 months I.P.I. and only (2.2%) of preterm babies were babies delivered after >12 months I.P.I. Short I.P.I.(<6months) was found to be a highly significant factor which lead to preterm birth as shown in (Table IV), which shows that the frequency of preterm delivery increase significantly with short I.P.I.

Fifteen out of 250 (6%) of babies were S.G.A. 12% of them delivered after <6 months I.P.I were S.G.A. in comparison to 6% were delivered after 6-12 months I.P.I. and only 1.1% were delivered after >12 months I.P.I. as shown in Table V, the difference was statistically significant, therefore, short I.P.I. <6 months is associated with a significant increase in the frequency of S.G.A. infant.

Gestational age	< 6 months		6-12 months		>12 months		Total	
	No.	%	No.	%	No.	%	No.	%
Preterm	12	16	4	4.7	2	2.2	18	7.2
Term	63	84	80	95.2	89	97.8	232	22.8
Total	75	30	84	33.6	91	36.4	250	100

X^2: 12.8477

P. value: 0.00162 very significant

Table IV. Relation of preterm delivery with inter pregnancy interval.

Gestational age	< 6 months		6-12 months		>12 months		Total	
	No.	%	No.	%	No.	%	No.	%
S.G.A.	9	12	5	6	1	1.1	15	6
Appropriate for gestation	66	88	79	94	90	98.9	235	94
Total	75	30	84	33.6	91	36.4	250	100

X^2: 8.663263

P. value: 0.01315 significant

Table V. Relation of S.G.A with inter pregnancy interval.

Discussion

Several studies have found an association between I.P.I and pregnancy outcome .The short interval between two pregnancies has been investigated as a possible risk factor for preterm birth and S.G.A infant [9,10]. Result of these studies are variable and most likely population specific, this may be due to the impact on the mothers ability to re-establish a proper hormonal balance (mainly oestradiol) and recover from nutritional depletion after the previous pregnancy [7,14].This study has investigated the association of I.P.I with preterm birth and S.G.A in addition, identification the relation of short I.P.I with selected maternal characteristics like age, parity and social class was determined. Women with short I.P.I (<6 months) were younger and most of them (56%) were between (21-30) years old. Although higher percentage of women with short I.P.I (<6 months) were between (21-30) years of age, the difference was statistically not significant. The result is in agreement with the results of a study done by Klebanoff [5]. Higher percentage of women with short I.P.I were of low

parity (P1-2) (56%) in comparison with the other two groups who had same parity. This is in contrast with Bass-Olsen Christensen study[1], which revealed that women with short I.P.I were of high parity, the difference was statistically not significant. This result may be population specific because Iraqi women with low parity, have desire to conceive and complete their family as early as possible while grand multiparous women tend to prolong the interval between pregnancies[4]. Social status was a strong predictor for preterm birth and S.G.A. Several studies regarded it is a risk factor associated with short I.P.I. and found women with short I.P.I were to be of low social class. This study had identified that 40% of women with short I.P.I (<6month) were illiterate in comparison to 31.1% with >12 months interval were illiterate. This result is in agreement with study done by Klebanoff[5]. (4%) of women with short I.P.I were highly educated in comparison to 29.9% with>12 months I.P.I were highly educated. (64%) of women with short I.P.I were housewives while 53.8% with >12 months I.P.I were housewives. Maternal occupation had a highly significant effect on I.P.I, this result is in agreement with Klebanof study[5]. This may indicate that those illiterate mothers and housewives do not have adequate information about the adverse effect of short I.P.I. on fetal and maternal outcome due to lack of prenatal counselling and inadequate antenatal care unlike the educated mother who have adequate education and information about the risk of short I.P.I. on fetal and maternal outcome. I.P.I. <6 months was found to be a highly significant risk factor which lead to preterm birth as shown in Table IV. This result is in agreement with Basso O, Olsen Christensen study [1] and Rawling and Mavolanker studies [15]. While Barken[10] and Kallen [14] found no association between I.P.I. and preterm birth and this is in disagreement with out results. Short I.P.I. was found to be highly significant risk factor which lead to S.G.A. infant as shown in Table V. this result is in agreement with Brody Barken [10] and Kallen [14] studies but Fourn[11] did not show a significant correlation between I.P.I. and S.G.A infant. The present finding may be due to depleting stores of essential vitamins, iron and hormones which play a major role in human parturition for example the prostaglandin's especially PGE_2 and $PGF_2\ \alpha$, is observed in amniotic fluid and plasma just before the onset of labaur. This act on both cervical ripening and uterine contraction causing early initiation of labour and result in preterm birth and low birth weight (L.B.W). The risk of preterm delivery associated with short spacing should be taken into consideration in a new pregnancy planing because prematurity is one of the most important cause of infant death and impaired fetal development in industrialized countries[7]. From this study we conclude that short I.P.I < 6 months was significantly associated with preterm labour and S.G.A infants and it was more prevalent among women of low social class. Although most of our results are similar to other studies, however few of them were not similar to other results in other- countries, this indicates that these results may be on population bases. Lastly we recommend that women with short I.P.I should be carefully and successfully identified by general practitioner and obstetrician during pre-pregnancy period to discuss the risk of short I.P.I on the maternal and fetal out come. Education of these women about family planning is important, this can be achieved by prescription of appropriate contraceptive methods without adverse effect, these either natural, hormonal, mechanical barrier or chemical methods. Breast feeding is important to child and child spacing, it is one of the natural method of contraception. Nevertheless it is not

very reliable method of family planning and pregnancy may occur while lactation especially for women whose infant are on 3-4 hours day time only feeding schedule, so using another method of contraception, in addition to breast feeding is preferable to avoid risk of unplanned pregnancy like using mini-pills or condom. This study is first one in Basrah that deals with identification of risk of short I.P.I. on fetal outcome, so we strongly recommended that further studies should be carried out to certify and prove more same of doubtful results which were pointed one during the discussion of this study.

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