UTILIZATION AND PROVIDER CHOICE IN MATERNAL AND CHILD HEALTH CARE IN HSINTIEN CITY: A REVIEW OF THE ROLE OF THE HEALTH STATION

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*A probability proportional to size (PPS) sample of 320 infants was drawn from 1102 infants between 13 and 16 months of age from the city of Hsintien, a satellite city of Taipei. Home visits and questionnaire interviews were conducted for all of the mothers by eight trained interviewers in September, 1990. Utilization and provider choice of maternal and child health care of these infants were investigated. Most of the mothers had had prenatal care and postnatal care and were currently using contraceptive methods, the rates were 99.1%, 78.8%, and 77.0% respectively. Only 31.1% had had Pap smears in the past year. In all, 81.5% of the infants had had neonatal screening, and 77.9% had had well baby examinations. The rate for completion of all immunizations before one year of age exceeded 90%. Almost all maternal care was provided in hospitals or clinics. Health stations were used more often for infant care, and usage increased as the baby grew older. None of the neonatal screening was provided in health stations. About 30% of the immunizations within one month and over 70% of the immunizations after one month were given in health stations. Stepwise multiple regression analysis shows that total use of health stations by completely immunized babies was positively related to the understanding of health stations, accessibility, and the need for cheap or free care, while being negatively related to requirements of good attitude and of attending delivery. The authors suggest a review the role of health stations and thedevelopement of an integrated health care system to organize all possible resources. (Chin J Public Health (Taipei): 1995; **14**(3): 237-245)*

Key words: Maternal and child health, health station

INTRODUTION

Maternal and child health care is an essential part of primary health care [1]. In the past forty years, the World Health Organization (WHO) has made great progress in maternal and child health throughout the world [2,3]. In the global strategy of health for all by the year 2000, maternal and child health is of worldwide imporfance [4-7].

Efforts in maternal and child health care have been in progress in Taiwan since the 1950s. The Committee of Maternal and Child Health was organized in 1952 under the support of WHO and the United Nations Children's Fund (UNICEF) to improve the nutritional status of mothers and children. The Committee was reorganized into the Institute of Maternal and Child Health in 1959. Five-

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year programs were first instituted in 1966. The first five-year program focused on prenatal care, postnatal care, and well-baby clinics [8]. Since then 363 health stations in townships or districts of cities have become the major sources of maternal and child health care. The function of health stations is almost the same as the "primary health care" stated in the Declaration of Alma-Ata in 1978 [1]. Under these efforts in the following years, the proportion of deliveries attended by unqualified personnel decreased from 46% in 1950 to 0.32% in 1988. In 1988, more than 95% of all deleveries were attended by physicians. Maternal mortality concurrently declined from 196.56 per 100,000 live births in 1952 to 8.94 per 100,000 live births in 1988. Infant mortality delined from 44.71 per 1,000 live births to 5.08 per 1,000 live births during the same period [9]. Even after a correction for unreported deaths, the infant mortality rate of Taipei County was estimated as only 11.12 to 14.91 per 1,000 in 1983 [10]. This figure already meets the average of developed countries [4]. Taiwan has experienced a transition of maternal and child health care in recent years. Meanwhile, health care programs in rural areas were reorganized. In 1983, the Department of Health initiated Group Practice Center Program and Primary Health Care Center Program on the basis of the health station system. Maternal and child health care is a major task in these programs [9]. Evaluations showed improvements in accessibility, satisfaction, as well as health knowledge of local residents [11,13].

The purpose of this study is to investigate the utilization and provider choice of maternal and child health care in a suburban area in Taiwan. Hsintien City, a satellite city of 220,000 population, near Taipei, was chosen as the study community. The whole city can be divided into four different parts—the old city near the Green lake downtown, the new city near Taipei, the mixed region as an intermediate zone, and the agricultural region near surrounding rural area-on the basis of stage of development, economic status and the size of "Li", a subunit of administration. The health care resources for maternal and child health care were found to be adequate but not well-organized. The problems in Hsintien can be found in all other cities in Taiwan and countries of similar evers of development.

MATERIALS AND METHODS

A probability proportional to size (PPS) sample of 320 infants was drawn from the registrated name list of 1102 infants between 13 and 16 months in the Household Registration Office of Hsintien. The city was first divided into four parts on the basis the stage of development, the economic status, and the size of the unit of sampling—"Li", a subunit of administration of the city. Twenty infants were randomly drawn from each of the 13 Lis of the new city area and mixed area, 10 from each of the 6 Lis of the old city area and the agricultural area. Home visits and questionnaire interviews were conducted for all the mothers or one other chief caretaker by eight trained interviewers of the Graduate Institute of Public Health, College of Medicine, National Taiwan University in September, 1990.

Utilization and provider choice of maternal and child health care and possible factors related to the choice of health stations as the source of care were questionned. Maternal and child health care was defined as contraception, prenatal care, postnatal care, Pap smear, neonatal screening for metabolic inborn error and congenital anomaly, immunization, and well-baby clinic. Immunization records were checked with "yellow cards", the immunization records kept by parents. Records of utilization of other items was obtained only from the answers of the subjects. The choice of health stations as the only source of immunization was further studied because of the wide range of variation. Related factors were basic demographic characteristics, understanding and accessiblilty of health station, and requirements of providers. Since it is difficult and impolite to ask one's income directly in Taiwan, economic status of the family was assessed by adding up the number of 15 indicator family appliances the family had, based on previous studies. Understanding of health stations was assessed by ten yes-no questions. Accessibility and requirements of providers were as-

sessed by five-point questions. Only those who completed all required immunizations before one year were included in the health station use analysis. Total freqeuncy of immunizations at health stations were summed up as the dependent variable. Stepwise multiple regression was used to evaluate the effects of possible related factors.

RESULTS

The response rate of this study was 69.4% (222/320). Areas of the city, infants'age in months, and sex differences between respondents and non-respondents are compared in Table 1. There were no significant differences in age or sex distribution. The mixed and agricultural areas had insignificantly lower proportions of respondents.

The demographic characteristics of mothers and infants are shown in Table 2. Half of the babies are the first children of their parents. Most of them (77.0%) were born in hospitals. Most (74.3%) of the mothers were between 25 and 34 years. Half of the mothers had high school education, 25.2% finished their college courses. Most (48.6%) of the mothers were housewives. Most (58.6%) of the families were nuclear families, i.e. families composed of only parents and children. Most (60.4%) of the babies' chief caretakers, i.e. the ones who took care of the babies for the better part of the day, were their mothers. Of them, 70.3% including the 48.6% housewives, worked at home.

Table 3 shows the utilization rates and the percentages of health station use. For mothers, 99.1% had prenatal care, 83.8% started from the first trimester, 75.3% went more than ten times, 79.7% had postnatal care and 77.0% were currently using contraceptive methods. The rate of Pap smears was much lower in comparison with other items. Only 31.1% had received at least one Pap smear examination in the past year. In the aspect of infant health care, the rate of neonatal screening for metabolic inborn error and congenital anomaly was 81.5%, while the fraction of families participating in well-baby examinations was 77.9%. The rates of all immunizations exceeded 90%. The percentage of health station use, outside of contraceptive services (24.6%), was less than 3%. None of the neonatal screening (performed within a few days after birth) was done at health stations. The rates of health station use for BCG and the first dose of hepatitis B vaccination (performed within one week after birth) were 34.2% and 34.1%. After the second dose of hepatitis B vaccination (performed one month after birth), the percentages of health station use became stable around 60%

Table 1. Comparisons between respondents and non-respondents

Basic information	Respondents (n=222)		Non-respondents (n=98)		Total (n=320)		Chi-square
Region							
New city	103	46.4%	37	37.8%	140	43.8%	2.82 (N.S.)
Mixed	80	36.0%	40	40.8%	120	37.5%	
Old city	21	9.5%	9	9.2%	30	9.4%	
Agriculture	18	8.1%	12	12.2%	30	9.4%	
Age in months							
13 months	60	27.0%	26	26.5%	86	26.9%	0.47 (N.S.)
14 months	52	23.4%	20	20.4%	82	25.6%	
15 months	60	27.0%	29	29.6%	89	27.8%	
16 months	50	22.5%	23	23.5%	73	22.8%	
Sex							
Male	112	50.5%	52	53.1%	164	51.3%	0.18 (N.S.)
Female	110	49.5%	46	46.9%	156	48.7%	

Table 2. The demographic characteristics (n=222)

	N	%
Parity		
1	111	50.0
2	79	35.6
3+	32	14.4
Place of Birth		
Hospital	171	77.0
Clinic	45	20.3
Midwife, home	6	2.8
Mother's age		
15-24	18	8.1
25-34	165	74.0
35+	39	17.6
Mother's education		
Primary school	21	9.5
Middle school	33	14.9
High school	109	49.1
College and above	59	25.2
Mother's Occupation		
Housewife	108	48.6
Working	114	51.4
Family structure		
Nuclear	130	58.6
Extended	92	41.4
Chief caretaker		
Mother	134	60.4
Grandmother	48	21.6
Babysitter	40	11.7
Workplace of the chief caretaker		
Home	156	70.3
Hsintien city	40	18.0
Taipei, other	26	11.7

to 70%. Maternal and infant health care were separated. Maternal care was chiefly provided by hospitals, while infant care was provided chiefly by health stations.

Altogether, 198 babies completed all eight immunization services. Total frequency of immunization services used by the 222 babies studied ranged from 0 to 8, mean ± S.D. = 7.80±0.84. Total frequency of health station use by the 198 babies ranged from 0 to 8 times. Mean ± S.D. was 4.80±3.10 times. Table 4 shows the results of a stepwise multiple regression of total use of health stations for those who completed all immunizations before one year. With other variables being controlled, ten variables had significant associations with the dependent variable. Babies living in the mixed city area, had a significantly less frequent use of health stations than those in the new city area, b=–1.075. The second parity of the mothers interviewed, compared to the first one, used health stations significantly less often, b=–0.909. Babies born in physicians' or midwives' clinics, used health stations more often those born in hospitals, b=1.249. Babies whose mothers had middle school education, used health stations significantly more often than those whose mothers had high a school education or above, b=1.254. Babies whose caretakers worked in Taipei city, usd health stations significantly more often than those whose caretakers worked at home, b=1.477. Understanding of health stations, accessibility and the need for cheap or free care were positively associated with use of health stations, their b values were 0.197, 0.700, and 0.523, respectively. Requirements of attending delivery and requirements of good attitude were negatively associated with huse of health stations, respectively semi-colon their b values were –0.441 and –1.636. Thirty-eight point seven percent of all variation of the dependent variable could be explained by this regression model.

DISCUSSION

Except for Pap smears, all of the listed maternal and infant health care procedures had rather high practice rates, especially those of immunizations. Double checked with "yellow cards", data for immunization were reliable. As there were no unified records for maternal health care, the reliability could not be checked. The answers might have been affected by recall bias. The lower rate of Pap smear might be a result of less emphasis on younger women in previous programs. This preventive measure is important for all age groups because cervical cancer is the most common form of female cancer in Taiwan [14].

Table 3. Practice rates of maternal and infant health care and percentages using health station among users (n=222)

	Practice rate (%) health stations	Percentages using
Prenatal care	99.1	2.7
Since first trimester	83.8	
Over 10 times	75.3	
Postnatal care	79.7	2.3
Contraception	77.0	24.6
Pap smear	31.1	1.4
Neonatal screening	81.5	0.0
BCG Vaccination (1st week)	98.6	34.2
HBV (I) Vaccination (1st week)	99.1	34.1
HBV (II) Vaccination (5th week)	99.1	62.7
HBV (III) Vaccination (9th week)	98.2	66.4
OPV+DPT (I) Vaccination (2nd month)	99.1	66.4
OPV+DPT (II) Vaccination (4th month)	97.7	70.0
OPV+DPT (III) Vaccination (6th month)	96.4	71.0
Measles vaccination (1 year)	91.1	71.1
Well baby examination	77.9	

BCG: bacillus Calmette-Guerin
HBV: Hepatitis B vaccine
OPV: Oral poliomyelitis vaccine
OPT: Diphtheria, pertusis and tetanus
I: First dose; II: Second dose; III: Third dose.

The separation of maternal and infant health care with regards to provider choice is a remarkable finding of this study, followed by the discontinuity of care record. Continuity of care is a basic requirement for primary health care. This concept is clearly described in the Alma-Ata Declaration [1] and articles of family medicine [15-17]. The original design of health stations and the newly developed group practice centers and primary care centers are based on this concept [9,11-13]. Similar design can also be found in other countries. Finland [18], Hungary [19], and the Netherlands [6] have primary care systems covering the whole population like the health station system of Taiwan. In Canada [20] and the USA [21], similar public primary care centers are desinged to take care of the less privileged people, both in rural areas and urban areas. All of their care is designed in a comprehensive and continuous way. The finding of this study casts some doubts on the feasibility of such a system in urban areas like Hsintien city. It is a good time to review the roles of health stations in such a suburban community. All eligible resources of care should be involved in the system of maternal and child health under the same criteria of quality assurance. The Mother-and-Child Handbook and the IC Card in the future, instead of the yellow card, might be helpful resolving the problem of record discontitnuity.

The discontinuity of maternal (including prenatal, delivery and postnatal care) and infant care (including immunization and well-baby examination) may be a natural result of the high percentage of hospital deliveries [9]. When mothers choose hospitals (and some clinics) to give birth to their babies, it is easy for them to use other related maternal care at

Table 4. Stepwise multiple regression of total use of health stations

Variables	B
Constant	9.101***
Region	
Old vs. new	–0.117
Mix vs. new	–1.075
Parity	
2nd vs. 1st	–0.909
3rd vs. 1st	0.602
Birth place	
Clinic vs. hospital	1.249
Mother's education	
Primary vs. high school	–0.249
Middle vs. high school	1.254
College vs. high school	–0.112
Workplace	
Hsintien city vs. home	–0.268
Taipei vs. home	1.477
Understanding of health stations	0.197
Accessibility of health stations	0.700
Requirements of providers	
Attending delivery	–0.441
Cheap or free	0.523
Good attitude	–1.636

Total frequency of immunization of 222 infants: 7.80±0.84 times
Total frequency of health station use of 198 infants with complete
All eight times of immunization: 4.80±3.10 times
Adjusted R-Square = 0.387 F = 7.49 P<0.001
* P<0.05, ** P<0.01, *** P<0.001

the same hospital. Although maternal care provided in health stations are free, it seemed not of concern when per capita income now in Taiwan has exceeded US$9,000 a year and total fertility rate is only 1.7 [9]. In fact, health stations in urban areas have stopped delivery services for many years. This further urges mothers to use hospitals and clinics which provide a "continuous" maternal care. The relatively more frequent use of health stations for immunizations, especially when babies get older, may be explained by the following reasons. First is the image of health stations as places to give vaccinations to children. Second is geographic and time accessibility. Another possible reason is that mothers see immunization as a simpler procedure, which can be done successfully by public health nurses in health stations. Some parents believe that the vaccinations provided by health stations are fresher and safer since there is standardized cold-chain equipment and high utilization rates.

The associations between demographic characteristics and total use of health stations are not so prominent in the stepwise regression. The association between area and total use of health stations is out of our expectation. The health station of Hsintien city is located at the old city area, and the people in the old city and the mixed area have less privileged status, infants there are supposed to be more dependent on health stations. The area may not be a good index of community socioeconomic status. The socioeconomic status may not be a good predictor of health station use in the study community. The finding of parity is also out of expectation. First children usually attract more attention of parents and are supposed to use hospitals or clinics more often for immunizations and well-baby examinations than to health stations. The less frequent use of health station by second babies may be a result of higher priority of public health nurses of health stations for the first babies, or the less satisfied experience with the first child. The associations between place of birth and total use of health stations may reflect the provider factor. Hospitals usually have well-baby clinics for babies born in their obstetric departments while clinics do not necessarily have. This may make hopital-born babies users of hospitals while clinics-born babies users of health stations for immunization. The correlation between the mother's educational and level use of health stations is not as strong as expected. It is possible that eaucational level has lost its influence in the younger generation in Taiwan

as a result of the prolongation of public education. The association between the workplace of caretakers and their use of health stations is difficult to explain. It is possible that the term "health station" is not limited to "the" health station in Hsintien.

The positive associations of understanding and accessibility of health stations to the total use imply that more understanding and better accessibility encourage use of care. The positive associations of requirements of cheap or free and negative associations of requirements of attending delivery, and good attitude, imply that health station users do not require continuity and good attitude of the provider, but a lower cost. The index of family economic status—total number of appliances did not show significant association with ealth station use. These may represent characteristics of health stations. Health stations have free care, provide no delivery services and may have not put too much effort into good attitudes.

In conclusion, the separation of maternal and infant health care is a remarkable characteristic of primary health care in Hsintien. Accessibility and understanding affect the use of health stations. The frequent users of health stations require cheap or free medical cost and are less concerned with continuity and good attitude of health care workers. Health stations are at least not the only providers of maternal and child health care. The originally designed health stations-based maternal and child health care system may have changed some. It is necessary to review the role of health stations and develop a more efficient system to coordinate availible resources. Uniform Maternal-and Child Booklets instead of only the yellow card for immunization, or IC Card may be of use in the future.

ACKNOWLEDGEMENTS

This study received a grant from the National Science Council of the Republic of China (No. NSC80-0301-H002-21). The authors are also grateful for the administrative support from the health station and the office of household registration of Hsintien City, as well as for the participation of students from the Department of Public Health, College of Medicine, National Taiwan University.

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新店市婦幼衛生服務使用與供給者選擇之研究：衛生所角色之重探

季瑋珠　符春花

本研究以按人口比例機率抽樣法，自台北縣新店市13至16個月大之嬰兒1102人中，抽得320人為研究對象，由8名經過訓練之訪員於1990年9月對其母親進行家庭訪視，以瞭解該市母親與嬰兒接受婦幼衛生服務情況及供給者的選擇。總共有222人完成訪視。結果發現：產前檢查，產後檢查，與目前避孕的比率分別為99.1%, 78.8%與77.0%，但孕期中子宮頸抹片接受比率僅31.1%。新生兒先天代謝異常篩檢比率為81.5%，健兒門診檢查實施比率為77.9%。一歲內各類疫苗的預防接種率均在90%以上。幾乎所有的孕產婦照顧都由醫院或診所提供；嬰兒保健照顧方面，衛生所使用的比例隨嬰兒月齡而上升：無一新生兒代謝異常篩檢在衛生所進行，一個月內的預防接種只有30%由衛生所提供，一個月以上的預防接種則高達70%以上由衛生所提供。逐步複迴歸分析顯示：完成接種嬰兒使用衛生所總次數與母親對衛生所的瞭解程度，衛生所地點的可近性，以及要求服務便宜或免費的程度呈正相關，與要求服務態度良好及同時提供接生服務的程度呈負相關，依變項的變異量有38.7%可被此模型解釋。根據本研究的結果，吾人建議類似研究社區之都會區衛星城市，應重新評估衛生所的角色，並重組各個可用資源，建立整合性的婦幼衛生照顧體系。(中華衛誌 1995；**14**(3)：237-245)

關鍵詞：婦幼衛生，衛生所

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收稿日期：82年12月
接受日期：84年2月