RESEARCH PAPER

"Preconception nutrition Care: Predictors and practices among married female software professionals in Chennai, Tamil Nadu"

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Abstract

Background: Growing recognition on 'continuum of care' throughout the reproductive age for improving pregnancy outcome and reduction of maternal and neonatal mortality emphasizes the need of pre-conception care (PCC). Software professionals owing to their life style changes are at risk of developing obesity, maternal malnutrition, nutritional anemia and other life style related disorders.

Aims & Objective: To find out the predictors of preconception nutrition care among currently married software professional women of reproductive age group in Chennai, Tamil Nadu and to assess the preconception nutrition care practices among the same population.

Material & Methods: Descriptive cross sectional study was done among 149 female software professionals who are currently married belonging to reproductive age group (15-45 years) working in an IT park, Chennai using universal sampling method. Self administered semi-structured questionnaire was used to collect data which was adopted from world health organization policy report on preconception care. Data was analyzed using SPSS 23 version software.

Results: Among 149 married women software professionals in Chennai, predominantly aged 25–30, only 37.58% were aware of pre-conception care (PCC) and 24.83% practiced it—mainly through check-ups and folic acid intake. Income significantly influenced PCC practice ($p < 0.0013$), while awareness of congenital defect risk factors remained low (31.54%). Most pregnancies were unplanned, especially first ones. Around 25% had chronic illnesses, mainly diabetes and thyroid issues. Fitness activity was low (41.6%), with high intake of junk foods and caffeine.

Conclusion: Even in a well literate population, awareness about better pre-pregnancy nutrition care was low. This emphasizes the need for a multi-pronged approach to create health education and inculcate the better pre-pregnancy nutrition care practices to cover the women of reproductive age group across all socio-economic groups.

Keywords: pre-conception care, adverse birth outcome, folic acid

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Introduction

Preconception care is the care comprising of healthy behavioral practices applied before pregnancy and therefore modifying behavioral, biomedical and social risks for better pregnancy outcome through prevention and management. Growing recognition on 'continuum of care' throughout the reproductive age for improving pregnancy outcome and reduction of maternal and

neonatal mortality emphasizes the need of pre-conception care. Importance of preconception care is such a way that by the time many of the women find out their pregnancy their fetal organs would have been developed, and moreover wide gap persist during the 'continuum of care' in our society with majority felt that healthy behaviour is required only during the period of pregnancy (1).

Because of the fact that half of the pregnancies are unplanned maternal, newborn, and child health (MNCH) outcomes is at stake. MNCH outcome depends on number of factors like family history of genetic disorders, pre-pregnancy weight, nutritional status, age at marriage, interval between pregnancies, risky sexual behaviour, illegal abortion, folic acid supplementation, systemic diseases, mental and oral health, abuse and violence, exposure to environmental toxins, sexually transmitted diseases, certain drug use, smoking, alcohol and other substance abuse, radiation exposure and immunization against some diseases (2, 3).

Counseling, risk screening, physical assessment and vaccination are the four important components of pre-pregnancy care (4). Opportunistic pre-conception counseling should be provided to all women of reproductive age group who intended to have a child in future (2). According to a study estimates, there could be 8-15% prevention in congenital disorders among live births annually in England through proper pre-conception care programme and specifically 46%, 32-62%, 53% and 54% reduction in specific congenital disorders due to adequate folic acid fortification or supplementation, alcohol intervention and diabetes management respectively (5). Thus, pre-pregnancy care should become a health care priority for better MNCH outcome.

Software professionals owing to their life style changes are at risk of developing obesity, maternal malnutrition, nutritional anemia and other life style related disorders. There is scare of data resource on the aspect of pre-pregnancy care practices in India, thus this study was planned to explore the predictors and practices towards preconception care among currently married software professional women of reproductive age group.

Aims & Objectives:

1. To identify the factors of preconception nutrition care among currently married software professional women of reproductive age group in Chennai, Tamil Nadu.
2. To assess the preconception nutrition care practices among the same population.
3. To determine the association between various socio-demographic factors & pre-conception care practices among female software professionals.

Material & Methods

This was a descriptive cross- sectional study done among 149 female software professionals who are currently married belonging to reproductive age group (15-45 years) working in an IT park, Chennai from January 2017 to December 2017 using universal sampling method. Those who were not willing to participate in the study, unmarried, divorced or separated female software professionals of reproductive age group and those were long leave during the time of data collection period were excluded.

There are three main software parks in Chennai, namely MEPZ, Tidal Park and Sirucheri IT (Information Technology) park. Through simple random sampling method, Sirucheri IT Park was selected randomly chosen. In Sirucheri IT Park, there were seven multinational IT companies. Among them, one multinational IT company was selected with total female currently married software professional population of 165 as it was consisting of more female employees compared to others. Using purposive sampling method, all 165 female employees were selected. Considering 10% non-response rate, effort was made to cover 149 samples.

Data collection: Institution Ethics Committee approval was obtained. After getting written informed consent from the participants, self administered semi-structured questionnaire was used to collect data which was adopted from world health organization policy report on preconception care after content validation and pilot testing(6). It consisted of questions pertaining to socio-demographic details, marital and obstetric history of the participants and their knowledge on preconception care and its practices.

Data analysis: The data was entered in Microsoft Office Excel version 2016 and statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 23. Descriptive data was expressed as frequencies and percentages. Chi-square test was used to test the association between different variables studied and $P < 0.05$ was taken as statistically significant results.

Results:

The majority of participants were aged 25–30 years with mean of 30.45± 3.27, primarily residing in Chennai. Most were Hindus from nuclear families. Over half held B.E/B.Tech degrees, with MCA and MBA were also notable. The primary income range was Rs. 50,000 – Rs.1,00,000. (Table 1) Almost three fourth of the participants were married at the age between 26 to 30 years of age, not having any chronic diseases and were having a history of practicing contraception. Almost half of the participants were having at least one child at the time of study and about

10% were having consanguineous marriage. About 24% had a history of chronic diseases. (Table 1)

The majority of first and second pregnancies were unplanned across age, income, family type, and religion. About 55% of the first pregnancy were unplanned and in second pregnancy, it was 33%. About three fourth of the participants had a history of using contraception and 20% had previous history of abortion. Among women under 30 years, 21% had a planned first pregnancy, compared to 25% in those 30 years and above ($p = 0.5398$). Income showed a statistically significant association with planned second pregnancies ($p < 0.0135$), with those earning ≥ Rs. 1 lakh reporting more planned pregnancies. No significant associations were found between pregnancy planning and family type or religion. Nuclear families had slightly higher planned pregnancy rates than joint families. Christians reported lower planned pregnancy rates than Hindus, but associations were not statistically significant ($p > 0.05$). (Table 2)

Among 149 participants, only 37.58% were aware of pre-conception care (PCC), with doctors being the main information source (19.46%), followed by mass media (11.41%) and friends (5.37%). Despite awareness, only 24.83% practiced PCC. Among them, 59.37% underwent check-ups, 37.5% combined check-ups with folic acid intake, and 18.75% also received Hepatitis B vaccination. Few participants (4.02%) quit night shift work as part of PCC. Screening tests were done by 18.79%, mostly for anemia (100%) and diabetes (85.71%). Additionally, 67.56% of those practicing PCC modified medications. Awareness of congenital defect risk factors was low (31.54%), with poor nutrition and smoking (25.53%) being the most recognized. Other risks like infectious agents (23.40%), alcohol use (21.27%), and diabetes (12.76%) were less commonly known. About 25% of the married female software professionals continued the habit of alcohol consumption even during their pre-conception care**.** Every respondent reported using Iodised salt. Overall, the data highlights significant gaps in awareness and practice of PCC, emphasizing the need for improved education and access to reproductive health services. (Table 3)

Awareness and practice of pre-conception care (PCC) varied across demographic groups. Younger women (<30 years) showed slightly lower awareness and practice than those ≥30, though not statistically significant ($p > 0.05$). Income had a significant impact on PCC practice ($p < 0.0013$), with higher-income women more likely to practice PCC. No significant associations were found for family type or religion with either awareness or practice. Overall, income emerged as a key predictor of practicing PCC, indicating socioeconomic influence on maternal health behaviors. (Table 4) The dietary pattern shows varied intake of recommended and junk food categories. Fruit and vegetable consumption was high, with 58.3% consuming vegetables ≥5 times/week and 23.4% eating fruits 3–4 times/week. Egg, fish, and chicken were commonly consumed 2–3 times/month to 1–2 times/week. Red meat intake was low, with 46.2% never consuming it. Junk foods like aerated drinks and bakery products were consumed frequently; 30.2% had aerated drinks 3–4 times/week, and 46.2% consumed bakery items 1–2 times/week. Coffee/tea was widely consumed, with 40.2% drinking 3–4 times/week and 30.2% drinking it ≥5 times/week, indicating high caffeine intake. (Table 5)

Among women Software professionals, only 41.6% were involved in fitness related activities as a part of Pre-conception care. Among them, around 29% of them followed aerobics exercise, 27.4% did yoga, 25.8% went to gym, 8% were involved in Zumba exercise and 4.8% were involved in meditation. (Table 6)

Pre-conception care screening showed a significant association only with diabetes ($p < 0.0234$), more frequent in women under 30. No significant differences were found between age groups in anemia, hypertension, hypothyroidism, or dental checks. Fitness activity, sleep duration, vaccine uptake, and quitting night shifts showed no statistically significant age-related differences. (Table 7)

Discussion:

Preconception care (PCC) is a vital and often underutilized aspect of women's health that can significantly influence maternal and fetal outcomes. In this study among 149 married female software professionals, several findings highlight both awareness and practice gaps, as well as lifestyle patterns influencing pre-conception health.

- **Awareness and Practice of PCC**

Despite being educated professionals, only 37.58% of participants were aware of PCC, and just 24.83% reported practicing it. This low level of awareness aligns with earlier findings by Doke et al.[7] who reported poor perception of PCC in rural Indian women, indicating that the issue spans both rural and urban populations. Similarly, Pimple and Ashturkar [8] found a lack of awareness in an Indian context, underscoring systemic gaps in health education.

The primary sources of PCC information in this sample were healthcare professionals (19.46%) and mass media (11.41%). This is consistent with Kasim et al.[9], who emphasized the role of healthcare workers in promoting PCC, especially during routine gynecologic or family planning visits. However, reliance on informal sources like friends and relatives was lower in this educated cohort, which contrasts

with findings from rural settings where family and community opinions weigh heavily (Phalke et al.[10]).

- **Association of Socio-Demographic Variables with PCC**

Age, income, religion, and family type were examined for their association with PCC awareness and practice. Although awareness and practice were not significantly associated with age or religion in our study, income emerged as a significant predictor ($p < 0.0013$) of PCC practice. Participants with higher income (> 1 lakh) were more likely to engage in PCC activities. Similar findings have been reported by Shadab et al.[11] and Steel et al.[12], who noted that women with socio-economic advantages were more likely to receive and follow PCC.

Interestingly, our analysis showed no significant difference in awareness or practice between nuclear and joint family types. This contrasts with findings from rural India (Phalke et al.,)[10], where joint family structures often influence health-seeking behavior, sometimes negatively due to traditional beliefs or limited autonomy among women.

- **Marital and Obstetric History**

Most women (71.81%) married between ages 26–30, which reflects trends in urban India among professionals. While consanguineous marriages were low (10.06%), they remain a public health concern due to the increased risk of congenital disorders, as outlined by the WHO [1]. Of those with such marital ties, nearly three-quarters were married to cousins, aligning with cultural norms in certain Indian communities.

Chronic illness was present in nearly one-fourth of participants, with diabetes (45.94%) and thyroid disorders (29.72%) being the most common. These findings reinforce the need for individualized PCC, especially in women with chronic medical conditions. Literature supports this; Steel et al [12].emphasized the role of PCC in managing chronic conditions like diabetes to prevent adverse pregnancy outcomes.

- **Pregnancy Planning and Contraceptive Use**

A concerning finding was the high percentage of unplanned pregnancies (55.38% for the first and 33.33% for the second). While religion and family structure showed no significant association with planned pregnancies, income showed a significant correlation with second pregnancy planning ($p < 0.0135$). This aligns with Lu MC[4], who indicated that higher income and education levels are associated with better reproductive planning.

Contraceptive use was high (73.1%), with condoms being the predominant method (88.07%). This departs from rural data where permanent methods or no contraception is more common. The pattern here is likely due to better awareness and the desire for spacing pregnancies among working women (Annadurai et al.[3]).

- **Pre-Conception Lifestyle and Diet**

Dietary habits displayed both positive and concerning trends. Vegetable intake was high, with 58.3% consuming them regularly, but only 23.4% consumed fruits 3–4 times/week. Protein sources like egg and chicken were moderately consumed, while red meat intake was low. However, unhealthy food consumption, such as aerated drinks and tea/coffee, was prevalent—with 30.2% consuming aerated drinks 3–4 times/week and 70% consuming coffee/tea frequently. These habits can negatively impact reproductive outcomes, especially high caffeine intake, as noted in studies like Shannon et al.[5], which links poor nutrition with congenital disorders.

- **Fitness and Sleep Patterns**

Only 41.6% engaged in fitness activities, mostly 1–3 days per week, and for short durations (30–45 minutes). Sleep habits were more favorable, with 61.29% getting 9 hours of sleep daily. These findings align with WHO[1], which stresses the importance of a healthy lifestyle in the pre-conception period. Women who were physically active were also more likely to practice aspects of PCC, although not statistically significant in our study.

BMI and metabolic profiles further highlighted health concerns—40.93% were overweight (>25 kg/m²), though most had a normal waist-hip ratio and waist circumference. These trends reinforce the need for lifestyle modification interventions as part of PCC, which has been advocated by Ukoha and Mtshali [14] in their study on PCC practices among healthcare workers.

- **PCC Screening and Risk Factor Awareness**

Only 18.79% underwent screening, mostly for anemia and diabetes, with screening for mental health, dental, and thyroid issues being extremely low. This suggests an urgent need for comprehensive PCC services. A significant association between screening for diabetes and age (<30 years) was observed ($p < 0.0234$), indicating that younger women may be more proactive about health checks. However, screening rates remain low overall.

Regarding awareness of congenital birth defects, only 31.54% were informed, with poor nutrition and smoking being the most commonly identified factors. Awareness levels were far lower for conditions like diabetes, advanced parental age, and infections, despite their well-established risks [(1,13)]. This gap suggests current education strategies are not adequately informing even educated, urban populations.

Conclusion

This study highlights substantial gaps in both awareness and practice of pre-conception care among married female software professionals, an ostensibly informed group. Although higher income correlated with improved PCC practice, overall adherence to recommended screening, lifestyle changes, and preventive measures remained suboptimal. Compared with prior studies in both rural and urban settings, the present findings echo a consistent need for improved health education, accessibility of pre-conception services, and integration of PCC into routine reproductive health consultations. Efforts should be made at the policy and community levels, as emphasized by WHO and several researchers, to bridge the gap between knowledge and practice for optimal maternal and child health outcomes.

Limitation: The study was conducted in a single IT park in Chennai, which may limit the generalizability of findings to software professionals in other IT parks or regions. Additionally, the role of male partners in preconception care practices was not examined, potentially overlooking their influence on reproductive health decisions.

Conflicts of interest: None

Funding: None

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Table 1: Socio-demographic details of the study participants (N=149)

Variables	N (%)

Age (years)	25 – 30	84(56.37)
	31 – 35	59(39.59)
	36 - 40	2(1.34)
	41 -45	4(2.68)
Place of residence	Chennai	136(91.2)
	Coimbatore	2(1.34)
	Bangalore	4(2.68)
	Hyderabad	1(0.67)
	Pune	3(2.01)
	London	3(2.01)
Religion	Hindu	138(92.6)
	Christian	11(7.38)
Type of family	Nuclear	118(79.19)
	Extended nuclear	25(16.77)
	Joint	6(4.02)
Education	B.E/B.Tech	82(55.03)
	M.E	21(14.09)
	BCA	3(2.01)
	MCA	27(18.12)
	MBA	16(10.73)
Income	<Rs.50,000	57(38.25)
	Rs.50,000 – Rs.1,00,000	79(53.02)
	>Rs.1,00,000 - Rs.1,50,000	7(4.69)
	>Rs.1,50,000	6(4.02)
Age at marriage (years)	22 -25	40(26.84)
	26-30	107(71.81)
	>30	2(1.34)
Chronic diseases (N=37)	Diabetes	17(45.94)
	Hypertension	3(8.10)
	Thyroid illness	11(29.72)
	Obesity	6(16.21)
Contraceptives used (N=109)	Condoms	96 (88.07)
	IUD	1(0.91)
	Oral pills	11(10.09)
	Permanent sterilization (Tubectomy)	1(0.91)

Table 2 : Association of socio-demographic variables with planned I & II pregnancy

Variables		**Planned 1st pregnancy Yes**	**No**	**P value**	**Planned 2nd pregnancy Yes**	**No**	**P value**
Age	< 30 yrs	13	49	0.5398	10	52	0.072
	≥ 30 yrs	22	65		6	81	
Income	< 1 lac	33	103	0.470	7	129	**<0.0135***
	≥ 1 lac	2	11		3	10	
Family type	Nuclear family	30	88	0.277	7	111	0.4581
	Extended Nuclear/ Joint family	5	26		3	28	
Religion	Hindu	33	105	0.666	10	128	0.8218
	Christian	2	9		1	10	

Table 3: Predictors of Pre-conception care among women software professionals.

Predictors		**N(%)**
Awareness of Pre-conception care (N=149)	Yes	56(37.58)
	No	93(62.41)
Source of information (N =57)	Doctors	29(19.46)
	Friends	8(5.37)
	Mass media	17(11.41)
	Relatives	2(1.34)
Practicing pre-conception care (N=149)	Yes	37(24.83)
	No	112(75.16)
Pre-conception care followed (N =37)	Check-up	19 (59.37)
	Check-up & folic acid intake	12 (37.5)
	Check-up, folic acid intake & Hepatitis B vaccination	6 (18.75)
Quitting Night shift work (N =149)	Yes	6 (4.02)
	No	143(95.97)

Undergone Screening test (N =149)	Yes	28 (18.79)
	No	121 (81.20)
Screening test (N =28)	Anemia	28 (100)
	Dental	4(14.28)
	Diabetes	24(85.71)
	Hypertension	3(12.5)
	Hypothyroidism	9(32.14)
	Mental health	4(14.28)
As a part of PCC, have you stopped or replaced any drugs? (N = 37)	Yes	25 (67.56)
	No	12 (32.43)
Aware of risk factors for Congenital birth defects? (N = 149)	Yes	47 (31.54)
	No	102 (68.45)
Awareness on risk factors for Congenital birth defects? (N = 47) (Multiple responses)	Advanced parental ages	6(12.76)
	Alcohol consumption	10 (21.27)
	Diabetes	6(12.76)
	Infectious agents & drugs	11(23.40)
	Folic acid deficiency	5(10.63)
	Poor nutrition	12(25.53)
	obesity	4(8.51)
	Smoking	12(25.53)

Table 4: Association of socio-demographic variables with Pre-conception care

Variables		**Awareness Yes**	**No**	**P value**	**Practicing Yes**	**No**	**P value**
Age	< 30 yrs	27	35	0.2044	20	42	0.076
	≥ 30 yrs	29	58		17	70	
Income	< 1 lac	48	88	0.1854	29	107	**<0.0013***
	≥ 1 lac	7	6		8	5	
Family type	Nuclear family	46	72	0.4914	33	85	0.084
	Extended Nuclear/ Joint family	10	21		4	27	
Religion	Hindu	53	85	0.4631	37	101	0.1944
	Christian	3	8		1	10	

Table 5 : Consumption of fruits/vegetables/animal based protein foods as a part of pre-conception care (N = 149)

Average consumption	**Recommended food categories**						**Junk food categories**		
	Fruits	**Veg**	**Egg**	**Fish**	**Chicken**	**Red meat**	**Aerated drinks**	**Bakery**	**Coffee/tea**
Never	34 (22.8)	0	1 (0.67)	15 (10.0)	6 (4.02)	55 (46.2)	24 (16.1)	6 (4.02)	5 (3.35)
<1 time/month	26 (17.4)	0	2 (1.34)	52 (34.8)	18 (12.0)	28 (18.7)	22 (14.7)	21 (14.0)	0
2 – 3 times/ month	28 (18.7)	0	67 (44.9)	46 (30.8)	62 (41.6)	40 (26.8)	17 (11.4)	21 (14.0)	0
1 – 2 times/ week	14 (9.3)	0	46 (30.8)	36 (24.1)	36 (24.1)	23 (15.4)	41 (27.5)	55 (46.2)	39 (26.1)
3 – 4 times/ week	35 (23.4)	62 (41.6)	31 (20.8)	0	27 (18.1)	2 (1.34)	45 (30.2)	30 (20.1)	60 (40.2)

≥ 5 times/ week	12 (8.05)	87 (58.3)	2 (1.34)	0	0	1 (0.67)	0	16 (10.7)	45 (30.2)

Table 6: Physical Activity & sleeping as a part of Pre-conception care

Variables		**N(%)**
In a week, no of days spent on moderate to vigorous physical activity (N =62)	1	21(33.87)
	2	14 (22.58)
	3	19 (30.64)
	4	6 (9.67)
	5	2 (3.22)
In a day, duration of time spent on moderate to vigorous physical activity (N =62)	0 hours 15 min	2 (3.22)
	0 hours 25 min	6 (9.67)
	0 hours 30 min	25 (40.32)
	0 hours 45 min	18 (29.03)
	1 hour 0 min	2 (3.22)
	1 hour 15 min	5 (8.06)
	1 hour 30 min	4 (6.45)
No of hours sleeping per day (N = 149)	5 hours	8 (5.36)
	6 hours	20 (13.42)
	7 hours	21(14.09)
	8 hours	59 (39.59)
	9 hours	38 (61.29)
	10 hours	3 (2.01)
BMI (south Asian Pacific Classification) (N = 149)	< 18.5 kg/m^2	1 (0.67)
	18.5 – 22.9 kg/m^2	42 (28.18)
	23 – 24.9 kg/m^2	45 (30.20)
	>25 kg/m^2	61(40.93)
Waist Hip ratio (WHO classification) (N = 149)	<0.85	141 (94.63)
	≥0.85	8 (5.36)
Waist circumference (N = 149)	<80 cm	116 (77.85)
	≥80 cm	33 (22.14)

Table 7: Association of women's age with good pre-conception care practices

Good Pre-conception care practices		**Age**		**P value**
		<30 years	**≥ 30 years**	
1. Screening tests				
Anemia	Yes	16	12	0.0642
	No	46	75	
Dental	Yes	1	3	0.4944
	No	61	84	
Diabetes	Yes	15	9	**<0.0234***
	No	47	78	
Hypertension	Yes	2	1	0.3737
	No	60	86	
Hypothyroidism	Yes	5	4	0.3812
	No	57	83	
2. Pre-conception care followed				
Check-up & folic acid intake	Yes	5	7	0.9967
	No	57	80	
Check-up, folic acid intake & Hep-B vaccine	Yes	3	3	0.6704
	No	59	84	
3. Spending time for fitness activity	Yes	31	31	0.079
	No	31	56	
4. No of hours of sleep/day	7 - 8hrs/day	34	46	0.8125
	< 7 hrs/day	28	41	
5. Quitting night shift work	Yes	3	3	0.6704
	No	59	84	