Factors affecting Unsuccessful Referral by the Lady Health Workers in Karachi, Pakistan

H. A. Afsar, A. F. Qureshi[a], M. Younus[b], A. Gulb, A. Mahmood[c]

Services Development, Aahung, Ziauddin Medical College[a], Division of Epidemiology and Biostatistics, Department of Community Health Sciences, The Aga Khan University[b], Karachi and Department of Public Health, University of Adelaide[c], Australia.

Abstract

Objective: To estimate the proportion of patient referral and to identify the factors associated with unsuccessful referral in Karachi, Pakistan.

Methods: In a cross-sectional survey, a total of 347 patients referred to different health care facilities by the LHWs were interviewed. Data was collected using a structured questionnaire, on demographic characteristics of patients (age, sex, income etc) and potential factors (seriousness of medical condition, distance of health facility, attitude of health center staff etc) that can affect patient referral outcome.

Results: An overall referral rate of 55% was found in this study. Out of a total of 347 patients interviewed, 265 (76.4%) were successful while 82 (23.6%) were unsuccessful referrals. Multivariate logistic regression analysis showed that objection to referral (Adjusted OR, 2.96; CI: 1.44-5.52), never referred before (Adjusted OR, 1.25; CI: 1.34-6.90), not visited the referral site before (Adjusted OR, 4.04; CI: 2.50-6.08) and no knowledge of who to meet at the referral site (Adjusted OR, 1.30; CI: 1.01-2.96) were the factors associated with unsuccessful referral. Other factors found significant were duration of the illness of the patient, anyone not known at the referral site and failure of LHW to follow up.

Conclusion: Our study found that a significant proportion of patients seen by the LHWs are referred to different health facilities. Improved management skills of LHWs for simple medical problems would probably reduce the number of referrals. Efforts should also be directed to enhance the communication and counseling skills of LHWs, which may reduce a significant proportion of unsuccessful referrals (JPMA 53:521;2003).

Introduction

The Government of Pakistan initiated the National Program for Family Planning and Primary Health Care (PHC) in 1994.[1] The primary objective of this program was to improve the health status of the people by training Lady Health Workers (LHWs) to provide PHC at the grass roots level. To date, the program has recruited about 70,000 workers. LHWs are trained to provide essential maternal and child heath and family planning services, management of common ailments and provision of family planning material and health education. In addition, they collect information regarding basic health indices and utilization of services, which is aggregated at the national level and form an important part of national health statistics. LHWs are based at First Level Care Facilities (FLCFs). Being an outreach worker, they make at least one visit per household per month. Each LHW is responsible for at least 100 households or a population of 1000, whichever comes first. It has been estimated that LHWs coverage of services to 'eligible individuals' ranges from 32.5% to 49% in various provinces of the country.[2] This figure is expected to rise as the government is planning to expand the coverage by increasing the number of LHWs.[3] Thus the LHWs are becoming an increasingly important source of health delivery within the community.

The FLCFs constitute an integral part of the district health system. Ideally, FLCFs should act as a filter to prevent crowding of patients at district tertiary care hospitals and other Higher Level Care Facilities (HLCFs) for conditions that can be managed at lower levels. However, simultaneously there must also exist a referral system for those who cannot be dealt with at the FLCF. This referral should be such that there is continuity of individual care and information flow in a way that is acceptable to the health worker and the individual patient.[4]

One of the important functions of the LHW is referral of patients to the appropriate health facility. Referral has been defined as a process in which the treating physician at a lower level of the health service seeks the assistance of a trained person with better resources/facilities at higher level, to guide him in managing or take over management.[5] Successful referral means that a patient who has been referred for whatever reason, reaches the referred health facility in an appropriate time period irrespective of the treatment outcome. However, a significant proportion of patients comprise of those who are referred, but who, for whatever reason, do not comply. These non-attenders are defined as 'unsuccessful referrals'. Unsuccessful referrals are wasteful with regards to limited resources.[6] Patients do not receive necessary medical care. On the contrary many may visit at later dates with complications that are expensive and are difficult to treat.[7-9] In Pakistan, an estimated 44% of patients presenting at the FLCF are subsequently referred to the HLCFs.[10] However, due to

various reasons not all these referred patients attend the referral sites, constituting referral failure. Referral failure rates vary widely all across the world from 12% in the British National Health Services (NHS)[6] to 31% in South Western Uganda.[11] There is no data pertaining to referral pattern from the grass root level in Pakistan. Furthermore, this topic has never been researched systematically in the developing countries. Therefore, we conducted a study with the objectives: 1) to estimate the proportion of patients referred to various health care facilities and 2) to identify the factors associated with unsuccessful patient referral in Karachi.

Patients and Methods

This cross-sectional study was conducted from November through December 2001 in the District West of Karachi. There are a total of eight BHUs in the district, which report to District Health Office (DHO), District West.

Selection of referring LHWs

Based on the assumption that one LHW would refer a minimum of eight patients a month, the records of at least 42 LHWs were required to meet the required sample size of the referred patients. A list of LHWs working in the District West was obtained from the DHO West. A random selection of LHWs through a random number table was done.

Selection of referred patients

The records of selected LHWs were examined to identify the subjects referred to various health care facilities during the study period. Referred patients, irrespective of age, sex and the referring LHW, were included as the study population. Sub-sets of this population include those referred for outpatient specialist advice, technical examination (including laboratory and radiological investigations), management intervention and inpatient care to nearby referral health facilities. The last eight patients referred by the selected LHWs were included in the study. Subjects were excluded if they did not consent or were too sick to respond the questions at the time of interview.

Sample size

Based on 2-sided testing with alpha 0.05, power 0.80, and a detectable odds ratio (OR) of 2.0 between the successful and unsuccessful referral groups for the least prevalent factor, a sample size of at least 296 was required. This figure was inflated by 15% to 340.4 (rounded to 341) to accommodate non-responders.

Data collection

A pre-designed structured questionnaire (translated in Urdu) was used to gather the data. Prior to questionnaire development, a series of in-depth interviews with experienced LHWs and patients were conducted at BHUs to identify variables that may be incorporated. The referred patients were contacted after obtaining their addresses from LHWs records. Subjects were explained about the objectives of the study and after obtaining a verbal consent; questionnaire was administered through the trained interviewers. Data was collected regarding demographic characteristics (age, sex, monthly income, employment status) and potential factors that can effect referral outcome (such as seriousness of medical condition, distance of health facility from home and ever referred before).

Patients who attended the referral facility within one week of their referral date were counted as 'successful referrals' while others as 'unsuccessful referrals.

Formulae for referral rate and unsuccessful referral rate

The referral rate was calculated by the following formula:[12]

Total number of patients referred by the LHWs in the last month/ Total number of patients seen by the LHWs in the last month

The unsuccessful referral rate was determined as follows:[12]

Total number of unsuccessful referrals in the last month/ Total number of patients referred by the LHWs in the last month

Statistical Analysis

Data was coded and double entered into Epidemiology Information based program (Epi-Info 6.04).[13] After validation, analysis was done using Statistical Package for Social Sciences (SPSS-10).[14] Chi-square and Fishers Exact Tests were used for all categorical variables. Associations between the outcome variable (successful versus unsuccessful referral) were sought for independent variables in two categories namely LHW characteristics (age, experience, practices) and patient characteristics (demographics, attitudes, income etc). Variables with p-value <0.25 on univariate analysis, were entered into the stepwise logistic regression model to compute Adjusted Odds Ratios (AOR) with their respective 95% Confidence Intervals (CIs). A p-value <0.05 was considered significant in all analysis.

Results

A total of 941 patients were seen by the selected LHWs during the study period, out of which 515 were subsequently referred to various health care facilities. (Referral rate was 55%). Out of 515 patient referred, 347 patients were interviewed, among them 265 (76.4%) were successful, while 82 were unsuccessful referrals. (Unsuccessful referral rate was 23.6%).

Table 1. Characteristics of the Lady Health Workers (LHWs) participated in the study, Karachi, Pakistan (n=46).

	n	%*
Age (completed years)		
<35	18	39
≥ 35	28	61
Educational status		
Illiterate	2	4
Up to Matric	4	9
Intermediate and above	40	87
Ethnicity		
Sindhi	5	11
Hindko	4	9
Urdu	35	76
Punjabi	2	4
Marital status		
Currently single	16	35
Currently married	30	65
Service experience (completed years)		
<3	1	2
3-5	36	78
>5	9	20
Local resident		
Yes	44	96
No	2	4

*Rounded to whole numbers

Table 2. Characteristics of the patients referred by the Lady Health Workers, Karachi, Pakistan (n=347).

	n	%
Age (completed years)		
<15	59	17.0
16-35	116	33.4
>35	172	49.6
Gender		
Male	112	32.3
Female	235	67.7
Marital status		
Currently single	193	67.0
Currently married	95	33.0
Educational status*		
Illiterate	113	42.3
Primary and secondary	89	33.3
Intermediate	51	19.1
Graduation and above	14	5.3
Ethnicity		
Sindhi	36	10.0
Hindko	79	23.0
Urdu	204	59.0
Punjabi and others	28	8.0
Beneficiacy status		
Yes	69	19.9
No	278	80.1
Monthly income (Rupees)		
<3,000	89	30.4
3,000 - <6,000	161	54.9
6,000 - <10,000	30	10.2
≥ 10,000	13	4.4
Distance from referral site in km		
<1	54	16.3
1-2	102	30.8
3-5	90	27.2
>5	85	25.7

*15 years and above was used in the analysis (n=267)

Tables 1 and 2 describe the socio-demographic characteristics of LHWs and referred patients respectively. The majority of LHWs 36 (78%) were in service for 3 to 5 years and most of them were currently married 30 (65%). Forty- four LHWs (96%) were local residents. On the basis of mother tongue, as a surrogate marker for ethnicity, four major groups were identified. 'Mohajirs' were identified as a major ethnic group 35 (76%) in LHWs, which corresponds to the major ethnic group of the respondents 204 (59%). There was a majority of female client 235 (67.7%) in the referred patients. One hundred and seventy two (49.6%) patients were over 35 years of age and 193 (67%) were currently unmarried. The majority 250 (85.3 %) had income less than 6000 rupees per month. There was no significant difference found between successful and unsuccessful patient referral groups with regards to the patient demographic characteristics.

Patients were referred for various medical and/or surgical and/or obstetrical reasons. The majority of referrals 106 (62%) were made for respiratory problems. Eighty six (52%) were for cardiovascular disease (CVDs) including hypertension and 57 (36%) were due to gastrointestinal (GIT) related diseases. Forty-six (30%) were for female reproductive health problems, 29 (22.5%) due to accidents and injuries, 22 (16.5%) for diabetes and its complications, 15 (7%) for surgical procedures/ conditions and 31 (5.4%) for other reasons. Most of these patients had multiple conditions (Figure).

Factors associated with outcome of referral

Association with outcome of referral was tested for

Table 3. Univariate analysis for factors associated with unsuccessful patient referral by the lady health workers, Karachi, Pakistan (LHWs' characteristics*).

	Successful		Unsuccessful		OR+	95% CI#	P-value
	n	%	n	%			
Marital status							
Currently married	183	78.5	50	21.5	1.00	-	0.17
Currently single	82	71.9	32	28.1	1.43	0.85-2.38	
Years of schooling							
≥ 10	193	75.7	62	24.3	1.00	-	0.62
1-9	59	76.6	18	23.4	1.00	0.40-9.60	
0	13	86.7	2	13.3	1.98	0.94-4.62	
Years in service							
<3	14	60.9	9	39.1	0.34	0.13-0.94	0.11
3-5	183	75.9	58	24.1	0.71	0.37-1.31	
>5	68	81.9	15	18.1	1.00	0.92-1.41	
Mother tongue							
Urdu	155	75.6	50	24.4	1.00	-	0.47
Hindko	30	73.2	11	26.8	0.88	0.41-1.88	
Sindhi	33	84.6	6	15.4	1.77	0.70--4.48	
Punjabi and others	29	82.9	6	17.1	1.56	0.61-3.97	
Local resident							
Yes	259	76.2	81	23,8	1.00	-	0.21
No	3	60.0	2	40.0	1.31	1.23-1.39	

*n is different for each variable + Odds radio # Confidence interval

various independent variables. Tables 3 and 4 show results of univariate analysis for LHWs and patients characteristics respectively.

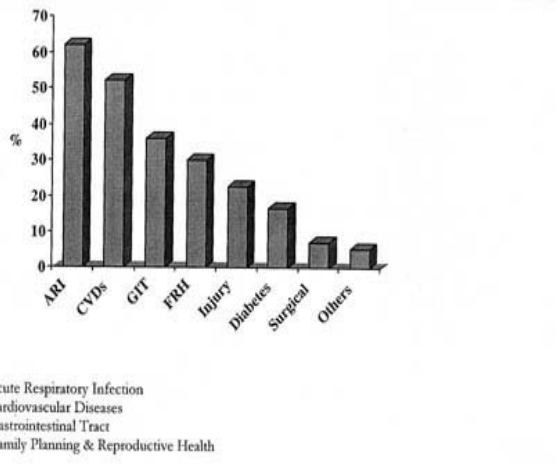

Figure 1. Diagnosis at the time of patient referral by the Lady Health Workers (LHWs) in Karachi, Pakistan.

Figure. Diagnosis at the time of patient referral by the Lady Health Workers (LHWs) in Karachi, Pakistan.

With regard to LHWs characteristics, currently unmarried [No vs Yes Adjusted OR, 1.61; 95% CI, 1.21-2.38] and being a local resident (Yes vs No, Adjusted OR, 1.74; 95% CI, 1.20-2.24) were found associated with unsuccessful referral in the multiple logistic regression analysis (Table 5). Patients characteristics associated with unsuccessful referral in the final model included patient objection to being referred (No vs Yes, Adjusted OR, 2.96; CI: 1.44-5.52), ever been referred before (Yes vs No, Adjusted OR, 1.25; CI: 1.34-6.90), visited referral site before (Yes vs No, Adjusted OR, 4.04; CI: 2.50-6.08), knowledge of who to meet at the referral site(Yes vs No, Adjusted OR, 1.30; CI: 1.01-2.96) and any one known referred before (Yes vs No, Adjusted OR, 1.96; CI: 1.54-4.16). Subjects were asked if the LHW visited them later to check if they had visited the referral site. Most of the successful referrals had been visited by the LHW later compared to unsuccessful referrals (Adjusted OR, 3.84; CI: 1.92-8.12). Duration of patients' condition was also found significant. Factors including distance of health facility from home, referral slip given, referral decided by, beneficiary status of the patient, monthly income of the patient were not found associated with unsuccessful referral in this study (Table 5).

Table 4. Univariate analysis for factors associated with unsuccessful patient referral by the Lady Health Workers, Karachi, Pakistan. (Selected Patients characteristics)

	Successful		Unsuccessful		OR‡	95%CI§	P-value
	n	%	n	%			
Gender							
Male	86	(76.8)	26	(23.2)	1.00	-	0.90
Female	179	(76.2)	56	(23.8)	0.92	(0.57- 1.64)	
Monthly income (PKR) ††							
>3000	69	(75.8)	22	(24.2)	1.00	-	0.98
=3000	117	(76.0)	37	(24.0)	0.99	(0.54- 1.82)	
Beneficiary Status							
No	57	(85.1)	10	(14.9)	1.00	-	0.06
Yes	208	(74.3)	72	(25.7)	1.97	(0.96- 4.00)	
Referral decided by							
LHW	158	(74.9)	53	(25.1)	1.00	-	0.49
Self	80	(76.9)	24	(23.1)	1.12	(0.64- 1.94)	
Family member	27	(84.4)	5	(15.6)	1.81	(0.61- 4.90)	
Duration of condition (days)							
>30	87	(70.2)	37	(29.8)	1.00	-	0.06
8-30	88	(79.3)	23	(20.7)	1.62	(0.89- 2.96)	
≤7	83	(83.0)	17	(17.0)	2.07	(1.09- 3.96)	
Knowledge of who to meet at the referral site							
Yes	183	(81.0)	43	(19.0)	1.00	-	0.03*
No	77	(70.6)	32	(29.4)	1.80	(1.04- 3.00)	
Referral slip given							
Yes	121	(79.6)	31	(20.4)	1.00	-	0.34
No	133	(75.1)	44	(24.9)	1.29	(0.77-2.18)	
Objection to referral							
No	193	(85.0)	34	(15.0)	1.00	-	<0.01*
Yes	67	(63.8)	38	(56.2)	3.22	(1.87- 5.50)	
Distance from home (kilometer)							
<1	56	(70.0)	24	(30.0)	1.00	-	0.05*
2-10	163	(82.7)	34	(17.3)	2.05	(1.23- 3.76)	
>10	38	(74.5)	13	(25.5)	1.25	(0.50- 2.76)	
Ever been referred before							
Yes	129	(78.2)	34	(20.6)	1.00	-	0.01*
No	118	(71.1)	35	(21.1)	1.26	(0.66- 1.92)	
Anyone known referred before							
Yes	162	(83.9)	31	(16.1)	1.00	-	<0.01*
No	101	(67.8)	48	(32.2)	2.85	(1.48- 4.16)	
Visited referral site before							
Yes	179	(87.3)	26	(12.7)	1.00	-	<0.01*
No	80	(63.0)	47	(37.0)	4.04	(2.34- 6.98)	
Asked LHW about visit							
Yes	245	(79.8)	62	(20.2)	1.00	-	<0.01*
No	14	(56.0)	11	(44.0)	3.12	(1.34- 7.17)	

*Statistically significant †Pakistani rupees ‡ Odds ratio § Confidence Interval n is different for each variable

Table 5. Multivariate model for factors associated with unsuccessful patient referral by the Lady Health Workers, Karachi, Pakistan.

	Adjusted OR*	95%CI†
LHWs characteristics		
Marital status		
Currently Married	1.00	-
Currently Single	1.61	(1.21-2.38)
Local resident	1.00	-
Yes	1.74	(1.20- 2.24)
No		
Patients characteristics		
Duration of condition (days)		
>30	1.00	-
8-30	1.59	(1.19- 3.12)
≤ 7	2.23	(1.21- 3.96)
Knowledge of who to meet at the referral site		
Yes	1.00	-
No	1.30	(1.01- 2.96)
Objection to referral		
No	1.00	-
Yes	2.96	(1.44- 5.52)
Ever been referred before		
Yes	1.00	-
No	1.25	(1.34- 6.90)
Anyone known referred before		
Yes	1.00	-
No	1.96	(1.54- 4.16)
Visited referral site before		
Yes	1.00	-
No	4.04	(2.50- 6.08)
Asked LHW about visit		
Yes	1.00	-
No	3.84	(1.92- 8.12)

Odds ratio †Confidence interval

Discussion

The focus of this study was to identify the factors associated with unsuccessful referrals made by the LHWs in Karachi, Pakistan. The demographic characteristics of LHWs in our study showed that the program is staffed by local, experienced workers, which is likely to increase their acceptability in the communities. Generally, in our society, an experienced married LHW would be more respected and trusted than younger workers. This is especially important when considering health education about socially sensitive issues like family planning.[15] These features of LHWs may be invaluable in building trust between the service provider and the community and have been identified as the key factors in the success of the National Health Program.[2]

In our study, there was an over all predominance of females patients (67.7%). The majority of these women were in the reproductive age group. This reflects the typical clientele of the LHW as the main focus of these workers is maternal and child health (MCH) services. The greater proportion of female patients is also probably due to the fact that LHWs visit households in the daytime when most men are away at work.

About 50% of the study population was over 35 years of age and among them a significant proportion were elderly people. This reflects the importance of LHWs in dealing with the vulnerable older age groups in the comfort of their homes, and refer them only when is needed.

Proportion of referrals

Referral rates around the world vary from 2.3% in Taiwan[16] to 40% in the United States.[23] The high referral rate seen in our study (55%) is most probably due to the limitations of the LHWs to manage very basic medical conditions. It may also imply a lack of resources such as drugs, contraceptives and other medical supplies necessary to deal with such issues.

The proportion of unsuccessful referrals varies worldwide. Figures range from 10.6% in Taiwan[16] to 12% in the British National Health Service[6] and up to 31% in Uganda.[11] Our study shows an unsuccessful referral rate of 23.6%. Perhaps more important is the converse of this statement: 75.5% referrals were successful. Most of these referrals were to the BHU. Considering the over all low level of utilization of these facilities, we can assume that the LHWs can play an important part in increasing utilization of these FLCFs. Having said that, it must be kept in mind that there are various other important factors affecting utilization patterns, the most important perhaps being perceived quality of care and competence of staff at FLCFs.[17]

Reasons for referral

Studies have shown that the most frequent reason for referral is for management of common ailments.[18,19] Our study revealed similar results; the most common referral reason (54%) was for the management of medical and surgical conditions. The most common reason (62%) was Acute Respiratory Infections (ARI). This reflects the high prevalence of ARI in the community, particularly in the winter season when data collection was done. It must be noted that most cases of ARI can be safely managed at home. With proper training and adequate supplies, the LHWs could perhaps treat more people at home and refer

fewer people to hospitals. One must be cautious though of inappropriate diagnosis and irrational use of drugs.[20] Non-communicable diseases were also found to be a common reason for referral. The high figures (52% CVDs and 16.5% Diabetes) reflect their high prevalence in the community.[21,22] Injuries and accidents, constituting 22.5% of all referrals in the study, are also projected to be the second most common cause of death and disability in developing countries by the year 2020.[23] This highlights the importance of properly equipping LHWs with first aid kits and training to manage small accidental injuries at the community level. Another large group of referrals (30%) was for female reproductive health problems. Female reproductive health including family planning is a major activity for the workers, and thus the government plans to intensify training and services in this field.[3]

Factors associated with unsuccessful referrals

Referrals were twice more likely to be unsuccessful if the patients had chronic conditions compared to acute ones. This may be because people are more concerned at the start of an illness. Another explanation is that people with chronic conditions may already be under treatment and need no referral. Also, people may use public services for minor illness and prefer private services for more serious or chronic problems. This finding is consistent with other studies.[24] Level of anxiety may also be more in acute conditions so people heed advice and are willing to go a health facility.

In the majority of successful cases (75%), decision for the referral was made by the LHW herself. Studies have shown that referrals were more successful if initiated by the referring physician. In Pakistan, women do not make serious decisions by themselves, especially decisions regarding health care. A male or senior female family member most often makes these decisions and this would probably lead to the action being taken.[25] However, in our study this was not found significant.

Patient belief and attitude regarding referral decision have been shown affecting outcome of referral process in many studies. If the patient believes that referral is unnecessary, she/he will probably not go.[13] In our study people who had no objection to being referred or who were not anxious about being referred were more likely to visit the referral site. This explains the importance of proper counseling, or explaining to patients exactly why they need to be referred. LHWs should be trained for providing such counseling.

In our study, people who had been referred earlier or knew of someone else who had been referred or had visited the referral site before were more likely to have successful referrals. This high lights the importance of knowledge about the system and what to expect in order for the system to function properly. This again signifies the role of the LHWs in counseling. This would reduce anxiety and people would be more willing to adopt a behavior, in this case, visit the referral site. Fear has been shown significant in referral behavior in black Africans in London.[26] These fears may be based on patients' experiences or those of their relatives and community myths.

As further evidence to the importance of inter-personal skills of LHWs, it was seen that successful referrals had been visited by the LHW after sometime to inquire about the outcome of the referral. Communication has come up as an important variable for successful completion of the referral process.[27]

Income was similar in both patient groups and made no difference in success of referral. Although the association was not found significant, quite a few patients mentioned financial reason for not visiting the referral site. This is quite understandable regarding the inevitable costs of travel, hospital charges and medications for people in the lower socio-economic strata. Twenty percent of all households in the study had some financial reimbursement of medical bills by their employers/insurance. These were also the people likeliest to have successful referrals, though the association was not significant.

The implications of our findings are limited by the fact that this study only reports proportion and factors associated with unsuccessful referral. We cannot comment on the appropriateness of these referrals. Also due to time and budget constraints only one district was included. However, our findings are generally consistent with other researcher's work.

Conclusion

Our study showed that a large number of patients seen by the LHWs are being referred onwards. Though we cannot comment on the appropriateness of referrals or the outcome as regards to quality of care at the FLCF, we know that a majority of these referrals are successful. This is a very important finding with regards to the effectiveness of LHWs as a first contact with the health system.

Based on the findings, we can safely assume that referral success specifically and health care utilization in general can be further improved with better communication between LHW and client. This warrants special training in communication skills and counseling as well as the technical competence of the LHW. Improved management skills for simple problems like ARI would probably reduce the number of referrals. LHWs stand at the entrance of the system and hence their crucial role cannot be over looked and must be strengthened along with improving quality of

and access to higher facilities. Their role in providing PHC and collecting vital data from the communities is just as important as their role as gatekeepers. This implies that the whole system be viewed holistically. What is required is, not any major structural change but simply re-orientation of how services are provided at all levels in the health system.

Acknowledgements

The authors thank the participating LHWs and patients. We are grateful to Dr Saqib Ali Shiekh (District Health Coordinator, District West) and Ms Zahida Hussain Shah (Health Education Officer and Assistant coordinator, District West) of the National Programme for Family Planning and Primary Health Care for their invaluable support. We also acknowledge Dr Zafar Fatmi (Senior Instructor, Community Health Sciences, The Aga Khan University) for his continuous advice.

References

1. Revised PC-1, Prime Ministers Program for Family Planning and Primary Health Care, Ministry of Health (MoH), Government of Pakistan, 1993.
2. National Programme for Family Planning and Primary Health Care. [Accessed on: May 2, 2001]. Available at URL:http://phc.gov.pk/sindh.php
3. National Health Policy, The Way Forward. Ministry of Health (MoH). Government of Pakistan, December 2001.
4. World Health Organization, Technical Report Series-14. The Hospitals in rural and urban district (WHO). Geneva: WHO 1992.
5. Tawfik AM, Khoja M, Shehri AM, et al. Patterns of referral from health centers to hospitals in Ritadh region. La revue de Sante de la Mediterranee Orientale 1997;3:236-43.
6. Hamilton W, Round A, Sharp D. Effect of hospital attendance rates of giving patients a copy of their referral letter: randomized control trial. BMJ 1993;318:1392-5.
7. Kincaid MC. Ocular disease in the diabetic elderly. Clinical Geriatric Med 1999;15: 279-92.
8. Ifudu O, Dagwood M, Iofel Y, et al. Delayed referral of black, Hispanic and older patients with chronic renal failure. Am J Kidn Dis 1999;33:728-33.
9. Chessar AM, Baker LR. Temporary vascular access for first dialysis is common, undesirable and usually avoidable. Clin Nephrol 199l;51:228-32.
10. Siddiqi S, Kielman A, Khan MS, et al. The effectiveness of patient referral in Pakistan. Health Policy Planning 1997;16:193-8.
11. Whitworth J, Pickering H, Mulyanyi F, et al. Determinants of attendance and patient satisfaction at eye clinics in southwestern Uganda. Health Policy Planning 1999;14:77-81.
12. Atkinson S, Ngwengwe A, Macwan M, et al. The referral process and urban health care in Sub-Saharan Africa: the case of Lusaka, Zambia. Soc Sci Med 1999;49:27-38.
13. Epi-Info, Version 6. The Division of Surveillance and Epidemiology, Epidemiology Program Office, Center for Diseases Control, Atlanta, GA, USA.
14. Statistical Package for Social Sciences. Release 10.0 1989-1999, Copyright @ SPSS Inc, Chicago, IL, USA.
15. World Bank, Department of Health, Sindh. Family Health Project, Sindh. Project assessment report, March 2000.
16. Wu CH, Kao JC, Chang CJ. Analysis of outpatient referral failure. J Fam Pract 1996;42:498-502.
17. Maynard C, Cordonnier D. Late referral of diabetic patients with kidney insufficiency has a high human and financial cost: Interdisciplinary communication is urgently needed. Diabetes Metab 2001; 27:517-21.
18. Harold C. Decision-making: a comparison of referral practice and primary care. J Fam Pract 1996;42:155-9.
19. Salem-Schatz S, Moore G, Rucker M, et al. The case for case-mix adjustment in practice profiling. When good apples look bad. JAMA 1994;272:871-4.
20. Akbani S. Factors leading to irrational prescribing amongst general practitioners of Karachi, Pakistan. Unpublished data (Dissertation). The Aga Khan University Karachi 1998.
21. Shera SA, Rafique G, Khawaja IA, et al. Pakistan National diabetes survey: Prevalence of glucose intolerance and associated factors in Shikarpur, Sindh Province. Diabet Med 1995;12:1116-21.
22. Badruddin SH, Molla A, Khurshid M, et al. Cardiovascular risk factors in school children from low middle income families in Karachi, Pakistan. J Pak Med Assoc 1994; 44:106-12.
23. Ghaffar B. Injuries in Pakistan: directions for future health policy and planning. Development statistics of Sindh, Bureau of Statistics, Government of Sindh 2000.
24. Hsu WC, Liu HW, Huang CT, et al. The referral pattern in the family medicine clinic. J Med Sci 1988;4:350-7.
25. Agha SA. Gender issue neglected aspect of health promotion in Pakistan. J Pak Med Assoc 1999; 49:309-11.
26. Malanda S, Meadows J, Catalan J. Are we meeting the psychological needs of black African HIV-positive individuals in London? Controlled study of referrals to a psychological medicine unit. AIDS Care 2001;13:413-19.
27. Muzzin LJ. Understanding the process of medical referral. Part 5: Communication. Can Fam Physician 1992;38:301-7.