

Sub-fertility and life style factors which affecting sub-fertility among women in Regional Director of Health Service area, Colombo

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Abstract

Background: Sub-fertility is one of the leading health issues with its economic and social implications in Sri Lanka and changes in lifestyles of the people have a great impact on it.

Objective: To determine the association between selected lifestyle factors and sub-fertility among women in the Regional Director of Health Service area, Colombo.

Methods: A case control study was conducted among sub-fertile (n=170) and fertile (n=340) women as case and control respectively. A pre-tested, structured interviewer administered questionnaire, which underwent face, content validity and reliability (Cronbach's alpha= 0.8) was used. Chi-square, Mann-Whitney, two-way ANOVA, independent sample t- test and odds ratio (OR) were performed.

Results: The mean age at marriage was 25.1±3.1 years and 26.5±3 years for fertile and sub-fertile women, respectively. Level of education of both groups was not significantly different (p= 0.120, 95% CI). Islamic women have high fertility than others. Vigorous physical activities were significantly high among sub-fertile women (p=0.000; 95%CI 1.08-1.59). OR for passive smoking for fertile women was 1.3, (95%CI). Sub-fertile women experienced a lack of full restful sleep than fertile women (p=0.001, 95%CI) and majority of sub-

fertile women (63.8%) recorded high levels of stress.

Conclusion: Vigorous physical activities, exposure to passive smoking, lack of full restful sleep, and having high levels of stress have the negative effects on fertility. Therefore, counselling sessions for the sub-fertile couples and a sensitization programme for newly married couples on lifestyle factors by the primary health care staff are recommended.

Keywords: sub-fertility, lifestyle factor, physical activities, passive smoking

Introduction

Subfertility is a silent struggle which affects the quality of life with psychological distress, social stigmatization, economic strain and family discord of the people and it has become a priority issue of public health, affecting 10-15% of all couples in reproductive age globally ^[1]. Furthermore, it has been estimated that more than 80 million couples worldwide suffer from sub-fertility and most of them live in developing countries ^[2]. Although South Asia Region is the most densely populated region in the world the Total Fertility Rate (TFR) has declined from 4.2 in 1990 to 2.6 in 2012^[3]. Similarly, despite the substantial progress of the maternal and child health, one in six couples are sub-fertile in Sri Lanka ^[4] as well as lowest TFR in the region ^[5].

Sub-fertility is defined as the failure to achieve the pregnancy after twelve months or more of regular unprotected sexual intercourse and it is classified as primary and secondary ^[6]. Primary sub-fertility occurs when a couple has never been conceived, and the prevalence of primary subfertility is 5.52% in the Colombo district in Sri Lanka ^[7]. Subfertility is due to a wide spectrum of abnormalities found in either partner or sometimes both including ovulatory disorders, tubal disease, endometriosis, chromosomal abnormalities, sperm factors, sexual dysfunctions and unexplained sub-fertility ^[8]. Despite clinical and genetic reasons, lifestyle factors such as exercise, dietary patterns, smoking and mental stress have a great impact on the fertility, ^[10] the lifestyle factors are the behaviours and circumstances, that can be modified and subsequently contribute to improving the health and wellbeing of the people. [9]. However, in Sri Lanka there are 86.8% of sub-fertile women who don't engage in any type of sports activities or exercise regularly and one third of sub-fertile women are either overweight or obese ^[11] ^[12].

This study was conducted in Regional Director of Health Service (RDHS) area, Colombo, which has 1.8 million population and Colombo is among the districts which have lowest TFR (1.8) in the country ^[5]. Moreover, availability of lifestyle related risk factors is comparatively high in Colombo district. ^[13]. Objective of this study was to determine the association between selected lifestyle factors and sub-fertility among women in the Regional Director of Health Service area, Colombo.

Method

This was a case control study and cases were primary sub-fertile women, selected from eligible couple register of selected Public Health Midwife (PHM) area. The selections were done by random number generation software. Controls were pregnant women attending the antenatal clinics in same PHM area. Pregnant women with parity one and without any fertility issues were included as control group. Women, those with any chronic disease were excluded from the study. The sample size was 520 with 170 case and 340 controls. Ethical approval was obtained from the Ethical Review Committee of the Faculty of Medicine, University of Kelaniya (P/03/01/2019). Written informed consent was obtained and interview administered questionnaire was used to collect the data. Questionnaire comprised of socio demographic factors, physical activities, mental relaxing practices and level of stress, exposure to the passive smoking and weight, height and BMI.

The physical activities were assessed in second section of the questionnaire, and questions were taken from Step Survey in Sri Lanka and Global Physical Activity Questionnaire (GPAQ) version -02 which was validated in Sri Lanka ^[14,15]. Participants were instructed to recall and record activities they were engaged in the last seven days and record only the Physical Activity (PA) that lasted for at least 10 minutes. The PA of the questionnaire had four domains, work-related, transport-related, and sport and leisure-time related. The energy utilization of PA of moderate and vigorous intensity was expressed as Metabolic Equivalent Task (MET) per week (MET per week = minutes per day of PA * day per week * Particular MET value). MET values for vigorous and

moderate physical activities were 8 and 4 respectively^[16]. The questionnaire was face and content validated by the panel of experts. Pre-testing was done with twenty participants and internal reliability was done with Cronbach's Alpha test which was 0.8^[17].

EpiData was used to enter the data and then exported to the SPSS (23 version) for the analysis. Statistical significance was defined as P value less than 0.05. Descriptive statistics including mean and standard deviation (SD) was computed for quantitative variables while number and percentage for categorical variables. Independent sample T – test was done to compare the mean age at marriage between two groups, to compare the BMI of both groups. Two-way ANOVA was performed, including two explanatory variables (profession and fertility). Shapiro- Wilk test indicated that data, pertain to the variable of vigorous and moderate physical activities, walking time, and total sitting time were not normally distributed ($p < .05$). Therefore, non-parametric test (Man Whitney U test) was performed to compare the mean ranks. Chi-square test was performed (95% CI) level of stress between two groups and full restful sleep per week. Moreover Odds Ratio (OR) was used to assess the passive smoking and subfertility.

Results

The response rates were different (fertile 100% and sub-fertile 95%). Mean age at marriage was 26.5 ± 3 and 25.1 ± 3.1 for sub-fertile and fertile women respectively ($p = 0.915$, 95% C.I). However, there was a significant difference between the mean age of sub-fertile (32.7 ± 3) and fertile groups (27.6 ± 4) at the time of data collection ($p = 0.001$, 95% C.I). Regarding the level of education, most of fertile and

sub fertile women were A/L qualified ($>62\%$) ($p = 0.120$, 95% CI). Islam women were more fertile than other ethnicities ($P = 0.01$, 95%). The percentage of the occupation of two groups is given in table 1.

Table 1: Occupation of the participants (%)

Occupation	% of fertile (n=340)	% of sub-fertile (n=170)
Private sector	36	32
Government sector	12	14
House wife	31	29
Self-employment	18	21
Daily payment job	03	04

There was no association between fertility state and employment of the participants ($p = 0.178$, 95% C.I).

The income levels of the two groups were also not statistically significant ($p = 0.105$, 95% C.I).

There was a significant difference ($p = 0.036$, 95% C.I) of BMI between fertile (23.4 ± 2.5) and sub-fertile (21.9 ± 2.10) women in the study and it has been depicted in following box plots.

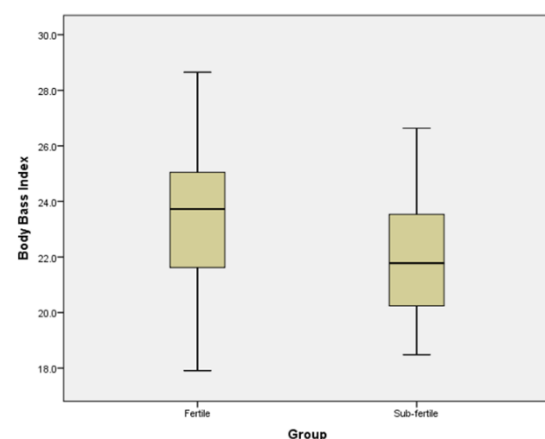


Figure 1: Body Mass Index of participants

Total MET of vigorous and moderate physical activities of two groups was analysed (Man Whitney U test) and results were as follows in table 2.

Table 2: Vigorous and moderate physical activities of participants

	Mean Rank	
	Vigorous physical activities	Moderate physical activities
Fertile	200.97	187.25
Sub-fertile	249.65	291.54
P value	<0.001	<0.001
Mann-Whitney U	12951.50	8553.50

The majority sub-fertile women (62%) did not have quality sleep (more than 07 hours per night) ^[19] even 02 days per week. Conversely 86.2% of fertile women had good rest-full sleep more than 04 days per week. Moreover, the level of stress between two groups was statistically significant (p=0.000, 95% C.I). Majority of sub-fertile women (63.8%) had severe stress and 71% of fertile women had no stress.

OR was calculated to measure the association between exposure to tobacco smoke and subfertility.

Table 3: Odds ratio of exposure to tobacco smoke and subfertility

	Sub-fertile (n=170)	Fertile (n=340)	Total (n=510)
Exposure to smoking	76	130	206
No exposure to smoking	94	210	304

OR= odds that a sub-fertile was exposed to tobacco smoke/ odds that a fertile was exposed to tobacco smoke

OR= 1.3 (95% CI 1.17 to 1.80)

Discussion

This study demonstrated that there was no significant difference of mean age at marriage between fertile and sub-fertile women and national and Colombo district figures of mean age at marriage in Sri Lanka are (24.1±5.7) and (27.3±6.4) respectively ^[20]. Moreover, a previous study in Sri Lanka has concluded that most of sub-fertile women are over 30 years [21] and it is consistent with this study because mean age of sub-fertile women at the time of interview was 32.7±3. Majority of study participants were A/L qualified (>62%) and level of education is an independent factor of sub-fertility. However, Frank Gotmark and others have stated that longer period of education particularly involvement of higher education pave the way to later marriage, later child bearing and smaller in family size ^[22].

Women employment is increasing globally especially in low and middle-income countries and there was a negative association between women employment and fertility state ^[23]. Nevertheless, in this study there is no significant difference of percentages of women in each occupation according to their fertility state. Level of income is not significantly different between the two groups as well. However, the past literature has stated that there may be positive or negative relationship between income level and fertility of the women and it is different according to country and regions ^[24]. The percentage of fertile women in Islam religion (91.2%) is significant and highest percentage of sub-fertile women was among the Buddhist. Similarly, a report of census and statistics department of Sri Lanka has mentioned that Sri Lankan moor has the highest fertility rate ^[25].

According to Asian specific BMI cut offs ^[26], mean value of BMI of sub-fertile women were in the normal range while fertile group were in overweight category in this study. This is inconsistent with some previous studies because it has been concluded that overweight and obesity is associated with poor reproductive outcomes including fertility of women ^[27] ^[28]. The study was limited to measure only BMI for general obesity but central obesity (waist circumference) has an inverse relationship between fertility of women ^[29] ^[30]. Moreover, the sub-fertile women had higher MET of vigorous and moderate physical activities than fertile women. The most common vigorous physical activities were cycling, aerobics, construction works and involved day today activities in high intensities. This is consistent with a previous study, which mentioned that increased frequency, duration, and intensity of physical activity were negatively associated with fertility ^[31]. Involving brisk walking is significantly high among fertile group and this is in line with a publication of Department of Reproductive Medicine in Manchester University ^[32].

Jacqueline D Kloss and colleagues have stated that poor sleeping quality directly cause irregular menstrual cycles and consequently affects the fertility ^[33]. Similarly, this study found that sub-fertile women have poor sleeping quality. Moreover, majority of them had a severe level of stress which leads to deteriorate of health. K.L Rooney and others have stated that most sub-fertile women have a feeling of guilt, shame, low self-esteem as well as high level of depression and anxiety which lead to poor quality of life ^[34]. O.R 1.3 means that a woman, exposed to passive smoking (PS) has 1.3 times higher chance to be sub-fertile than a woman who is not

exposed to PS. A previous research concluded that if women are exposed to PS they have risk for spontaneous abortion and still birth ^[35]. Furthermore, the deleterious effects of smoking for the fertility of women have been proved with several epidemiological studies ^[36, 37].

Conclusion

Involving in vigorous physical activities regularly, having high level of stress, lack of full restful sleep and exposure to passive smoking are the negatively associated life style factors for fertility. Newly married and sub-fertile couples should be aware of the importance of the life style factors on fertility. Streamlining pre-conception counselling which are conducted by primary healthcare staff of Sri Lanka is recommended.

Limitations

Even though lifestyle factors have great impact on fertility, certain important factors like dietary habits were excluded in our study due to resource constraints. Furthermore, we assessed the physical activity through a questionnaire. The accuracy of data is dependent on the recall ability of the participants which is also a limitation of the study. Therefore, objective measurements by accelerometers or direct observations are suggested to overcome such drawbacks.

Conflict of Interest

Each author declares that he/she has no any conflict of interest (e.g. consultancies, equity interest, patent licensing arrangement etc.) in connection with the submitted article.

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