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A survey on foot care practices among filarial lymphoedema patients in Orissa, India

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Abstract. The study is to investigate the foot care practices among filarial lymphoedema patients, which is relevant to strengthen the second pillar of the Programme to Eliminate Lymphatic Filariasis (PELF). The patients are drawn randomly from a clinic as well as from the community. After getting verbal consent, each patient was subjected to an in-depth interview by using a structured questionnaire on how she/he dealt with lymphoedema and probed about various foot care practices. Of the six foot care measures, most of the patients are practising one or two measures only. Substantial numbers of patients are practising the washing the affected limb regularly. Though majority use normal footwear, none of the patients use specially made footwear. Other foot care practices like, massaging, elevation and exercising of affected, limb and use of bandage are practised by a few patients. The patients' education and lymphoedema grade had significant influence on number of foot care practices adopted. The present results are not surprising, but disappointing, as a few patients are practising the measures specifically aimed to ameliorate the lymphoedema condition. Though the present study area is covered by the mass drug administration under PELF, no serious attempts are made to alleviate disability and morbidity control. Appropriate care of affected limb at early stage can help in prevention or reversal of the progression of the disease, in addition to decrease in frequency of acute lymphangitis attacks. PELF is one of the functions of primary healthcare (PHC) system and hence, peripheral level health institutions of PHC system including primary health centres, health sub-centres and their health workers should take lead in encouraging the patients to modify their behaviour with foot care practices.

INTRODUCTION

Lymphatic filariasis (LF) has been ranked as the second leading cause of disability worldwide (World Health Organization, 1995), and current Programme to Eliminate Lymphatic Filariasis (PELF) is based on the interruption of transmission and alleviation of disability and suffering among those who have the most common manifestation of LF (Seim *et al.*, 1999). The lymphoedema and other chronic forms of LF have also significant impact on various facets of patients' life (Haddix & Kestler, 2000). Even though, LF presents with chronic manifestations, i.e. lymphoedema and hydrocele, acute attacks in the form of lymphangitis are also common. Repeated acute episodes have a greater short-term disability and it leads the progression from lymphoedema to elephantiasis (Pani *et al.*, 1995). Two types of lymphangitis were recognized by Dreyer *et al.* (1999). They are acute filarial lymphangitis (AFL) caused by the death of adult filarial worms; and acute dermatolymphangioadentis (ADLA), the result of secondary bacterial infections. The role of bacteria in the pathogenesis of ADLA has been well established (Olszewski & Jamal, 1994; Shenoy *et al.*, 1995). Subsequently, Olszewski *et al.* (1997) conducted bacteriological studies on skin, tissue fluid, lymph and lymph nodes from cases of filarial lymphoedema, and explained the episodes of dermatolymphangioadenitis (DLA) and their aetiology. Stagnation of lymph encourages growth of bacteria invading the region. Injuries, even trivial ones, resulting in wounds or abrasions; fungal or bacterial infections; fissuring of the skin; paronychia and eczema, are the lesions of the skin that favour entry of such bacteria into the tissue (Shenoy *et al.*, 1995, 1999). Along with that secondary infection and the resultant inflammation also seem to play major role in the skin changes seen in the limbs affected by lymphoedema, including the development of elephantiasis (Olszewski *et al.*, 1992, 1993). Also, Olszewski (1996) reported that simple hygiene, supplemented with antibiotic treatment have profound effect in preventing these acute episodes. Shenoy *et al.* (1999) also demonstrated how well designed programmes of foot care can significantly decrease the frequency of ADL attacks and also promote to alleviate the disability of LF. In such programmes, meticulous hygiene in treating the effected area needs to be incorporated with the creation of hope and understanding among the patients, their care providers and the community as a whole (Addiss & Dreyer, 2000). Though many of the endemic countries adopted PELF, there is need to strengthen the second pillar of PELF, i.e., the alleviation of disability and control of morbidity. As the foot care is the mainstay in the morbidity control in LF (Shenoy *et al.*, 1998, 1999), attempts should be made to promote the foot care among lymphoedema patients. In this direction, it is essential to assess the current practices of foot care existing in the communities, and no such information is available except a little information from Andhra Pradesh and Tamil Nadu states (Babu & Nayak, 2003; Nanda & Ramaiah, 2003). Hence, the present study is taken up to assess the foot care practices among lymphoedema patients from Orissa state of India.

MATERIAL AND METHODS

Patients

This study has been conducted among lymphoedema patients sampled from a clinic and from a few endemic villages. 108 patients were sampled from the lymphoedema patients attending filariasis clinic at government run state headquarters hospital at Bhubaneswar, Orissa, India. The clinic is managed by our institute and functions twice a week to provide treatment exclusively to filariasis patients. Patients suffering from various forms of LF attend the clinic and only five patients suffering from lymphoedema per day were selected randomly for this study. Similarly, 100 patients were sampled from six villages of Khurda district. Epidemiological data of LF of these six villages are available from our previous study and the present patients were selected randomly from the list of lymphoedema patients. The Bhubaneswar city is contiguous to Khurda district, and the Khurda district is endemic for LF (Dash *et al.*, 1998; Babu *et al.*, 2001). The other characteristics of the patients are shown in Table 1.

Data collection and analysis

After getting verbal consent, each patient was subjected to an interview by using a structured questionnaire (Hudelson, 1994). Each patient was asked how she/he dealt with lymphoedema particularly about the treatment, and regular care. Subsequently the patient was asked whether she/he practice the identified foot care measures. Six most commonly recommended foot care measures were identified (Dreyer *et al.*, 1999; World Health Organization, 2003). The patient was probed on each measure specifically and probed about various foot care practices. The details of their age, sex, home environment (i.e. rural or urban), level of education, annual family income, grade and duration of lymphoedema were recorded. Lymphoedema cases were categorized, according to standard criteria, as grade 1 (pitting oedema of the limb that is reversible on elevating the limb), grade 2 (pitting/non pitting oedema that is non-reversible on elevating the limb; skin normal), grade 3 (non pitting oedema of the limb, non-reversible on elevation, skin thickened), or grade 4 (non pitting oedema

Table 1. Characteristics of the lymphoedema patients

Characteristics	Number (%) of patients	
	Clinic (n=108)	Community (n=100)
Gender		
Male	67 (62.0%)	38 (38.0%)
Female	41 (38.0%)	62 (62.0%)
Age groups (years)		
11-20	15 (13.9%)	1 (1.0%)
21-30	34 (31.5%)	2 (2.%)
31-40	30 (27.8%)	09 (9.0%)
41-50	15 (13.9%)	26 (26.0%)
>50	14 (12.9%)	62 (62.0%)
Environment		
Rural	43 (39.8%)	100(100%)
Urban	65 (60.2%)	0 (0%)
Level of Education (years)		
0	08 (7.4%)	54 (54.0%)
1-10	54 (50.0%)	44 (44.0%)
>10	46 (42.6%)	2 (2.0%)
Annual family income (Indian Rupees)		
<20,000	27 (25.0%)	83 (83.0%)
20,000-40,000	19 (17.6%)	10 (10.0%)
>40,000	62 (57.4%)	7 (07.0%)
Location of Lymphoedema		
Right lower limb only	40 (37.0%)	37 (37.0%)
Left lower limb only	45 (41.7%)	26 (26.0%)
Both lower limbs	23 (21.3%)	37 (37.0%)
Lymphoedema grade		
1	79 (73.1%)	18 (18.0%)
2	24 (22.2%)	16 (16.0%)
3	04 (3.7%)	63 (63.0%)
4	01 (0.9%)	03 (3.0%)
Duration of Lymphoedema (years)		
≤ 1	25 (23.1%)	3 (3.0%)
1–10	58 (53.8%)	34 (34.0%)
> 10	25 (23.1%)	63 (63.0%)

and verrucous skin changes, i.e., elephantiasis) (World Health Organization, 1992). If both the legs are affected with different grades of lymphoedema, the most advanced grade is considered. The data were analysed through SPSS V.10 (SPSS Inc., Chicago, IL, USA). For quantifying the level of foot care practice, six most commonly recommended foot care measures were considered (Dreyer *et al.*, 1999; World Health Organization, 2003), and each patient was given a score of one for each of six foot care practices (Table 2). This score possibly ranging from zero to six, was used as the dependent variable in multiple regression processed analysis, with the other demographic and clinical characteristics of the patient as independent variables.

RESULTS

Most of the patients are practicing one or two measures of the six foot care measures (Table 2). Only one patient from clinic and 19 patients of community had not practised any of these foot care measures. Around 40% of patients drawn from clinic and 60% of patients from community said that they are washing the affected part regularly, apart from the regular bathing. However, with the assumption that Indians have the custom of washing the legs when they come home after an outing, before a meal and before going to bed, the parents were asked specifically how they wash and dry the affected part. Though

Table 2. Practice of important foot care measures among the lymphoedema patients

Practices	Number (%) of patients	
	Clinic (n=108)	Community (n=100)
1. Regular cleaning of affected area	44 (40.7%)	60 (60.0%)
2. Massaging of affected area	16 (14.8%)	20 (20.0%)
3. Use of comfortable foot wear	104 (96.3%)	60 (60.0%)
Use of specially made foot wear	0 (0.0%)	0 (0.0%)
4. Elevation of affected leg regularly	27 (25.0%)	19 (19.0%)
5. Exercise of affected leg	02 (1.9%)	02 (2.0%)
6. Use of bandage	16 (14.8%)	16 (16.0%)

it appeared that they washed the limbs specifically, it can not be linked to lymphoedema care, in view of poor practice of other measures. Of the patients who wash the affected limb regularly 79% of patients, know that they should make it dry after washing. Massaging of affected limb is noticed among 15% of clinic patients and 20% of patients drawn from the community. Wearing of footwear is reported among majority of patients. None of these patients used any specially made footwear; just they use bigger sized footwear. Similarly, wearing of footwear is a routine practice and not particularly aimed at amelioration of lymphoedema condition. It is observed that similar proportion of non-patient community also wears foot wear. In the present study, 25% of the clinic patients and 19% of patients from the community reported that they elevate their affected limb during sleep by putting pillows under limbs. A very small proportion (2%) of patients reported that they do exercise by moving the affected feet/ limb back and forth frequently. The usage of bandage is reported by around 15% of patients. Some patients use pressure bandage but majority use a strip of cloth.

Table 3 shows the association between some demographic and clinical characteristics of the patients with foot care practice. The means of foot care score practices among various groups of patients show that education of the patient is influenced significantly. However, the regression analysis indicated that, of the patients' characteristics, education (t=3.434, $p<0.01$) and lymphoedema grade (t=2.338, $p<0.05$) had significant influence on number of foot care practices adopted ($R^2 = 0.046$).

Table 3. Distribution of mean foot care score by demographic and clinical characteristics of patients

Variable	Mean score ± SD	F-value (*p*)
Gender		
Male	1.86±1.02	
Female	1.79±1.19	0.213 (0.645)
Age groups		
11–20 years	1.81±0.83	
21–30 years	1.94±0.92	
31–40 years	2.00±0.97	0.619 (0.651)
41–50 years	1.78±0.99	
Above 51 years	1.69±1.34	
Education		
Illiterates	1.48±1.10	
1-10 years	1.94±1.14	4.351 (0.014)
Above 10 years	1.92±0.94	
Lymphoedema grading		
Grade 1	1.80±0.95	
Grade 2	1.73±1.01	0.722 (0.540)
Grade 3	1.94±1.32	
Grade 4	1.25±1.50	
Duration of lymphoedema		
Less than 1 year	1.80±0.82	
1 – 10 years	1.80±1.09	0.056 (0.945)
Above 10 years	1.85±1.20	
Total sample	1.82±1.10	

DISCUSSION

The present results on foot care practices among filarial lymphoedema patients are not encouraging, as the practices, specifically aimed to amelioration of lymphoedema are practiced by a few patients. However, most of the patients are using ordinary footwear, which will certainly prevent external injury while moving. Similarly, cleaning of affected limb is reported by considerable proportion of patients. It is uncertain to link these two practices to lymphoedema care, as many of the people in this area use footwear while they go outdoor and wash their limbs before going to bed. Most likely a similar proportion of unaffected people will be practicing these measures routinely. As no specially designed footwear is available commercially, the patients should be informed to use at least bigger size footwear. This improves the foot hygiene, and prevents injuries and infections when they go outdoors and for work. Similarly, washing of affected limb on regular basis is important. Attention should be given to the skin between the toes, skin folds and wounds, if any. And it should be ensured to make them dry. Minimum foot hygiene is key in the lymphoedema management. Dreyer *et al.* (2002) recommended washing of the affected limb regularly with soap and clean water to avoid the progression of lymphoedema to elephantiasis. Though the use of foot wear and washing of limbs are routine practice of the people irrespective of disease status, they certainly improve the affected limbs. As these practices match with the measures recommended for lymphoedema management, efforts should be made to promote these practices, as these measures are not followed by all patients. In the present study area, people use different oils, such as coconut oil, mustard oil, etc. for massaging. But mostly they do not wash to remove the oil, which facilitates accumulation of dust, when they go out. It is not desirable to use such oils during massaging and necessary care should be taken when they are using oils. Elevation of the affected limb during sleep and leisure time is recommended as it prevents the accumulation of fluid in the affected part, and brings considerable relief (Dreyer *et al.*, 2002). Some patients in this study practice it when they sleep and they thought that limb elevation causes reduction of oedema. Exercising of affected limb is seen very rarely. Movement or exercise of affected limb increases the flow of blood and lymph through the limb (Bingham, 2002). Many patients perceive the advantage of use of bandage and around 15% of patients had used bandage. Of these patients, some used a simple cloth strip in lieu of commercially available pressure bandage. Most of the patients sampled from clinic are urban dwellers and belong to comparatively better economy group and were advised to take foot care measures by the staff of the filariasis clinic. The association between patients' characteristics and practice of foot care indicated that education of the patient influences this practice, as educated people had more awareness and access of health information. Similar relation is observed with lymphoedema grade also in regression analysis. When, it is examined independently the proportion of patients washing regularly has increased with the lymphoedema grade. It may be due to the fact the patients of higher grades of lymphoedema had more secondary infections and that tend them to wash the affected area. Also due to non-practicing of regular washing among grade 1 and 2 lymphoedema patients, the lymphoedema might have been progressed further. Though, some information on foot care is available to the patients, the level of practice of foot care measures is not encouraging. The results indicate that some practices which are routinely practiced in this community are in practice among lymphoedema patients also. However, it has to be assessed how these measures match with the measures recommended for lymphoedema management. A few patients are benefiting from these routine measures. Also, it seems that the knowledge of the practices and their benefits is poor among these patients, as the practice of these measures (particularly those other than routinely practiced) is very poor. Therefore, advocacy to promote foot care practices should be behaviourally driven and intensive, rather than just giving information.

It is well established that each acute episode among lymphoedema patients may cause considerable economic loss to the family affected and increase the risk of more episodes of lymphangitis and further worsening of the condition. It is known that bacterial and fungal infections contribute to the progression of filarial morbidity and aetiology of acute episodes and these attacks can be prevented by improving skin hygiene and treatment with topical antibiotics and anti fungal cream (Shenoy *et al.*, 1995; 1999). The mainstay in the prevention of acute episodes is local care of the affected limbs (Shenoy *et al.*, 1998; 1999). The available information indicates that the level of foot care practices is very low in other endemic areas like Andhra Pradesh and Tamil Nadu (Babu & Nayak, 2003; Nanda & Ramaiah, 2003). All these areas, including the present study have been included for the mass drug administration under PELF. Though the alleviation of disability and control of morbidity is one of the two components of PELF, no serious attempts have been made in this direction. The filarial patients visit to the institutions of primary health centres in rural areas as well as urban health centres, for treatment of various forms of LF. Implementation of various components of PELF is one of the functions of primary health care (PHC) system. The medical and paramedical staff of these peripheral institutions of PHC system should be educated about recent developments in the clinical management of LF. The peripheral health workers should advocate for the promotion of foot care practices, such as regular cleaning of affected parts with soap and water, the use of antibiotics/antiseptics, limb elevation and exercising. Because optimal disease prevention at the community level requires the development of simple, reliable and effective strategies to control secondary infections, as these infections are essential cofactors in the development of filarial lymphoedema and the further progression of elephantiasis (Dreyer *et al.*, 2000). Many people living in endemic areas are aware of elephantiasis, but many of them failed to recognise early stages of lymphoedema and subsequent treatment (Babu *et al.*, 2004). Appropriate care at early stage can help in prevention or reversal of the progression of the disease (Dreyer *et al.*, 2002; Kerketta *et al.*, 2005). Though this home-based foot care relies on patients and the family, it should be integrated into the PHC system. Hence, peripheral PHC institutions should take lead in encouraging the patients to modify their behaviour with new foot care practices. Also, the operational issues to provide appropriate services at peripheral health institutions including transfer of available technology of lymphoedema management should be understood to optimise their utility and outreach.

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REFERENCES

Addiss, D.G. & Dreyer, G. (2000). Treatment of lymphatic filariasis. In *Lymphatic Filariasis* (Editor, TB Nutman) pp.151-199. Imperial College Press, London.

Babu, B.V., Acharya, A.S., Mallick, G., Jangid, P.K., Nayak, A.N. & Satyanarayana, K. (2001). Lymphatic filariasis in Khurda district of Orissa, India: an epidemiological study. *Southeast Asian Journal of Tropical Medicine and Public Health* **32:** 240-243.

Babu, B.V., Hazra, R.K., Chhotray, G.P. & Satyanarayana, K. (2004). Knowledge and beliefs about elephantiasis and hydrocele of lymphatic filariasis and some socio-demographic determinants in an endemic community of Eastern India. *Public Health* **118:** 121-127.

Babu, B.V. & Nayak, A.N. (2003). Foot care among lymphoedema patients attending a filariasis clinic in South India: A study of knowledge and practice. *Annals of Tropical Medicine and Parasitology* **97:** 321-324.

Bingham, F. (2002). Mastectomy and movement exercise and lymphoedema: a review. *British Lymphology Society Newsletter* **3:** 24-26.

Dash, A.P., Mohapatra, N., Hazra, R.K. & Acharya, A.S. (1998). Transmission dynamic of filariasis in Khurda district of Orissa, India. *Southeast Asian Journal of Tropical Medicine and Public Health* **29:** 137-140.

Dreyer, G., Addiss, D., Aguiar, A., Bettinger, J., Dreyer, P., Luiz, A., Miguel, S., Neves, M. & Peterson, A. (1999). *A New Hope for People with Lymphoedema.* Atlanta: Amaury Coutinho and Division of Parasitic Dieseases, CDC; 1-16.

Dreyer, G., Addiss, D., Dreyer, P. & Noroes, J. (2002). *Basic lymphoedema management: treatment and prevention of problems associated with lymphatic filariasis*. Hollis NS: Hollis Publishing Co.; 112.

Dreyer, G., Medreiros, Z., Netoo, M.I., Leal, N.C., de Castro, L.G. & Piessens, W.F. (1999). Acute attacks in extremities of persons living in an area endemic for bancroftian filariasis: differentiation of two syndromes. *Transactions of the Royal Society of Tropical Medicine and Hygiene* **93:** 413-417.

Dreyer, G., Noroes, J., Figueredo-Silva, J. & Piessens, W.F. (2000). Pathogenesis of lymphatic disease in bancroftian filariasis: a clinical perspective. *Parasitology Today* **16:** 544-548.

Haddix, A.C. & Kestler, A. (2000). Lymphatic filariasis: economic aspects of the disease and programmes for its elimination. *Transactions of the Royal Society of Tropical Medicine and Hygiene* **94:** 592-593.

Hudelson, P.M. (1994). *Qualitative Research for Health Programmes*. Document No. WHO/ MNH / PSF /94.3. Geneva: World Health Organisation.

Kerketta, A.S., Babu, B.V., Rath, K., Jangid, P.K., Nayak, A.N. & Kar, S.K. (2005). A randomized clinical trial to compare the efficacy of three treatment regimens along with foot care in the morbidity management of filarial lymphoedema. *Tropical Medicine and International Health* **10:** 698-705.

Nanda, B. & Ramaiah, K.D. (2003). Lymphodema management measures practised by cases of chronic lymphatic filariasis. *Annals of Tropical Medicine and Parasitology* **97:** 427-431.

Olszewski, W.L. (1996). Episodic dermato-lymphangitis (DLA) in patients with lymphoedma from lower extremities before and after administration of benzithine pencillin: A preliminary study. *Lymphology* **29:** 126-131.

Olszewski, W.L. & Jamal, S. (1994). Skin bacterial factor in progression of filarial lymphoedema. *Lymphology* **27:** 148-149.

Olszewski, W.L., Jamal, S., Lukomska, B., Kubika, U. & Manokaran, G. (1993). Skin changes in filarial and non filarial lymphoedema of the lower extremities. *Tropical Medicine and Parasitology* **44:** 40-44.

Olszewski, W.L., Jamal, S., Manokaran, G., Lukomska, B., Kubika, U., Swoboda, E. & Dworczynski, A. (1992). Skin changes in filarial Lymphedema. *Progress of Lymphology* **13:** 193-195.

Olszewski, W.L., Jamal, S., Manokaran, G., Pani, S., Kumaraswami, V., Kubicka, U., Lukomska, B., Dworczynski, A., Swoboda, E. & Meisel-Mikolajczyk, F. (1997). Bacteriologic studies of skin, tissue fluid, lymph and lymph nodes in patients with filarial lymphodema. *American Journal of Tropical Medicine and Hygiene* **57:** 7-15.

Pani, S.P., Yuvraj, J., Vanamali, P., Dhanda, V., Michael, E., Grenfell, B.T. & Bundy, D.A.P. (1995). Episodic adinolynphangitis and lymphoedema in patients with bancroftian filariasis. *Transactions of the Royal Society of Tropical Medicine and Hygiene* **89:** 211-214.

Seim, A.R., Dreyer, G. & Addiss, D.G. (1999). Controlling morbidity and interrupting transmission: twin pillars of lymphatic filariasis elimination. *Revista da Sociedade Brasilaria de Medicina Tropical* **32:** 325-328.

Shenoy, R.K., Kumarswami, V., Suma, T.K., Rajan, K. & Radhakuttyamma, G. (1999). A double blind placebo controlled study of the efficacy of oral pencillin diethyl-carbamazine or local treatment of the affected limb in preventing acute adenolymphangitis in lymphodema caused by brugian filariasis. *Annals of Tropical Medicine and Parasitology* **93:** 367-377.

Shenoy, R.K., Sandhya, K., Suma, T.K. & Kumarswami, V. (1995). A preliminary study of filariasis related acute adenolymphangitis with special reference to precipitating factors and treatment modalities. *Southeast Asian Journal of Tropical Medicine and Public Health* **26:** 301-305.

Shenoy, R.K., Suma, T.K., Rajan, K. & Kumarswami, V. (1998). Prevention of Acute Adenolymphnjitis in brugian Filariasis: comparison of the efficacy of ivermectin and diethylcarbamazine each combined with local treatment of the affected limb. *Annals of Tropical Medicine and Parasitology* **92:** 587-594.

World Health Organization (1992). *Informal Consultation on Evaluation of Morbidity in Lymphatic Filariasis.* Document No. WHO/TDR/FIL/92.3 Geneva: World Health Organization.

World Health Organization (1995). *Bridging the Gaps - World Health Report.* World Health Organization: Geneva.

World Health Organization (2003). *Learner's Guide: Training Module on Community Home-Based Prevention of Disability due to Lymphatic Filariasis.* Document No. WHO/CDS/CPE/CEE/2003-35, Part 1. Geneva: World Health Organization.