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Balancing the Present and the Future: A Study of Contraceptive Use in Calcutta's Slums

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Abstract

Calcutta, an important metropolitan city in eastern India, has a large slum population. Despite the poor economic status of this population, analysis of DHS data (2004–2005) reveals that contraceptive use levels in Calcutta slums is quite high, with a large proportion preferring terminal methods. Econometric analysis reveals that cultural factors are important determinants of contraceptive use. Results also indicate that respondents attempt to balance current needs (by trying to limit family size through use of contraceptives) but also try to provide for the future (by having at least one son before adopting family planning methods).

Introduction

Calcutta is one of the largest metropolitan cities in India, with a population of 4.6 million, spread over an area of 1380 sq km. About a third of the city's population, amounting to 1.5 million, live in slums.[1] Over 40% of Calcutta's slum residents have been slum dwellers for two generations or longer, while more than half originate from the districts surrounding the city.[2] In addition, there are also migrants from the neighbouring states of Bihar, Jharkhand, Uttar Pradesh and Orissa. About 37% of the slum population is engaged in economic activities, and as many as 86% of this population are marginal workers. The proportion of female workers is even lower (12%).

An interesting finding is that the literacy level in Calcutta slums is 66% among males, while the corresponding figure for the female slum population is 60%. This is not markedly below the national urban average of 70%. Given the relatively high literacy levels, it is not surprising that researchers have generally found high contraceptive prevalence rate among slum dwellers, with a preference for modern and irreversible methods, like sterilization (Chattopadhyay et al. 2004; Sen 2001). The only exception is Biswas et al. (1991), who found a low contraceptive prevalence rate in Calcutta slums. The latest wave of Demographic Health Survey data (2005–2006) reports that contraceptive use in Calcutta (77% of currently married women) is higher than in other cities surveyed. This indicates that analysis of contraceptive use patterns in Calcutta slums is an interesting area of study.

A major limitation of these studies is that they focus on estimating the prevalence of contraceptives, without attempting to identify factors influencing decisions to adopt family planning or barriers to contraceptive usage. This lacuna contrasts strongly with the existence of a large body of literature on determinants of contraceptive use in South Asia. Such studies identify son preference (Arnold 2001; Jayaraman et al. 2009; Roy et al. 2008; Saha and Bairagi 2007), education (Gubhaju 2010; Kamal 2007; Kamal and Huda 2008), religious identity (Bhatt and Xavier 2005; Iyer 2002; James and Nair 2005; Kulkarni and Alagarajan 2005) and empowerment of women (Jejeebhoy 2001) as factors having a strong influence on the decision to use contraceptives. Such studies model decision making as a binary process – the respondent either uses contraceptives or does not. However, there are different types of contraceptive methods, differing in terms of their reliability and reversibility. The decision to adopt a folkloric method, or use the rhythm method, for instance, does not have the same implication for reproductive behaviour as sterilization, or even intra-uterine devices. Our paper is motivated by the realization that a study of the forces that determine contraceptive choice should, therefore, distinguish between alternative methods.

The objective of this paper is to understand contraceptive use patterns and their determinants in Calcutta slums. The focus on Calcutta may be justified on the following grounds. Like the other metropolitan cities of India, Calcutta has long acted as a magnet for migrants from rural areas and small towns. This has led to over-urbanization and the creation of slums, whose population is characterized by economic and social vulnerability. At the same time, the level of awareness is possibly higher in Calcutta slums, partly owing to the dominance of the Left Front coalition that has ruled the state since 1977. The constituents of this coalition, particularly its biggest partner, the Communist Party of India (Marxist), have created a network of organizations in the slums, trying to make the slum population politically aware, increase their overall awareness, remove patriarchal attitudes and empower women. Simultaneously, the state and municipal governments have emphasized providing healthcare services to the poor – particularly women and children – at affordable rates through a network of local level health facilities. A study of reproductive health practices in Calcutta's slums would, therefore, provide some indications about the extent to which these efforts have been successful in removing traditional inhibitions to adoption of family planning methods. Lessons from this study could, in the case of success, be used to design suitable intervention strategies in other cities. Simultaneously, this study is able to incorporate the impact of the social and cultural heterogeneity of Calcutta's slum population on the economic considerations dictating the decision to use contraceptives. This constitutes an important addition to the existing body of literature on son preference and contraceptive choice.

Our research hypothesis is that, given the economic vulnerability of the study group,[3] economic considerations will be important in determining contraceptive use. In particular, in line with the microeconomic models of fertility (Becker 1977; Willis 1973), it is argued that slum dwellers will try to limit their family size (to prevent thin spreading of resources over a large family in the current period). Simultaneously, they will also consider the opportunity costs of conception, in the form of wages lost from the woman's withdrawal from the labour market during pregnancy and the postnatal period. Such economic considerations will be balanced by the desire to have at least one son in order to ensure economic security in the long run. This implies that families with only sons are more likely to use contraceptives than families with only girls or childless couples.

Database and Methods

The paper is based on unit level Demographic Health Survey (DHS) data. This survey, undertaken in 2005–2006, is the third in a series of national surveys. In DHS-3, the initial target sample size was 8500 completed interviews with ever-married women. Applying filters,[4] the data on Calcutta's female population were extracted from the DHS-3 data set. It was found that a total of 1615 out of 2471 respondents were currently married; 789 of these women resided in slum areas. The analysis is based on this subsample. As we are using a truncated section of the DHS sample, we prefer not to use sample weights during estimation. This may, of course, restrict our conclusions to the sample being used.

The function estimated takes the following form: Contraceptive choice = F (son preference, socio-religious identity, culture, age of respondent and its square, education of respondent and her partner, wealth index score, place of last delivery, participation in economic activities, whether respondent was allowed to go for health checkup alone).

The independent variables are explained in detail below.

- A categorical variable representing preference for sons is constructed by classifying families into four groups – those without any children, those with only daughters, those with only sons, and those with both sons and daughters (the reference category).
- Combining information on religion and social group, four socio-religious groups are constructed – Muslims (the reference category), Backward Caste Hindus (BCHs, comprising Hindus belonging to the Scheduled Castes or Tribes) and the remaining group (called All Others).
- Since age may not be linearly related to contraceptive choice, we use both age of respondent and its square.
- Education of the respondent and her partner are categorical variables. While respondents are classified into three groups – illiterate, primary (or less) and above primary, partners are divided into four groups – illiterate, below primary, above primary, and secondary level and above.[5]
- DHS calculates a wealth index score; in our study it is used as a proxy for household economic status.
- A dummy variable taking the value of unity if the respondent is unemployed, and zero otherwise, is also used.
- As a measure of the respondent's autonomy, a dummy variable capturing her ability to go alone for health checkups, is used. Three possibilities may occur – she may be allowed to go for checkups accompanied (the reference category), alone, or not at all. In the first two cases, the respondent has some freedom to make reproductive choices.
- As an index of institutional environment, the study uses place of last delivery. This is a dummy variable taking the value of unity if the first child is delivered in a public sector facility. In such cases, it is likely that healthcare providers may try to motivate the respondent to adopt family planning, particularly terminal methods.

The regression model is estimated in four steps:

Model 1: Son preference dummy, socio-religious identity, and age (and its square) are used as explanatory variables.
Model 2: Education of respondent is added.
Model 3: Educational level of partner is added.
Model 4: Remaining variables are added.

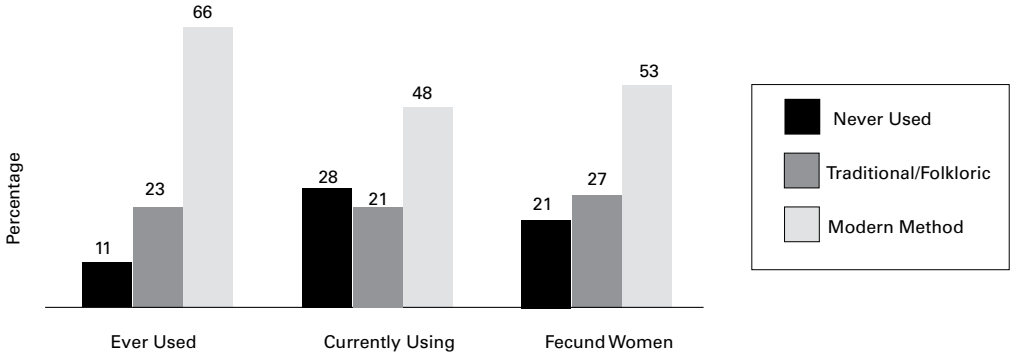
Most studies (D'Souza 2003; Kamal 2000, 2007; Kamal and Huda 2008; Stephenson and Hennink 2004; Waiz 2000) use binary or multinomial logistic models to identify the determinants of contraceptive prevalence rates. Now, the choice variable analyzed is discrete but not binary. Possible responses are not using any method, using a folkloric method, using the traditional method (rhythm and *coitus interruptus*, or withdrawal) or using a modern method (including methods like condoms, a interuterine device, pills, injectables and sterilization). Given the low incidence of

folkloric methods, traditional and folkloric methods can be put together, so that the choice variable can assume three values (no method, traditional or folkloric, modern). In such cases a multinomial model is appropriate.

Findings

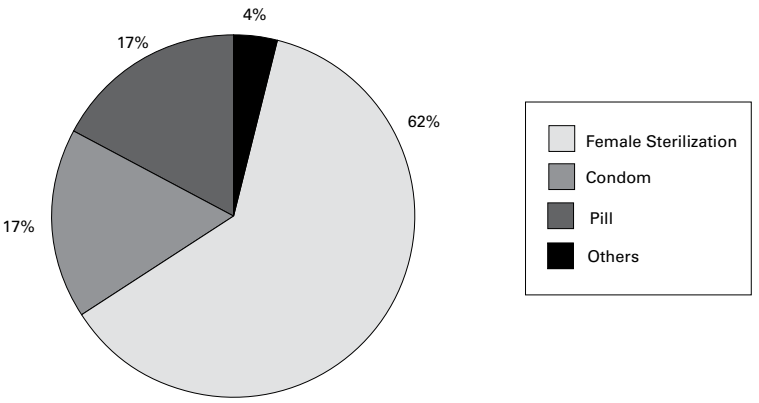
Analysis of DHS-3 data indicates that contraceptive prevalence rates in Calcutta's slums (72%) are higher than those in the other eight cities covered in the survey (64%) and also national levels (56%). Only 11% had never used contraceptives (Figure 1).

Figure 1. Contraceptive prevalence rates in Calcutta slums



Analysis of the methods used indicates that the incidence of female sterilization is very high, followed by use of condoms and pills (Figure 2). This corresponds to the preference for terminal methods (comprising male and female sterilization) observed in other Indian slums (Agarwal and Bharti 2006; Das and Shah 2001). Sen (2001) and Chattopadhyay et al. (2004), too, make a similar observation for Calcutta's slums. The reasons underlying preference for a method that allows less freedom than condoms, pills, IUD, and so forth, in terms of birth spacing needs investigation. But what is interesting is that 60% of respondents who have been sterilized had a boy on their last delivery. This may be indicative of the desire to satisfy son preference while limiting family size.

Figure 2. Distribution of population by contraceptive method



Analysis of the reasons for not adopting any contraceptive method shows that factors like religious strictures and opposition by partner or family members are unimportant. About 63% of respondents were either infecund, subfecund or had undergone hysterectomy. Since such terminal methods prevent further conceptions but do not protect women from sexually transmitted disease (STD) or HIV/AIDS, it appears that contraceptives are viewed primarily as a method for family planning, rather than protection against STD or HIV/AIDS. A further 11% either do not have intercourse or do so infrequently. Thus about 73% of the non-users do not require family planning methods. Examination of future intentions of the remaining 27% of non-users reveals that about 53% are planning to use contraceptives in the future. Again, it is interesting to note that 58% of these non-users who had a boy plan to use contraceptives in the future, while only 43% of non-users who had a girl will use contraceptives in the future.

This discussion indicates a high awareness about family planning methods among slum dwellers and willingness to adopt such methods. However, we argue that while slum dwellers realize the economic benefits of limiting family size, they are also motivated by the benefits of investing in male children as a means of assuring financial security for the future. If our hypothesis is valid, then the probability of using contraceptives will increase as the number of sons and daughters increases, but the increase will be greater for additional sons. That is, if we run an econometric model, the results should indicate that families with sons will be significantly more likely to adopt family planning, relative to families without sons.

Multivariate Analysis

As mentioned earlier, the multivariate analysis is based on a multinomial logit model with the respondent assumed to face three choices – no use, traditional/folkloric method and modern method. The results of the models are reported below. Note that non-usage of family planning methods is used as the base outcome. Thus the top panel reports results for traditional and folkloric methods (other methods) versus non-adoption of contraceptives, while the bottom panel reports results for modern methods versus non-adoption of contraceptives. In addition, instead of reporting coefficients, we report relative risk ratios (RRR). This is the probability that members of a particular group will adopt traditional and folkloric methods (in the top panel) and modern methods (in the bottom panel), relative to the reference group.

The χ^2 statistic, based on the log likelihood ratio, is significant in each of the four models. Pseudo R^2 values are low; but, given the cross-sectional nature of the study and the fact that this measure is only an approximation of goodness of fit, this is not a serious problem.

In Model 1, we test for son preference, controlling for only age and socio-religious identity of respondent. Since respondents with only sons are used as the reference category, we would expect RRRs of the dummy variables to be less than unity. The coefficients of "No children" and "Only girl" are significant; further, the RRR is less than unity. This indicates that respondents without any children or with only girls are less likely to adopt other methods than respondents with only sons. The coefficient of "Only son" is insignificant in the top panel. This possibly reflects the desire to have at least one girl because of social duty like *kanya dan* (selflessly giving away a daughter in marriage, a feeling strong among Hindus, the largest religious group in India), reported in several studies (Arnold 2001; Kabir et al. 1994; Visaria 1994). In the bottom panel, however, this coefficient is significant, with an RRR less than unity. The results hold in Models 2, 3 and 4, also – confirming our hypothesis of son preference dictating the decision to adopt contraceptives, as well findings by earlier researchers in the South Asian context (Jayaraman et al. 2009; Roy et al. 2008; Saha and Bairagi 2007).

Our results also confirm existing findings regarding the reluctance of Muslims to use contraceptives compared to other socio-religious communities (Bhatt and Xavier 2005, Iyer 2002; James and Nair 2005; Kulkarni and Alagarajan 2005). Only in the bottom panel (modern method versus no use), is the difference between Muslims and All Others insignificant. This, however, is not of any importance as the latter forms a negligible 2% of the slum population.

Table 1. Results of generalized ordered logit of contraceptive use by slum dwellers

CPR	Model 1			Model 2			Model 3			Model 4		
	RRR	Z	Prob	RRR	Z	Prob	RRR	Z	Prob	RRR	Z	Prob
NO USE VERSUS OTHER METHODS												
No children	0.10	-5.75	0.00	0.07	-6.20	0.00	0.07	-6.13	0.00	0.05	-6.51	0.00
Only girl	0.42	-2.87	0.00	0.37	-3.19	0.00	0.38	-3.15	0.00	0.34	-3.41	0.00
Only boy	0.93	-0.26	0.80	0.82	-0.68	0.49	0.81	-0.70	0.48	0.71	-1.13	0.26
Both girl and (RC)	1.00			1.00			1.00			1.00	1.00	
Muslim (RC)	1.00			1.00			1.00			1.00	1.00	
Hindu – FC	2.68	3.85	0.00	2.52	3.52	0.00	2.47	3.42	0.00	1.97	2.34	0.02
Hindu – BC	3.10	3.26	0.00	3.33	3.42	0.00	3.30	3.38	0.00	2.87	2.85	0.00
All others	6.89	2.54	0.01	5.85	2.30	0.02	5.76	2.28	0.02	4.54	1.94	0.05
Age	1.64	4.49	0.00	1.64	4.41	0.00	1.64	4.40	0.00	1.58	3.92	0.00
Square of age	0.99	-4.79	0.00	0.99	-4.72	0.00	0.99	-4.70	0.00	0.99	-4.46	0.00
Respondent's education: illiterate				0.63	-1.72	0.09	0.66	-1.30	0.19	1.01	0.03	0.97
Respondent's education: primary				0.34	-3.31	0.00	0.34	-3.11	0.00	0.41	-2.48	0.01
Respondent's education: above primary (RC)				1.00			1.00			1.00		
Partner's education: Illiterate							0.80	-0.68	0.50	0.88	-0.34	0.73
Partner's education: below primary							1.20	0.52	0.60	1.20	0.49	0.62
Partner's education: above primary (RC)							1.00			1.00		
Partner's education: secondary							0.96	-0.13	0.90	0.81	-0.64	0.52
Respondent is employed										0.86	-0.49	0.63
Wealth index score										1.00	2.14	0.03
Bengali speaking										2.13	2.88	0.00
Hindi–Urdu speaking (RC)										1.00		
Goes alone for healthcare										0.36	-0.62	0.54
Accompanied during healthcare										0.40	-0.56	0.58
Not allowed to go for healthcare (RC)										1.00		
Last delivery not in public sector unit										0.58	-1.64	0.10
NO USE VERSUS MODERN METHODS												
No children	0.04	-8.70	0.00	0.04	-8.67	0.00	0.04	-8.66	0.00	0.03	-8.79	0.00
Only girl	0.26	-5.11	0.00	0.26	-5.07	0.00	0.26	-5.06	0.00	0.23	-5.32	0.00
Only boy	0.48	-2.84	0.01	0.47	-2.87	0.00	0.47	-2.87	0.00	0.43	-3.15	0.00
Both girl and boy (RC)	1.00			1.00			1.00			1.00		
Muslim (RC)	1.00			1.00			1.00			1.00		

Table 1. Continued.

CPR	Model 1			Model 2			Model 3			Model 4		
	RRR	Z	Prob	RRR	Z	Prob	RRR	Z	Prob	RRR	Z	Prob
Hindu – FC	1.79	2.65	0.01	1.80	2.61	0.01	1.79	2.59	0.01	1.44	1.47	0.14
Hindu – BC	2.87	3.53	0.00	2.96	3.60	0.00	3.01	3.64	0.00	2.60	3.02	0.00
All others	3.16	1.53	0.13	3.10	1.50	0.13	3.12	1.51	0.13	2.40	1.15	0.25
Age	1.41	3.82	0.00	1.41	3.76	0.00	1.40	3.73	0.00	1.31	2.80	0.01
Square of age	0.99	-4.25	0.00	0.99	-4.20	0.00	0.99	-4.18	0.00	1.00	-3.46	0.00
Respondent's education: illiterate				0.98	-0.07	0.95	1.02	0.07	0.95	1.24	0.72	0.47
Respondent's education: primary				0.74	-1.17	0.24	0.75	-1.02	0.31	0.84	-0.58	0.56
Respondent's education: above primary (RC)				1.00			1.00			1.00		
Partner's education: Illiterate							0.98	-0.07	0.95	0.92	-0.29	0.78
Partner's education: below primary							1.14	0.42	0.67	1.02	0.07	0.94
Partner's education: above primary (RC)							1.00			1.00		
Partner's education: secondary							1.17	0.52	0.61	1.02	0.06	0.95
Respondent is employed										1.48	1.56	0.12
Wealth index score										1.00	1.68	0.09
Bengali speaking										1.59	2.02	0.04
Hindi–Urdu speaking (RC)										1.00		
Goes alone for healthcare										0.23	-1.06	0.29
Accompanied during healthcare										0.16	-1.31	0.19
Not allowed to go for healthcare (RC)										1.00		
Last delivery not in public sector unit										0.75	-1.00	0.32
Observations	789.00			789.00			789.00			789.00		
LR Chi2	200.48			214.67			216.50			248.47		
Pseudo R2	0.12			0.13			0.13			0.15		

BC = backward castes (scheduled castes or tribes); CPR = contraceptive prevalence rate; FC = forward castes; LR = likelihood ratio; RC = reference category; RRR = relative risk ratio; Z = Z-Ratio (standard normal statistic).

Age and its square are both statistically significant, though of opposite signs (positive and negative, respectively). This implies that while women are more likely to adopt contraceptives as their age increases (because they have reached fertility targets), the adoption rate declines as they approach the end of their reproductive phase. This is expected.

The findings with respect to education of the respondent are less clear and fail to confirm earlier findings reporting a positive relation between education and adoption of contraceptives (Gubhaju 2010; Kamal 2007; Kamal and Huda 2008). In Model 2, top panel, illiterate respondents and

those with only primary education are less likely to adopt traditional/folkloric methods compared to respondents with higher levels of education. However, the difference is insignificant when modern methods are compared against no use (bottom panel). A possible reason may be correlation between socio-religious identity and education – the Pearson χ^2 value of 63.43 for the contingency table indicates that there may be some association between the two variables. Education of partner is also strongly correlated with education of respondent. Not surprisingly, therefore, addition of this variable in Model 3 does not "improve" the model, as the coefficients of the dummies are insignificant.

In Model 4, where all control variables are incorporated, coefficients of two variables (wealth index score and language dummy) are statistically significant. While Bengali is the local *lingua franca*, the Hindi- or Urdu-speaking population mostly consists of interstate migrants from Bihar, Jharkhand and Uttar Pradesh. The latter are expected to be more conservative than the local population. Predictably, therefore, we find that the Bengali-speaking population is more likely to adopt contraceptives. Similarly, respondents possessing a higher wealth index score are more likely to adopt contraceptives.

We had also included the place of last delivery as an explanatory variable, motivated by anecdotal evidence that slum dwellers with more than two or three children are persuaded to get sterilized if they deliver in public sector health units. However, this variable is not significant. The coefficient of participation in labour market is also not significant. Alternatively, opportunity costs of withdrawing from the labour market may be low due to three reasons:

- Women may withdraw from the labour market only at late stages of pregnancy and rejoin soon after delivery, leaving the newborn under the care of its older sister. Incidentally, this may also explain the desire to have at least one girl.
- Women may work at home. In such cases they need not withdraw from the labour market.
- The lack of employment opportunities for women residents of Calcutta may also reduce the importance of this variable in the decision to adopt contraceptives. Census figures reported that only 12% of the female population in Calcutta slums work. Similarly, DHS data show that only 23% of slum dwellers work throughout the year.

Conclusion

To sum up, analysis of contraceptive use by slum dwellers in Calcutta reveals the importance of culture-related factors in influencing contraceptive use. Non-Bengali migrants and Muslims are reluctant to adopt contraceptives. The government should therefore consider targeting these communities. Given the prevailing lack of confidence in the state among migrants and, particularly, Muslims, such efforts should involve community-based organizations, rather than imposing them from outside. This will reduce the probability of controversy emerging over issues like whether contraceptives are permissible in Islam.

Fertility preference, however, is still a major barrier to the adoption of contraceptives. Preference for more children, particularly boys, reduces demand for contraceptives. This implies the persistence of patriarchal attitudes within Calcutta's slum population that grass-root arms of political parties (the Bustee Committees) have been unable to remove. Economic forces and desire to ensure security in old age, too, play an important role in creating son preference. Males constitute the majority of both workers and main workers[6] in not only slum but also non-slum areas. Within the Calcutta Municipal Corporation, males constitute 84.5% of total workers and 85.5% of main workers. Thus, sons rather than daughters are more likely to get employment and be able to provide economic security. The microeconomics of fertility decisions in Calcutta, therefore, creates a son preference that has a major impact on contraceptive use. This can be tackled by reducing differential returns from having a boy and girl child. The role of employment-generation schemes like Swarna Jayanti Sahari Swarojar Yojana, Pradhan Mantri Rojgar Yojana and others is important in this context.

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Notes

1. Slums have been defined in the 2001 census as "A compact area of at least 300 population or about 60 to70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities" (Office of the Registrar General and Census Commissioner of India 2005). In Calcutta there are 2011 registered and 3500 unregistered (occupied by squatters) slums.
2. A small proportion of migrants from the neighbouring country of Bangladesh have settled in the city at various times following India's independence in 1947.
3. Kundu and Sarangi (2007) estimates that about three quarters of the slum population are below the poverty line; the low workforce participation levels have been noted earlier.
4. At the first stage, respondents belonging to Calcutta were selected, dropping the rest. In the second stage, non–slum dwellers were dropped to arrive at the final sample of Calcutta slums dwellers.
5. DHS classifies respondents into four groups – no education, completed primary, completed secondary and higher levels. Since only 55 respondents are in the last group, it is merged with "completed secondary." On the other hand, partners' education is classified as no education, incomplete primary, incomplete secondary, complete secondary and higher levels. There is also a residual category, "Don't know," consisting of 10 respondents, which is merged with no education (illiterate). Based on a comparison of frequency distribution, this classification is modified to form the four groups described above.
6. The Indian census defines main workers as persons who are engaged in economic activities for the greater part of the year. Persons who have some other occupation (students, housewives, etc.) but occasionally participate in the labour market are called marginal workers by the census authorities. The union of these two groups is considered to be the group "workers."

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