PRIVATE SECTOR CONTRIBUTION TO CHILDHOOD IMMUNIZATION: SRI LANKAN EXPERIENCE

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ABSTRACT

BACKGROUND: *The main service provider for childhood immunization in Sri Lanka is the government sector. However, utilization of private sector for childhood immunization is increasing rapidly. Existing national immunization data does not routinely include statistics on private sector immunization delivery adequately.* ***OBJECTIVE:*** *To estimate the proportion of children immunized in the private sector; describe socio-demographic characteristics of private sector users and compare these with government sector users.* ***MATERIALS AND METHODS:*** *A community-based crosssectional descriptive study was conducted using a pre-tested interviewer-administered structured questionnaire. This was done in the Colombo municipal council area using the WHO 30 cluster methodology. The total number of households in the sample was 553.* ***RESULTS:*** *Out of the 5,028 total immunizations reported in the present study, around one-third (2,544) was obtained through the private sector. Nineteen percent (104) of children were exclusively immunized from the private sector. The distribution of usual immunization provider was - government sector 72.3% (400) and private sector 27.7% (153). Significant differences were observed (P < 0.001) between private and government sector users with regard to family income, social class, ethnicity, religion and educational level of the mother. The age-appropriate immunization among the 12- to 23-month age group was 92.3% (144) in the government sector, whereas it was 95% (38) in the private sector. Among the 24- to 35-month age group, it was 91.7% (121) and 92.7% (76) respectively. The age-adjusted immunization coverage rates were almost same among the government and private sector users except for the measles vaccine, where the private sector users had significantly (P = 0.016) higher coverage.* ***CONCLUSIONS:*** *Utilization of private sector immunization services is high in the Colombo municipal council area.*

Key words: *Childhood immunization, municipal council area, private sector utilization, usual immunization provider*

Provision of immunization services through the private sector has increased globally in recent years. The role of the private sector may be different from country to country as well as within countries.

With the growing demand for immunization, the role of private sector in immunization is showing a consistent increasing trend in

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Sri Lanka.[1] To ensure sustainable high immunization coverage and to achieve future immunization goals, it is very important to integrate the services of the public and private sectors,[2] so that they can complement each other's work in child immunization. However, limited information is available regarding the private sector utilization pattern. Further, the contribution of the private sector in Sri Lankan immunization programs has not been adequately evaluated.[1] The objectives of the present study were to quantify the private sector contribution to immunization coverage and to describe the socio-demographic characteristics of private sector users compared to the government sector users.

MATERIALS AND METHODS

A cross-sectional descriptive household study was conducted in the Colombo municipal council (CMC) area, which is the administrative and commercial center of the country. It is divided into six districts and 47 wards for administrative purposes. Immunization services are currently provided through the public health department of the CMC and several other service providers. Colombo group hospitals and Colombo south teaching hospital represent the other government sector service providers, whereas private hospitals and general practitioners represent the private sector service providers.

The unit of analysis for this study was a household with at least one child aged between 6 months and 3 years, residing in the CMC area for at least 6-months at the time of the field survey. Children whose infant immunization was completed outside the CMC area were excluded from the study even though they were residents of the CMC during the survey.

The modified WHO 30 cluster sampling technique with increased precision was used as the sampling technique. With 95% confidence limits and 0.1 precision on either side of proportion, the desired sample size amounted to 570. An interviewer-administered structured questionnaire was used to collect the data. Immunization data were extracted from the child health development Record and other immunization cards. For the present study, the age appropriate immunization was determined only for children aged more than 12 months. Children who had received BCG; three doses of each OPV, DTP and Hep B; and one dose of measles by the age of 12 months were considered as immunized up to date. At the age of 24 months, the age-appropriate immunization was defined as receiving BCG, four doses of each OPV and DTP, three doses of Hep B and one dose of measles.

Data collection was carried out during July and September 2005. A ward was selected as a single cluster except for two wards with larger population, where two clusters were included in each. Twenty-eight out of 47 wards in the CMC area were selected using probability proportionate to size methodology. The center of the selected ward was the starting point of the data collection process. It was identified using satellite maps available at the Geoinformatics (Pvt.) Limited. A random direction was also determined before

visiting the area for each cluster. Trained investigators visited the selected ward, and all the households that met with the inclusion criteria were interviewed. Data collection was done until the required sample size was achieved. This procedure was repeated for all the clusters in the sample.

Ethical clearance was obtained from the Ethical Committee of the Faculty of Medicine, University of Colombo. Informed verbal consent was obtained from the householders before collecting the data.

Coding of data was done manually. Data processing and analysis were carried out using Microsoft Access and SPSS package, Version 13.0. The primary outcome measure was the private sector utilization. Data were analyzed mainly as categorical data. Percentages and contingency table analyses (Chi-square and coefficient of contingency) were the statistical methods used. For comparison of immunization coverage, age-adjusted rates were used (using Government sector users as the reference population) to overcome the age group differences between the government sector and the private sector users in the study sample.

RESULTS

A total of 3,346 households were visited in the selected 28 wards in the CMC area, of which 570 eligible households were identified. Among 570 eligible households, 553 (97%) participated in the study while 13 households were unable to participate due to non-availability of parents or any other person knowledgeable about the child's immunization. Four parents refused to participate.

Private sector utilization

Private sector (PS) utilization was assessed in three ways. The first measure was the percent of children for whom PS was reported as the child's usual immunization provider (UIP), as perceived by the mother [Table 1]. The second measure of PS utilization was to get information on the percent of children for whom PS was mentioned as the exclusive provider of immunization [Table 2]. Finally, the utilization of PS was analyzed by calculating the number of vaccine doses delivered by the PS providers as a proportion of the total vaccinations delivered. For this purpose, respondents were questioned on each and every single dose of vaccine in order to get the actual provider.

Around 28% of the respondents indicated the private sector as their child's UIP. Out of this, the majority (130) used private hospitals for

Table 1: Distribution of study population by usual immunization provider

Usual immunization provider	*Immunization outlet*	*N*	*%*
Government sector	Municipality clinic	368	66.5
	Hospital clinic	32	5.8
	Sub total	400	72.3
Private sector	Family doctor	23	4.2
	Private hospital	130	23.5
	Sub total	153	27.7
Total		553	100

Table 2: Distribution of study population by immunization service usage pattern

Usage pattern	*N*	*%*
Exclusive government sector users (EGS)	350	63.3
Exclusive private sector users (EPS)	104	18.8
Mixed users	99	17.9
Total	553	100

immunization, while only 4.2% (23) used family physicians as their UIP.

The proportion of children who had been immunized in the private sector at least once during the first three years of life (as either exclusive private sector user or a mixed user) was 36.7% (203). Out of them, only 18.8% (104) were exclusive private sector users.

Socio-demographic characteristics of the study population by UIP groups

Some selected socio-demographic characteristics were explored to understand the differences in PS utilization pattern [Table 3]. All these variables were determined by directly questioning the respondent except the social class (SC). The latter was derived from the paternal occupation as used by Baker and Hall. It categorizes leading professionals and businessmen as SC-I, lesser professionals and businessmen as SC-II, skilled workers as SC-III, semi-skilled workers as SC-IV and unskilled workers as SC-V.

There was a significant difference between government and private sector users with respect to birth order, ethnicity, religion, social class and monthly family income. A significantly higher percentage of first- and

Table 3: Demographic and socioeconomic characteristics of study population according to usual immunization provider

	Usual immunization provider						
	Government sector		*Private sector*		*Total*	*Test Significance*	
	N	*%*	*N*	*%*	*N*		
Sex							
Female	183	70.1	78	29.9	261	χ^2 =	1.22
Male	217	74.3	75	25.7	292	df =	1
						P =	0.27
Birth order							
1st and 2nd	289	67.1	142	32.9	431	χ^2 =	27.209
3rd and above	111	91.0	11	9.0	122	df =	1
						P <	0.001
Ethnicity							
Sinhalese	150	73.5	54	26.5	204	χ^2 =	33.399
Tamil	94	58.4	67	41.6	161	df =	3
Muslim	156	83.9	30	16.1	186	*P* <	0.001
Burger*	0	0	2	100.0	0		
Religion							
Buddhist	127	70.6	53	29.4	180	χ^2 =	29.118
Hindu	73	57.0	55	43.0	128	df =	4
Islam	156	84.3	29	15.7	185	*P* <	0.001
Roman catholic	20	69.0	9	31.0	29		
Christian	24	77.4	7	22.6	31		
Social class							
I	3	9.1	30	90.9	33	χ^2 =	193.67
II	26	33.8	51	66.2	77	df =	4
III	76	61.8	47	38.2	123	*P* <	0.001
IV	42	87.5	6	12.5	48	C =	0.51
V	253	93.0	19	7.0	272		
Monthly family income (Rs.)							
<10000	177	96.7	6	3.3	183	χ^2	200.67
10001-20000	155	86.1	25	13.9	180	df	3
20001-30000	53	39.0	83	61.0	136	*P* <	0.001
>30000	15	27.8	39	72.2	54	C =	0.52

*This category was excluded for the significant testing, χ^2 = Chi square, df = Degree of freedom, C = Coefficient of contingency

second-born children of the family have received vaccines from PS. Even after adjustments for SC and income, this utilization differences according to birth order were significant (df = 1, *P* < 0.001). PS utilization as the UIP significantly varied in various ethnic groups. Muslim mothers had the lowest preference - of 16.1% (30) - for PS as their child's UIP. When only the Islam religion was considered, the preference was much lower (15.7%). Children of Tamil mothers had 41.6% (67) of PS usage as their UIP; and when mothers belonging to Hindu religion were considered, the utilization increased up to 43% (55).

PS usage as UIP had a highly significant correlation with the SC distribution (C = 0.51). Children born to families with monthly income less than Rs. 10,000 were less likely to use PS as their UIP (3.3%), whereas families with monthly income more than Rs. 30,000 were more prone to use PS as their UIP. This shows a highly significant correlation (df = 3, *P* < 0.001, C = 0.52).

Age-appropriate immunization

Age-appropriate immunization of the study sample was assessed to compare the immunization performances of GS and PS. Table 4 shows the age-appropriate immunization rates according to UIP.

Between both age groups, the percentage of children with age-appropriate immunization was higher among PS users, but these differences were not statistically significant. Immunization coverage rates for individual vaccines were compared according to the UIP. The age composition of the two groups was significantly different. Therefore, age-adjusted immunization rates were used for this comparison [Table 5].

Coverage of almost all vaccines was same among GS and PS users except for measles, where the GS users had only a 93.77% coverage compared to the 96.87% among PS users. This difference was statistically significant.

The total contribution of the private sector for immunization of the study group according to the number of vaccine doses given was 33.6% (2544) with 95% C.I. 29.7-37.5 [Table 2].

DISCUSSION

With the increasing involvement of the PS in the medical field over the last few decades, the contribution to child immunization by the

Table 4: Age-appropriate immunization in the study sample according to usual immunization provider

Age group	*Age appropriate immunization*			
	government sector		*private sector*	
	No.	*%*	*No.*	*%*
12-23 months	144 (N=156)	92.3	38 (N=40)	95.0
24-35 m5nths	121 (N=132)	91.7	76 (N=82)	92.7

Table 5: Age-adjusted immunization coverage rates for EPI vaccines of the study population according to the usual immunization provider

Age group	*Vaccine*	*Coverage*	
		government sector	*private sector*
12-23 months	BCG	100.0	100.0
	OPV3	100.0	100.0
	DTP3	100.0	100.0
	HEPB3	97.80	97.80
	Measles*	93.77	96.87
24-35 months	OPV4	92.42	88.80
	DTP4	92.42	88.80

*Significant, χ^2 = 5.88, df = 1, *P* = 0.016

PS has also increased. Rising PS utilization in developing countries despite free health services available in the public sector has been attributed to the latter's inefficiency, inflexibility and lack of responsiveness to consumer demands.[3] Although a free, accessible and a well-recognized immunization service delivery system is available in the government sector, PS involvement in immunization also keeps increasing in Sri Lanka.

Private sector contribution in immunization

The present study shows a substantial contribution from the PS for childhood immunization. For more than one-fourth of the study population, the usual immunization provider was the PS, and about one-fifth of this category exclusively used PS facilities. Altogether, 36.7% (203) of the population had used the PS at least once during the first three years of life for immunizing their children. These figures represent the highest reported contribution from the PS for immunization in Sri Lanka. The annual EPI survey of 1995 in the CMC area reported that for 19.7% of the children, the immunization provider was a general practitioner.[4] Whilst the PS utilization has increased, immunization service utilization has shifted from general practitioners to private hospitals. The present study reported only 4.2% (23) involvement of the general practitioners, as opposed to 23.5% (130) of private hospital involvement. Most of the private hospital users received their vaccines after having consulted pediatricians. It raises the question 'whether it is for immunization or for the services of a specialist that people seek services of the PS.' The other possibility is the increasing health literacy among the general population regarding the facilities needed for vaccine quality maintenance. It has been shown in several studies that PS providers may be more responsive to patient demands. But providing immunization services through PS was often questioned due to lack of expertise and facilities in the PS to deliver high quality immunization services.[5-8]

According to the estimations done by the Pan American Health Organization through e-mail surveys, estimated PS involvement in immunization for Sri Lanka was 15%.[9] Present study reported a total of 7,572 immunizations, out of which 2,544 (33.6%) were carried out in the PS. In contrast, Anuradhapura,[10] Trincomalee[11] and Matale[12] districts' annual immunization coverage surveys reported no involvement of PS in infant immunization. Of the surveys done outside Colombo, only the Monaragala district reported PS involvement in infant immunization, and that was only 0.7%.[13]

Demographic and socioeconomic factors

It was interesting to see highly significant ethnic and religious differences within the PS. Tamils had the highest percentage of PS usage, and this finding should be looked into very carefully. Further research and careful analysis of the reasons for this usage may provide valuable clues towards improving accessibility to GS services. The major problem arising from this finding concerns whether or not it is due to language barriers

within the GS. If it was purely due to language barriers, the Muslim ethnic group (whose mother tongue is Tamil) also should have the same pattern of PS utilization; but the pattern was totally different among Muslims.

The present study findings regarding religious group distributions in the PS utilization are quite contrary to the study findings in India. In India the number of PS users was highest for Buddhists, followed by Christians and Sikhs. Hindus were right below in the list, just above the Islamic religious group.[14] Lower usage of PS may be associated with general resistance to accept vaccines among Islamic religious groups, and it seems to be common in most of the countries in the region.[15-17]

The association of social class distribution, as well as monthly income of the family, with PS utilization was significant ($P < 0.001$). But the striking fact observed during the present study was the use of the PS by low socioeconomic group families. Out of all PS users, 23.5% (31) were earning less than Rs. 20,000 per month. Distribution of all PS users according to social class shows that nearly 50% of them belong to social class 3 or below. Increased use of PS in CMC area in spite of low socioeconomic status was also reported in earlier studies. The annual immunization coverage survey done by the Epidemiology unit in underserved areas of the CMC in 1999[18] reported that 10% of all infant immunizations were done in the PS. The present study reported even higher PS usage among those lower social classes (7% of social class 4 and 12.5% of social class 5). Not only in Sri Lanka but also in India the studies show that around 4% of the population whose standard of living is low uses the PS for childhood immunization.[14] Reasons given for using the PS among these low socioeconomic classes was somewhat different from the higher social classes. Nearly 40% of PS users whose income was less than Rs. 10,000, used the PS purely for non-EPI vaccines. All other income categories pointed out the efficiency of the PS services as the main reason - except the highest income group, who claimed that they chose the PS because the child was born at a private hospital. The use of the PS for non-EPI vaccines among low-income groups indicates the awareness regarding new vaccines, even among the underserved population. On the other hand, parents do not consider expenses when it comes to their child's health.

Age-appropriate immunization

Age-appropriate immunization in CMC is somewhat lesser than in other parts of the country. Most recent immunization coverage survey done by Epidemiology unit reported 100% coverage for all infant vaccines in Anuradhapura district.[10] All recent immunization coverage surveys show higher levels of immunization coverage outside the Colombo district. Further analysis of data showed that this was mainly due to low coverage of measles vaccine among both GS and PS users. Government sector users had significantly low coverage of measles vaccine. A comparison of immunization rates in India in 2002 also showed similar coverage for infant immunizations in both public and private sectors except for measles. However, in that study the private sector had low (44.8%) measles immunization coverage

compared to the public sector (53.3%).[3] This is another area open for more qualitative type of study to explore reasons for low acceptance rates for measles vaccine, especially among GS users.

Limitations

Cluster sampling technique might have some impact on the study results as the study units with the same socio-demographic background are selected to a specific cluster. But this effect was minimized by using large number of small clusters. Exclusion of children who completed their infant immunization outside the CMC area may also have introduced biased estimation as this population might have low PS utilization, which may have resulted in much lower PS utilization rates, if included in the study. Selection of children more than 6 months of age might also have resulted in biased estimation of the PS utilization. There are two reasons for this probable bias. Firstly, as shown in Table 6, HiB was the most commonly used vaccine from the PS and it is used within the first 6 months. Secondly, in Sri Lanka, the mass media advertisement and promotion of PS vaccination were started very recently. So the percentage of children using PS may be higher among more recently born children.

Table 6: Distribution of the total number of individual immunizations given by government sector and private sector

Vaccine	*Total in GS N %*		*Total in PS N %*		*Total doses delivered*
BCG	407	73.6	146	26.4	553
DTP	1362	70.4	572	29.6	1934
OPV	1365	70.3	576	29.67	1941
Hep B	1176	72.2	454	27.8	1630
Measles	306	69.6	134	30.4	440
JE	412	69.8	178	30.2	590
HiB	0	0	384	100	384
MMR	0	0	70	100	70
VZV	0	0	23	100	23
Hep A	0	0	7	100	7
Total	5028	66.4	2544	33.6	7572

GS - Government sector, PS - Private sector

CONCLUSION

According to our study we predicted that 18.8% (C.I. 15.5-22.1) of children under the age of 3 years residing in the CMC area were immunized exclusively by the PS. Another 17.9% (C.I. 14.7-21.1) of children used the PS services at least once during the first three years of life. As PS utilization is very high and expected to increase, the government should expand its immunization surveillance and services to the PS.

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