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Healthcare Utilization of Gynecological and Reproductive Morbidities: Role of Intra-Familial Relations and Empowerment among Women, Rural India

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Abstract

Maternal morbidity and mortality during pregnancy and childbirth is a serious concern in developing countries. The failure of women to discuss their reproductive health problems leads to less attention being given to healthcare for gynaecological and reproductive morbidities (GARMs). Intra-familial relations and empowerment specifically on GARMs may contribute to identifying determinants of healthcare in rural areas. Data from Primary Field Survey (N= 660) conducted during Feb-May, 2015 in 12 villages of Nalanda, Bihar, was accessed in order to identify the underlying determinants motivating women to seek advice or treatment for GARMs. The bivariate, logistic regression, and simultaneous equation modelling were used to achieve the objectives of the study. The GARMs related to female genital organs and menstrual cycle (56%) followed by menstrual disorder (53%), and prolapse (48%) was found to be the most common among rural women in Bihar. By drawing attention to intra-familial relations and promoting women to interact on GARMs may reduce maternal morbidity or death, particularly in rural India.

Keywords

Gynecological and reproductive morbidities; Empowerment; intra-familial relations; rural India

Introduction

Childbirth can lead to gynaecological and reproductive morbidities (GARMs) if not managed properly. The World Health Organization International Classification of Diseases (ICD-10) confirms morbidities such as female genital prolapse, menstruation disorder, pain and other conditions associated with female genital organs and menstrual cycle, pregnancy with abortive outcome, pregnancy and childbirth puerperium, maternal hypotension syndrome, complication of labour and delivery disorder venous puerperium disorder, infections of breast associated with childbirth, perinatal period disorder are common among women at disadvantaged sites. Earlier studies confirm that fewer morbidities have been studies but majority of them have wider scope of research especially in rural settings. The menstrual disorder, and pre-eclampsia are among those which has been studied. Studies on eclampsia indicate there are 2-3 cases per 10000 births

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in Europe while cases in developing countries tend to be 10-30 times more common than in high income countries. (Duley, 2009). Other studies showed that nutrition and body mass index (Fujiwara & Nakata, 2010; Vyver, Steinegger, & Katzman, 2008) show that complications such as polycystic ovary syndrome and infertility (Lambert-Messerlian *et al.*, 2011), strenuous workout and exercise (Chang, Chen, Hsieh, & Chiu, 2009; Earth & Sthapit, 2002; Tegerstedt, Miedel, Mæhle-Schmidt, Nyrén, & Hammarström, 2006) and presence of chronic morbidities (Adachi, 2008) are positively associated with GARMs among women. However, despite GARMs vastly affect maternal mortality and childbirth complications they have not attracted the attention of researchers. Complicating 2-8 percent of all pregnancies, pre-eclampsia, is a major contributor to maternal mortality worldwide (Khan, Wojdyla, Say, Gülmezoglu, & Van Look, 2006; Steegers, von Dadelszen, Duvekot, & Pijnenborg, 2010). The World Health Organization reports that as high as 18 million women aged 30-55 year report excessive menstrual bleeding (Goldrath, 1995). Askie *et al.* found that 10-15 percent of half million maternal deaths yearly are associated with pre-eclampsia and eclampsia, 99 percent of which are among the low-resource category (Askie, Duley, Henderson-Smart, & Stewart, 2007).

Every day, approximately 830 women die of pregnancy and childbirth related causes mostly in developing countries, with over one third of all maternal deaths worldwide in 2015 being in Nigeria and India (WHO, 2015). The negative consequence associated with GARM include the healthcare cost in consuming expensive hormonal drugs and other laboratory tests (Houston, Abraham, Huang, & D'Angelo, 2006), poor health (Adachi, 2008; Mathias, Kuppermann, Liberman, Lipschutz, & Steege, 1996), and limitations on attendance from regular day to day life and missed activities (Houston *et al.*, 2006; Kadir, Edlund, & Von Mackensen, 2010). The studies on healthcare for GARMs include the medication of such disorders (Ganzevoort *et al.*, 2005; Visser & Wallenburg, 1995; Walker, Greer, & Calder, 1983; Walraven *et al.*, 2002) but mostly from developed region. The case in rural India is slightly exceptional and it becomes even more complicated in patriarchal society where despite the role of health care at home women cannot decide to seek advice/treatment for her health (Dyson & Moore, 1983). In this case what brings women to healthcare provider need to be focused particularly in rural setting in rural Bihar, India? Till the date, there is no such study exist dealing the GARMs especially for the study population of Bihar, India. The objective of the paper is to study determinants promoting women for advice or treatment seeking for gynecological and reproductive morbidities (GARMs). This study tries to contribute in existing literature that intra-familial relations (IFR), and women's empowerment for gynecological and reproductive morbidities (WEGARMs) play a significant role in healthcare for GARMs among rural women Nalanda, Bihar.

Data and Methods

The data comes from primary field survey. The sampled villages were selected from Census 2011 with the probability of selection being proportional to number of households in village at district (Census, 2011a, 2011b) followed by complete house listing in selected villages. The district, of Nalanda in Bihar was selected based on its having the highest prevalence of any type of gynecological and reproductive morbidities (IIPS, 2010) and low female literacy levels (Census, 2011b). The survey was conducted during Feb-May 2015 using pre-structured and pretested schedule (n=660). A complete listing of women who are pregnant for 3 to 4 months or having at least one child in last five years prior to survey. At the final stage, selecting respondent from

house list and minimizing intra-household correlation only one youngest currently married woman from each household and 55 women from each village, in total 660 women were selected using systematic random sampling from 12 villages, in Nalanda district, Bihar, India. The information on gynecological and reproductive morbidities, socio-economic and demography characteristics was collected through face-to-face interview using a pretested structured bilingual schedule after obtaining informed written consent. The ethical clearance certificate came from the Students Research Ethics Committee (SREC) of the institute. The survey was supplemented with information on the household, birth history, advice/treatment seeking behavior for GARM, and availability of money among women. The data entry was done using CSPro 6.3 (Pro & Pro, 2016) and analyzed using STATA 13 (StataCorp, 2014).

Methods

The bivariate, multivariate binary logistic regression technique (Pampel, 2000) was used to predict the healthcare utilization among women experiencing the gynecological and reproductive morbidities. To understand the endogeneity of the intra-familial relations and women empowerment for gynecological and reproductive morbidities simultaneous equation modelling (Greene, 1993) was used. Chi-square test was also used to check the association between women's characteristics.

Dependent variable

The dependent variable is treatment/treatment seeking for GARMs. It was measured by a categorical variable, whether women sought treatment or advice for her GARMs from any healthcare personnel including ASHA, ANM, nurse or doctors of primary healthcare center (PHC), and private/government hospitals (1= yes; otherwise = 0).

Independent variables

Index of empowerment for gynecological and reproductive morbidities: The index of women empowerment for gynecological and reproductive morbidities was computed using binary information on whether permission seeking is problematic on 3- point Likert scale. Whether for women the seeking advice/treatment was a big problem (= 1), small problem (=2) or not at all (=3). The information on women empowerment for gynecological and reproductive morbidities was collected through eleven types of questions such as (1) as getting permission to go; (2) getting money needed for treatment; (3) distance to the health facility; (4) having to take transport; (5) finding someone to go with you; (6) concern that there may not be a female health provider; (7) concern that there may not be any health provider; (8) concern that there may be no drugs available; (9) any previous bad experience; (10) location of health care facility/provider; (11) household duties. The Cronbach alpha for the index was measured as 0.735. Based on the mean value the index (μ = 19.5) and categorized into two (low = below mean; and high = above mean).

Index of intra-familial relations: To access women's solidarity of relation with household members and frequency of interaction, a new variable was generated. The interaction with family member among woman was measured by eight types of social domain. These social domains include (1) religious, (2) money for daily needs, (3) surrounding conditions, (4) property, (5) maintaining public relation through reciprocity in terms of exchange of gifts, (6) visit to relative, (7) general health and (8) own (woman's) health. Therefore, intra-familial relations among women were computed using eight questions on Likert scale during last six months prior to

survey. It was ensured (by asking during interview) that whether discussion in such discussion were not lead to bitterness in familial relation. The information was collected using questions such as "*do you discuss on the domain with your family members?" and if yes, then "what is the frequency of discussion" (like 0= never; 1= Once in a month; 2 = 2/3 times in a month; 3= 4/5 times or once in a week; 4= 2/3 times in a week or daily).* The Cronbach alpha for the index is 0.91. Based on the mean value the index (μ = 17.2) was categorized into two (low = below mean; and high = above mean). The information on education (0= illiterate, 1= primary, and 2= secondary and higher women's work status (0= housewife i.e. no paid work/housewife, 1= agricultural labor i.e. agricultural related activity, 2= HW plus work i.e. contribute in husband's business along with her own role as housewife); parity (0=1/2, 1=3, and 2=3+); sanitation facility (0=non-improved toilet, 1= improved toilet), religion (0= Hindu, 1= Muslim) and caste (0= scheduled caste/tribe, 1= Other backward classes, 2=others) were also assessed.

Background

Study Population: Nalanda, Bihar

The demographic scenario of Nalanda, Bihar is not very satisfactory (Table 1). With lower female literacy, seems to account for low marriageable age i.e. 23 percent marrying below 18 years. The infant mortality rate (42) and maternal mortality rate (23) is amongst the highest for India (RGI, 2013, 2016). Despite the 10 percent per annum of net state domestic product (NSDP) records show the low absolute income - in tenth five-year plan period - as its per capita income at constant prices is still the lowest in the country. Furthermore, a high intra-state disparity made the incidence of poverty most prominent and therefore, the state lies near the bottom of the HDI rank (GOI, 2011). As the third most populous state, Bihar has a gender ratio of 916 (females per 1000 males) and 4.9 million of female shares 9 percent of total Indian population (Census, 2011).

Table 1: Area and demographic profile of the district Nalanda, Bihar, India

Indicators	Nalanda	Bihar
Area (sq. Km.)	2,355[a]	94,163
No. of HH	477,529[a]	18,867,444
Population		
Male	1,497,060	54,278,157
Female	1,380,593	49,821,295
Sex Ratio		
Overall sex ratio	921[a]	916
Child sex ratio	959[b]	935
Percentage of scheduled caste	21.1[a]	15.9
Percentage of scheduled tribe	0.0[a]	1.3
Percentage of urban population	15.9	11.3
Decadal Growth Rate (2001-2011)	21.3	25.4
Population Density (Pers./sq. Km.)	1,222	1,106
% of girls marrying below 18 years	22.5[b]	13.8[b]
% of boys marrying below 21 years	29.7[b]	20.6[b]
% using any family planning method	35[b]	41.2[b]
Mother availed financial assistance for delivery under JSY (%)	47.6[b]	40.9[b]
Literacy Rate		
Male	77.1	73.4
Female	54.7	53.3

Data Source: Sex Ratio: females per 1000 males. Primary Census Abstract, Table A-5, Series 11, Bihar, Census of India 2011. New Delhi: Directorate of Census Operations, Registrar General & Census Commissioner, India.

[a] District Census Handbook, Series- 11, Part XII-B, Village and Town Wise Primary Census Abstract, Nalanda, Bihar, Census of India, 2011. New Delhi: Directorate of Census Operations, Registrar General & Census Commissioner, India.

[b] Annual Health Survey 2012-13 Factsheet, Bihar. New Delhi: Office of the Registrar General & Census Commissioner, Ministry of Home Affairs, Government of India, India.

The district of Nalanda has amongst the lowest female literacy rates (54.7%) in India (Census, 2011a). The district level household and facility survey shows that 56 percent of the women in Nalanda have reproductive problems during pregnancy (IIPS, 2010) and 23 percent of girls marry before 18 years (ORGI, 2013). The mean age of women in the study was 25 years with five years of schooling. The study population comprised 8 percent Muslim and 61 percent from the scheduled caste (SC) and 14 percent from other backward caste (OBC). The scheduled castes (SCs) and other backward caste (OBC) are the official designations given to various groups of who have been historically marginalized, recognized in the Constitution of India.

Level of gynecological and reproductive morbidities in Nalanda

The findings show that most common was *pain and other conditions associated with female genital organs and menstrual cycle* was common (56%), followed by *menstruation disorder* (54%) and *pregnancy and childbirth the puerperium* (53%). However, the GARMs was lowest for *perinatal period disorder* (14%) to *pain and other conditions associated with female genital organs and menstrual cycle* (56%).

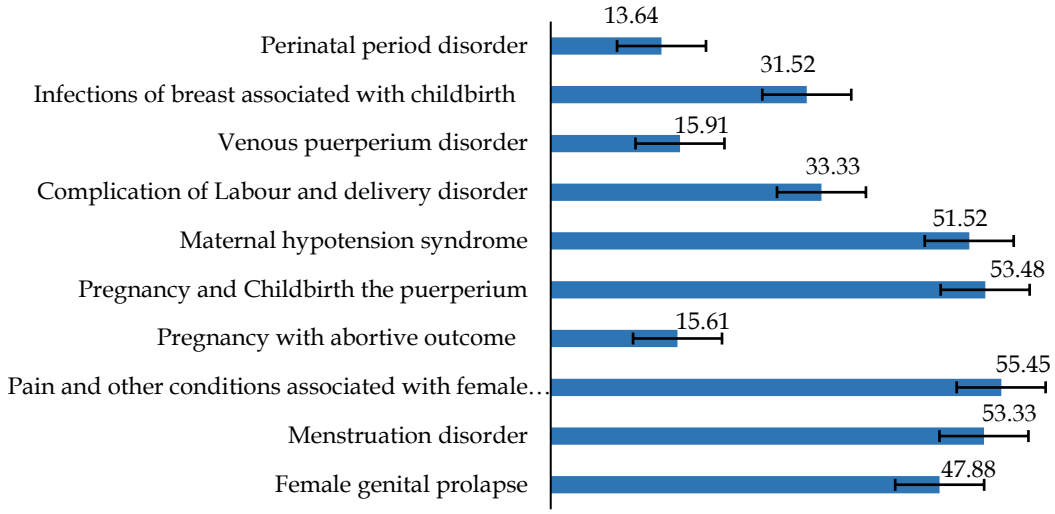

Figure 1: Percentage of gynecological and reproductive problems among women (15-49), 2015

About 52 percent women found to experience maternal hypotension syndrome. In Figure 1, the GARMs such as menstruation disorder, pain and other conditions associated with female genital organs and menstrual cycle, pregnancy and childbirth the puerperium, maternal hypotension syndrome were common and about two-fifth of these women were found to experience problems (p<0.05).

Women empowerment for gynecological and reproductive morbidities (WEGARMs)

Assessing individual characteristics such as empowerment among women in the context of GARMs and intra-familial relations (IFR) can help in measuring individual characteristics and those related to health. The study found that lower aged women were less empowered for GARMs compared to those who are older. In this context, Table 2 shows that 26 percent women aged 15-24 years were highly empowered compared to 54 percent women aged 25-34 years in Nalanda. Earlier studies had reported similar findings (Kishor & Subaiya, 2008). The women of lower parity were reported to be highly empowered compared to those with higher parity. About 61 percent women with parity of one/two compared to 21 percent with three plus parity was found to possess high empowerment for GARMs in Nalanda, Bihar. The association of intra-familial relations and WEGARMs reveals that women with higher intra-familial relations were more likely to be more empowered on reproductive health matters. About 57 percent women with high IFR were more empowered compared to 36 percent women with low IFR. Decision making on issues related to GARMs were less likely to be problematic if the women's intra-familial relations were higher (p<0.001).

Intra-familial relations among women in Nalanda, Bihar

The study found that only 37 percent women had high intra-familial relations (Table 2). Characteristics such as age of women, parity, husband's work, women's work, and educational attainment were found to be significant factors (p< 0.01). The IFR and women's education was found to be significantly associated (p<0.001) and intra-familial interaction was found higher among illiterate women. This study found that household economic status also contributes to better intra-familial relations. For instance, among women with high intra-familial relations, about 61 percent women were found richer compared to 20 percent women with low wealth status. However, the woman's educational attainment was found negatively associated with intra-familial relations (p<0.001). In other words, women with less education were more interactive in nature on given social dimension. It is evident that about 53 percent illiterate women were found to be interacting compared to 25 percent for those with primary and secondary education (Table 2).

Table 2: Percentage of women with high empowerment on gynecological and reproductive morbidity (WEGARMs) and intra-familial relation (IFR) in Nalanda, rural Bihar, India

Women's Characteristics	*WEGARMs*	IFI	N
Age group	71.46*** (2)	14.046*** (2)	
15-24	26.0	33.6	461
25-34	54.1	41.0	159
35-49	-	46.4	40
Parity	65.85*** (2)	14.979*** (2)	
One/Two	60.8	33.3	243
Three	44.7	32.5	232
Four and more	21.3	49.2	185
Husband Work	68.18*** (1)	14.014*** (1)	
Agricultural Labor	63.6	28.8	261
Others	31.1	43.2	399
Women's Work	5.99* (2)	70.18*** (2)	
Housewife	39.5	30.3	340
Agricultural Labor	48.7	28.3	187
HW plus work	49.2	31.1	133
Women's Education	122.23*** (2)	57.251*** (2)	
Illiterate	26.7	53.4	295
Primary	26.7	24.8	232
Secondary	70.3	24.7	133
IFI	28.747*** (1)		
Low	36.1		413
High	57.5		247
Total	**44.1**	**37.4**	**660**

Women's Characteristics	*WEGARMs*	IFI	N
Wealth Status	4.82 (2)	87.80*** (2)	
Low	38.8	19.5	238
Middle	45.8	26.4	292
High	50.0	60.8	130
Source of water	96.58*** (2)	79.15*** (2)	
Tube well/borehole	57.1	33.2	118
Standpipe/Public	43.3	75.0	135
Unprotected Well	11.0	23.2	407
Sanitation facility	26.18*** (1)	0.50 (1)	
Improved	16.9	33.8	78
Non-improved	47.7	37.9	582
Religion	22.58*** (1)	4.87 (1)	
Hindu	41.3	38.7	604
Muslim	74.6	23.6	56
Caste	40.11*** (2)	5.84 (2)	
SC	49.8	36.3	400
OBC	14.0	48.4	94
Other	47.3	33.9	166
Total	**44.1**	**37.4**	**660**

Note: Degrees of freedom in parenthesis;
***: $p \leq 0.001$; **: $p \leq 0.01$; *: $p \leq 0.05$; The scheduled castes (SCs) and Other backward caste (OBC) are the official designations given to various groups of historically marginalized people, recognized in the Constitution of India.

Determinants of Women empowerment on gynecological and reproductive morbidities (WEGARMs) and Intra-familial relation (IFR)

The Table 3 represents the coefficient of logistic regression for dependent variable IFR and WEGARMs which serves as a preliminary predictor for simultaneous equation modelling. Age of women, parity, husband's work status, women's work status, women's education, socio-economic status, and caste were reported to be significantly associated with IFR and WEGARMs. Controlling women's individual level characteristics, the odds of IFR was found significantly higher for those with high WEGARMs (OR: 6.53, p<0.001), meaning the probability that intra-familial relations is high, about seven times as likely as the value of the WEGARMs increased by one unit from low to high. The probability that a WEGARMs is high was reported to be three times as likely as the familial relations increased by one unit from low to high (OR: 3.48, p<0.001). The probability of intra-familial relation among women aged 35-49 years and parity three were more pronounced than younger woman. The probability that women had high interaction or high intra-familial relations were four times as likely as their work status change from housewife to working plus housewife. In addition, the odds of WEGARMs was significantly higher (OR= 1.59, p<0.05) in the case of women who participated in their husband's job while at the same time playing the role of housewife than women who were only housewives. The logit model supports the bivariate result that odds of high intra-familial relation among secondary educated women were about 0.08 (92% lesser) than that of illiterate women. On the other hand, the odds of women with secondary or primary education was 4.5 and 2.6 times that of illiterate women.

The odds of familial relation being high was greater among women with high empowerment on reproductive health (OR: 3.2, p< 0.001). The odds of being high WEGARMs was found 3.83 for women whose familial relation was high. The odds of intra-familial relations among richer women was significantly higher compared to poorer women (OR: 1.2, p<0.001). Similarly, caste belongingness was also observed to be significantly associated with the IFR and WEGARM. The odds of IFR was found to be higher among other backward caste women than the scheduled caste (OR: 6.03, p<0.001).

Table 3: The odds of intra-familial relation (IFR) and women empowerment for gynecological and reproductive morbidities (WEGARMs) among women in Nalanda, rural Bihar, India

Women's Individual Level Characteristics	IFR	WEGARMs	Women's Household Level Characteristics	IFR	WEGARMs
WEGARMs			*WEGARMs*		
Low [a]			Low [a]		
High	6.531***	NA	High	3.2***	NA
IFR			**IFR**		
Low [a]			Low [a]		
High	NA	3.482***	High	NA	3.83***
Age group			**Wealth Status**		
15-24 [a]			Low [a]		
25-34	3.043**	0.156***	Middle	1.092***	0.714
35-49	3.445*	-	High	1.217***	0.932
Parity			**Source of water**		
One/Two [a]			Tube well/borehole [a]		
Three	1.946*	0.351*	Standpipe/Public	2.332*	0.134***
Four and more	1.364	0.184***	Unprotected Well	0.3**	0.035***
Husband Work			**Sanitation facility**		
Agricultural Labor [a]			Improved [a]		
Others	2.018**	0.304***	Non-improved	1.76	3.182**

Table 3 (continued)

Women's Individual Level Characteristics	IFR	WEGARMs	Women's Household Level Characteristics	IFR	WEGARMs
Women's Work			**Religion**		
Housewife [(a)]			Hindu [(a)]		
Agricultural Labor	0.983	1.019	Muslim	0.692	1.935
HW plus work	4.015***	1.594*	**Caste**		
Women's Education			SC [(a)]		
Illiterate [(a)]			OBC	6.032***	0.201***
Primary	0.167***	2.566***	Other	1.154	0.924
Secondary & high	0.077***	4.513***			
Constant	0.123***	0.316*	**Constant**	0.361*	0.176***
N	660	620	N	660	660
log likelihood_null	-436.38	428.586	*log likelihood_null*	-436.38	-452.857
log likelihood_full	-316.884	-267.822	*log likelihood_full*	-337.623	-318.283
BIC	711.675	606.37	BIC	753.153	714.47
LR chi^2 (11)	238.98	321.53	LR chi^2 (11)	197.5	269.15
Prob. > Chi^2	0.001	0.001	Prob. > Chi^2	0.001	0.001

Note: NA: indicates not applicable; [(a)]: Reference Category.
***: $p \leq 0.001$; **: $p \leq 0.01$; *: $p \leq 0.05$; The scheduled castes (SCs) and Other backward caste (OBC) are the official designations given to various groups of historically marginalized people, recognized in the Constitution of India.

Interdependency of Women empowerment (WEGARMs) and Intra-familial relation (IFR) on gynecological and reproductive morbidities in rural Bihar

The Wald test confirms the simultaneity of the WEGARMs and IFR in the context of GARMs among women in rural setting. The two-stage probit least squares (2SPLS) model show that WEGARMs was positively associated with IFR (p<0.001) (Table 4). The IFR decreases as the permission seeking among women for their GARMs tend to be a bigger problem. On average, WEGARMs tend to result in 0.65 percent increase in intra-familial relation. In other words, the women experiencing GARMs was found to possess high IFR if women's experience for permission seeking were found to be less problematic. The WEGARMs tend to increase 0.65 percent in intra-familial relations while 1.18 percent by education increases particularly secondary education. The effect of empowerment on intra-familial relation was found to be lower than women's education (p<0.01). Similarly, education, socio-economic status, water and sanitation facilities were found to be positively associated with IFR in Nalanda, rural Bihar. It is evident that primary education (β=1.74, p<0.05) had greater impact than secondary and higher level educational (β=1.12, p<0.05). However, factors such as higher parity, women's work status as housewife, and using water from unprotected well negatively shaped the percentage of intra-familial relations among women in the household. For instance, housewives record a 0.92 percent decrease in familial relation (p<0.001).

The effect of intra-familial relations on WEGARMs was found to be positively associated (p<0.01). In other words, the women participating in intra-familial relations tend to have less problems in getting permission to access healthcare for GARMs by 0.16 percent. The study found that women controlling their parity to one/two were found to be empowered in context of GARMs (β=0.69, p<0.05) than those who faced problems in getting permission. This study supports that the view that education increases empowerment by 1.19 percent and 2.19 percent for those with primary education and secondary education respectively, thus increasing in WEGARMs (p<0.01).

Table 4: Result of Two-Stage Probit Least Squares (2SPLS) Model for intra-familial relations (IFR) and women empowerment for gynecological and reproductive morbidities (WEGARMs) among women, Nalanda, rural Bihar, India

Variable	IFR			*WEGARMs*		
	Est.	*SE*	*Z*	*Est.*	*SE*	*Z*
WEGARMs	0.65***	0.1863	3.49	NA		
IFR	NA			0.159**	0.05	3.18
Respondent age						
15-24[a]						
25+	0.665*	0.3068	2.17	0.694	0.4316	1.61
Parity						
One/Two	-0.082	0.1885	-0.43	0.687*	0.2748	2.5
Three[a]						
Four and more	-1.859**	0.556	-3.34	-1.468**	0.5116	-2.87
Women Education						
Illiterate[a]						
Primary	1.739*	0.8196	2.12	1.189**	0.4019	2.96
Secondary & High.	1.188*	0.5542	2.14	2.189***	0.3243	6.75
Women's Work Status						
Housewife	-0.92***	0.2226	-4.13	-1.441**	0.4639	-3.11
Agricultural Lab.	-0.209	0.3215	-0.65	-0.834*	0.4012	-2.08
HW plus work						
Wealth Status						
Low[a]						
Middle	3.172***	0.6942	4.57	2.557***	0.4287	5.96
High	4.771***	0.938	5.09	4.173***	0.6994	5.97
Water Facility						
Tube well/Borehole	1.397***	0.3479	4.02	1.513***	0.3776	4.01
Standpipe/public[a]						
Unprotected Well	-1.973***	0.3807	-5.18	-2.213***	0.5333	-4.15
Toilet Facility						
Non-improved[a]						
Improved	-0.797*	0.3194	-2.5	-1.642**	0.5447	-3.01
Caste						
Scheduled Caste				0.86	0.4674	1.84
OBC[a]						
Others				0.63	0.481	1.31
Religion						
Hindu				-0.284	0.3132	-0.91
Muslim[a]						
_constant	13.34***	3.5313	3.78	2.925	1.6166	1.81
N	**660**			**660**		
LR Chi2 (*df.*)	239.07 (15)			381.48 (18)		
Prob. > chi2	0.001			0.001		
Pseudo R2	0.274			0.421		
log likelihood_null	-436.376			-425.857		
log likelihood_full	-316.843			-262.117		
Wald Test (Chi², df., p)	**0.06 (1, *p*=0.813)**			**0.04 (1, *p*= 0.847)**		

Note: Wald Test: Wald Test of exogeneity; [a]: Reference Category; ***: $p \leq 0.001$; **: $p \leq 0.01$; *: $p \leq 0.05$

Healthcare for gynecological and reproductive morbidities in rural setting, Bihar, India

The literature on healthcare utilization for gynecological and reproductive morbidities are not available for Nalanda, Bihar. Treatment for gynecological and reproductive morbidities is lower due to factors such as shame, humiliation (Dixon-Mueller and Wasserheit, 1991). The issue of advice taking and treatment seeking are considered as healthcare in this study. The assessment of IFR and WEGARMs indicates that probability of healthcare utilization for

GARMs was about seven times as likely as the value of IFR increased by one unit from low to high (Table 5). While the probability of healthcare utilization was about 1.5 times as likely as the value of WEGARMs increased from low to high (Model 1). Women aged 25-34 years were more likely to seek advice or treatment for the GARMs (OR: 7.23, p<0.01) compared to women aged 15-24 years. Individual level characteristics such as lower parity, and women's education were found significantly positively associated with GARMs healthcare. The odds of healthcare among women with parity three (OR: 0.13, p<0.01) and four and more (OR: 0.01, p<0.001) were significantly lower than the women with parity one/two. This study found that women with higher education (OR: 2.07, p<0.001) were more likely to seek advice or treatment for their gynecological morbidity than illiterate women. The odds of healthcare utilization for GARMs among women contributing in her husband's business along with her own role of housewife were lower than housewife. The assessment of interaction variable of IFR and WEGARMs show that likelihood of GARMs healthcare were higher among women poses high IFR and WEGARMs (OR: 8.77, p<0.01), controlling other women's individual and household level factors (Model 3).

Table 5: Odds of health care utilization for gynecological and reproductive morbidities among women, Nalanda, rural Bihar, India

Covariates	Model 1	Model 2	Model 3
IFR			
Low [a]			
Higher	6.524***		
WEGARMs			
Low[a]			
Higher	1.546***		
IFR & WEGARMs			
Both Low[a]			
at least one high			0.841
Both High			8.769**
Age group			
15-24[a]			
25-34		7.232**	3.327*
35-49		0.427	0.381
Parity			
One/Two[a]			
Three		0.128**	0.168**
Four and more		0.014**	0.007**
Women's Work			
No Work/HW[a]			
Agri. Lab.		0.462	0.474
HW Plus Work		0.519***	0.018**
Women's Education			
Illiterate[a]			
Primary		1.361***	1.181***
Sec. & Higher		2.068***	1.941***
Wealth Status			
Low[a]			
Middle		1.462***	1.01***
High		2.001***	2.501**
Source of water			
Tube well[a]			
Standpipe		4.046***	3.386**
Unprotected		.089***	.024***
Caste			
SC[a]			
OBC		4.75***	2.483***

Table 5 (continued)

Covariates	Model 1	Model 2	Model 3
Other		2.251*	2.206
_cons	1.271*	0.081*	0.032**
level of significance	0.001	0.001	0.001
log likelihood_null	-457.429	-457.429	-457.429
log likelihood_full	-330.749	-126.678	-117.148
AIC	667.497	287.357	272.297
BIC	680.974	363.725	357.649
N	**660**	**660**	**660**

Note: [a]: Reference Category; ***: $p \leq 0.001$; **: $p \leq 0.01$; *: $p \leq 0.05$; IFR: Intra-familial relations, WEGARMs: Women empowerment for gynecological and reproductive morbidities.

IFI & WEGARMs: Interaction variable of IFR and WEGARMs

Discussion and Conclusion

The issue of GARMs is considered as "tabooed" topic and stressful for women. Earlier studies use the concept of familial relations to investigate the time spent together in context of child's human capital (Bryant & Zick, 1996), solidarity, family harmony and well-being (Chuang, 2005), interaction and cohabitation as impediments of working activity (Smith, Downer, Lynch, & Winter, 1969). The IFR and WEGARMs were found to be an endogenous predictor in terms of GARMs in a rural setting such as in Bihar, India. Therefore, advocating better IFR can be proved as effective determinants in combating maternal health. Additionally, women with high WEGARMs were more likely to utilize healthcare compared to those with low empowerment. There was higher likelihood that women with high empowerment status (OR: 1.55, $p< 0.001$) are more concerned with healthcare than their counterpart women with low WEGARMs. Even within India, women empowerment varies with region. The women in southern India are more empowered compared to those in the north of the country (Dyson & Moore, 1983; Sen, 1993). It is documented that lower empowerment and high fertility (Balk, 1994) results in increased health risk for women and the child (Mason, 1984). In Nalanda, the probability of women empowerment on GARMs was 0.18 as likely with an increase in parity by one unit from one/two to four or more. The women with parity one/two increases the WEGARMs by 0.68 percent while the parity four and more decreases not only the WEGARMs (by 1.5% decrement) but IFR (by 2% decrement) also. There is a negative relationship between higher number of children and WEGARMs among the women studied. The study support the findings that lower empowerment tends result in larger number of children (Abadian, 1996).

Several studies report that women's empowerment enables pregnancy care including in India (Bloom, Wypij, & Gupta, 2001; Mistry, Galal, & Lu, 2009). This study provides evidence to support the claim that economic status of the household is positively associated with the empowerment of women (Table 4). The estimates derived from simultaneous equation model suggests that, on average wealth status increases about 4 percent WEGARMs. This study suggests that a simultaneous association exists between the variables, where, WEGARMs has a positive and significant effect on IFR, and IFR has a positive and significant effect on WEGARMs (Wald test = $p<0.05$). This study argues that if the women are exposed to interact/discuss on her demand she tried to make the system convinced without paralyzing the inter-connectedness of familial relationship between her and the family in which she lives. The study confirms the view that if the family is a comfortable platform for discussion/interaction better decision can be arrived at, for a woman, particularly in a patriarchal society, then she can be more positively able to make the family/household convinced towards her decisions in healthcare perspective. For instance, the women with high

IFR and WEGARMs are more likely to seek advice or treatment for her GARMs in Nalanda, rural Bihar. Additionally, the study provides the evidence that education and better socio-economic status play a significant role in determining healthcare in GARMs and intra-familial relation thus WEGARMs among study population.

The limitations of this study are: the level of GARMs among women are based on self-reported morbidities, which may have been over-or under-reported. The estimate of healthcare utilization for GARMs was based on the definition of healthcare and included advice and treatment seeking. The findings should therefore be taken cautiously especially with regard to the restricted number of variables when analyzing "individual and household level characteristics".

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