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Foot Self-Care Educational Program and Its Effect on Foot Condition, Knowledge and Practice among Institutionalized Elderly in Damanhour

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Abstract: Self-care is highly crucial as it introduces an essential care level that stands in its own right. In fact, it involves making some vital lifestyle changes, which have a considerable effect on the wellbeing of older adults. This study aimed to identify the effect of the foot self-care educational program on the condition of foot and practice among institutionalized elderly in Damanhour. It is a Quasi- experimental research design. Settings; the study was carried out in Almogamae Dar Elmossenin and Dar El Sadaa in Damanhour. Subjects 32 residents were included in the study who fulfilled the criteria. Tools five tools were used: Socio-demographic and Clinical data structured Interview Schedule, Mini – Mental State Examination, The Manchester Foot Pain and Disability Index, Brief clinical foot assessment and knowledge and practice levels regarding foot care tool. Results showed that knowledge, practice and foot condition among institutionalized elderly after the implementation of the training program improved significantly. Conclusion, it could be concluded that foot self- care training program for elders had a significant and positive effect on condition of foot in Assisted Living Facilities in Damanhour. Recommendation; design and implement self-care educational and training programs should be planned and offered on a regular basis to residents in Assisted Living Facilities.

Key words: Self- Care · Institutionalized Elders · Foot Care Training · Assisted Living Facilities

INTRODUCTION

As a general rule, it is known that health education helps in increasing individuals' knowledge of some basic health matters and health care and provides them with better information about their health care alternatives. Among the topics where elderly people need help most, a lack of knowledge comes first [1]. As a matter of fact, World Health Organization (WHO) has given emphasis to the importance of health education in supporting health care requirements and enhancing health promotion particularly for the elderly [2].

Similarly, many studies carried out in different parts of the world have concluded that there is a dire need for developing vital health educational programs concerned with old age. Actually, the main role of health educators is to utilize education in order to develop responsibilities for the self-care of sick or incompetent individuals. Definitely, this lies among the duties and responsibilities that they are supposed to perform. Furthermore, health educators have other significant responsibilities concerning determining the learning needs related to health needs and the problems facing elderly. This is in addition to planning appropriate educational initiatives and providing a supportive environment [1, 3].

Naturally, foot problems cause a decrease in mobility and a higher risk of falling. Moreover, they get worse with age and they are more common in women rather than in men as they usually neglect the comfort and care of feet. This is due to the fact that foot problems, which are related to aging or disease processes, are often unrecognized and therefore untreated. Likewise, most elderly individuals do not get recommended foot care guidelines, such as the performance of regular foot examinations, conducting a thorough clinical examination of the feet of all old-aged residents in the assisted living facilities [4]. In fact, the incidence of foot-related symptoms and foot problems is considered quite high

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with over 75-year-old individuals who can still walk and are somewhat active. Definitely, foot conditions' prevalence and severity increase with age. Actually, both age and disease-related foot problems can lead to situations where the elderly individuals suffer pain, decreased range of motion and infection, which eventually reduce their functional ability to walk about or move from place to place properly, i.e. ambulate. The most common causes of disability and pain in older-aged individuals are those related to nail and skin problems principally corns and calluses [5, 6].

With the advancement in age, the skin is liable to become somewhat dry and inelastic. This is accompanied by a loss of the underlying fatty tissue, which is considered important for the protection of bones and soft tissue. Consequently, painful calluses are more probable to arise. Dryness, associated with reduced blood flow, may make the skin split, causing the occurrence of painful fissures. On the other hand, poor circulation can cause a high risk of infection, when the skin is broken [4].

In general, keratotic lesions such as corns and calluses are definitely the most frequently observed and reported foot disorders that cause foot pain in the elderly. Nail disorders, specifically fungal nail infections and structural deformities such as Hallux Valgusor bunions as well as lesser toe deformities including hammertoes Ingrown Toenail come next. An ingrown toenail can be defined as a pain-causing incarnation, in other words, an impingement of a nail border on its adjacent nail fold. Evidently, this condition may result from wearing ill-fitting tight shoes, an abnormal way of walking i.e. gait, e.g. toe-walking [7].

In fact, there are over 75% of old aged individuals complaining of foot pain, following a considerable foot problem and there is no radiographic evidence of arthritic changes. Moreover, it has been anticipated, on average, that 90% of adults whose ages exceed 65 years will show some evidence of foot pain, which is capable of changing independent activity. Therefore, when a person loses the ability to walk due to a foot problem, the only manifestations are not physical limitations; there is also a considerable effect on the person's mental, psychological, social, as well as economic status [8].

It goes without saying that foot pains and disorders are regarded as the most common complaints of aged adults reporting that pain makes it extremely difficult for them to walk or perform daily tasks or functions. Additionally, they interfere with certain activities, for instance getting out of a chair or going upstairs including, the regular activities of simple daily life and therefore, they affect the quality of life of the aged people. Another problem that confronts elderly adults is that they may have difficulty with their balance; hence, their chance of falling may increase. The direct effect of pain is less mobility, which eventually may bring about weight gain, decreased heart function and weakness. Doing simple exercises such as taking short walks is considerably important because walking is among the best, easiest and safest ways of exercising and keeping fit for aged people [9].

Accordingly, proper diagnosis and treatment of foot problems must be available in order to help older adults to maintain their independence and optimize their choices of quality of life [1, 6]. Likewise, since old people suffering from orthopedic conditions may encounter comorbid foot problems, it becomes highly essential for a gerontological nurse to make a distinction between the minor foot problems, which can easily be treated and the severe conditions that necessitate referral to a specialist. In fact, with the seniors suffering from foot problems, a podiatrist should supervise and monitor regular evaluation and treatment [6]. Thus, teaching older adults as well as their caregivers simple preventive procedures and techniques is basically quite crucial.

To conclude, the educational role of a gerontological nurse and care providers involves empowering aged people to have a better management through performance of self-care, encouraging them to practice good foot hygiene and care. Actually, keeping feet unaffected, in other words safe and sound is quite indispensable for an effective functioning [8]. Recently, there have been many studies, which focused on old aged people suffering from some physical diseases, e.g. diabetes or rheumatoid arthritis [9-11]. However, there is quite little information known about foot care procedures performed by the healthy aged adults themselves. There is evidence supporting the belief that the elderly who get regular instructions for a better self-foot care continue this self-care process and bring about positive results [12]. Evidently, since the healthy seniors have reported their poor knowledge of foot care techniques [13]. There is a dire need for designing and organizing updated preventative self-care programs and techniques.

Aim of the Study: The study aimed to identify the effect of the foot self-care educational program on the condition of foot, Knowledge and practice among institutionalized elderly in Damanhour.

Research Hypothesis:

- Elderly who followed the educational program about foot care exhibit higher knowledge mean score post program implementation.
- Elderly who followed the educational program about foot care exhibit higher practice mean score post program implementation.
- Foot condition could be improved and maintained among elderly demonstrated foot self-care.

MATERIALS AND METHODS

Materials

Design: This study followed a Quasi-experimental design (Pre-posttest one group).

Setting: The study was conducted at all available elderly residential homes in Damanhour in El Beheira Governorate in Egypt (2 homes).

- The only Governmental residential home in Damanhour is ElMogamae Dar Elmossenin. The home is composed of three floors, each one considered as a separate residential home; Dar El-Hanan, Dar El-Hana and Dar El-Amal, respectively. There are 36 elders residing in this home.
- The only private residential home in Damanhour is Dar El-Saada with 24 elderly residents.

Subjects: Out of the 60 elderly residents in both settings, only 32 residents were included in the study because they fulfilled the following 5 criteria: **a-** Has 60 years or more. **b-** Has no cognitive impairment. **c-** Is willing to participate in the study. **d-** Has proper communication skills that allow him to answer the required questions. **e-** Has no diabetic foot as verified by the physician diagnostic procedures and examinations.

Tools: Five tools were used to collect the necessary data for the study:

Tool I: Demographic and Clinical Data Structured Interview Schedule: It was developed by the researchers based on relevant literature and consisted of three parts: **part a: biological and socio demographic data that includes;** Age, Duration in elderly home residency, Sex, Educational level, Working before retirement, Marital status, Monthly income, Smoking, Alcohol intake, Caffeine intake. **Part b: medical status:** to indicate the medical history of the following diseases; Parkinson's disease, peripheral vascular disease, respiratory disease, glaucoma, kidney disease, leg cramps, diabetes, stroke, cancer, transient ischemic attack, heart disease/heart attack, high blood pressure, low blood pressure, incontinence, osteoarthritis, rheumatoid arthritis, and broken hip. **Part c:** to specify the physical condition including; hearing, vision, mobility/ambulation, and health condition monitoring.

Tool II: Mini – Mental State Examination [MMSE]: This scale was developed by Folstein [14]. It was translated into Arabic language by Elokl [15] and approved to be valid and reliable (r= 0.93). It was designed for assessing the elder's cognitive function. It investigates changes in different cognitive functions such as attention, language, orientation, recall, calculation, naming, registration, praxis and copying of a design. This tool is very useful in assessing the cognitive functions in residents.

The scale consists of 30 questions in which resident's response either by Yes or No. The maximum score is 30, from 24 to 30 is with no cognitive impairment, from 18 to 23 is considered to be with mild cognitive impairment and severe cognitive impairment takes the score from 0 to 17. It will be used to exclude residents with cognitive impairment.

Tool III-The Manchester Foot Pain and Disability Index: It was developed by Garrow *et al.* [16] and it was validated on sample of older adults.

Manchester Scale score for both feet was combined to provide an overall foot problem score to determine whether the 17 items in the questionnaire could be combined into separate components reflecting different aspects of foot pain and disability during last month. The response of the older adult reflects functional limitation; pain intensity and activity restriction. The total MFPDI score and MFPDI subscale scores were then calculated using the scoring system reported by Garrow *et al.* [16]: none of the time (Score = 0), some days (Score = 1), on most days/every day (Score = 2). Responses to individual items on the MFPDI were also dichotomized by combining the "Some days" and "Most days/every day" categories.

Tool IV -Brief Clinical Foot Assessment: This tool was developed by the researchers after reviewing relevant literature [17-19]. This tool comprised 5 parameters; 1. Neurologic symptoms; Numbness, Tingling, Prickling,

Hypersensitivity to touch. Pain and discomfort may be stimulated by even light touch, Weakness, Balance and Coordination Disturbances, 2. Look at both feet: Skin Changes-bone structure; Infection, Ulceration, Calluses or corns, Skin breaks –dryness, nail disorders thickened toenail, nail disorders Onychomycosis, involution, Edema, Bone structure (Hallux Valgus), Bunion, Hammer toe, Claw toe and Flat foot. 3. Check foot circulation; Dorsalis pedis left, Dorsalis pedis right, Posterior tibial left, Posterior tibial right (pulse), temperature, changes in skin color, 4. Test for neuropathy; Monofilament left, Monofilament right. 5. Assess footwear; style, condition, fit.

The overall score ranged from 0 – 74; a score between 0 – 18 indicates Very good foot condition, a score between 19 – 36 revealed a Good foot condition, a score between 37 – 54 indicates a fair condition and finally, a score between 55 - 74 indicates poor condition.

Tool V -Knowledge and Practice Levels Regarding Foot Care Tool: This tool was developed by the researchers after reviewing relevant literature [19, 20]. This tool is comprised two parts; Part (a): knowledge assessment; It was comprised of (3) questions about knowledge related to foot care as, importance of foot hygiene and care on health, appropriate foot care practices, abnormalities of foot; Level of knowledge. Each point was checked and given a score ranging from (1-3) as follow: (1) poor knowledge, (2) fair level of knowledge, and (3) good level of knowledge and the scoring system was distributed as follows; <50 poor, 50 - <75 fair, ≥75 good.

Part (b): Assessment of foot self-care practices: It comprised of (9) questions about patient's practice related to foot care such as:(1) Perform foot assessment daily, (2) Notify the supervisors on any abnormalities, (3) Foot wash is assumed as part of the bathing schedule: pay attention to the area between toes, where is a common area of fungal infection, (4) Moisturizer can be used if the feet is too dry or dry fissure can be seen on the heel area. Avoid putting moisturizer on the plantar surface, which may lead to fall, (5) Allow foot soaking in warm water (After testing the water temperature), (6) Trimming toenail straight, (7) Changing socks every day, (8) Check shoes for foreign bodies to be removed, (9) Wear proper shoes. Each point was checked and given a score ranging from (1-3) as follow: (1) Not done, (2) partially done, and (3) done completely and the scoring system was distributed as follows; <50 poor, 50 - <75 fair, =75 good.

Method:

- Official letters were issued from the Faculty of Nursing, Damanhur University to the directors of the resident homes for administrative approvals.
- Permission was obtained from the head of the study settings who informed about the purpose of the study, the date and the time of data collection.
- Tools 1, IV and V were developed by the researchers after review of the relevant literature. Then they were tested for content validity by a jury of five experts in the related field. The required modifications were carried out accordingly. Reliability of tools IV and V were tested by using Cronbach's coefficient alpha and results were 0.89and 0, 86 respectively.
- All residents were examined to assess their cognitive function by using tool II, those who were free from cognitive impairment were included in study sample.
- Tool III was adopted, translated and reviewed for content validity by a jury of five experts in the related field. The required modifications were carried out accordingly. Reliability was tested by using Cronbach's coefficient alpha 0.87.
- A pilot study was carried out on 5 elders from Dar Elhana governmental elderly home in Alexandria city. They were conveniently selected and were not included in the study subjects. The aim of pilot was to ensure the clarity of the tools, identify obstacles that may be encountered during data collection and estimate the time needed to fill the questionnaires.
- Ethical considerations: A verbal consent was obtained from each study subject to participate in this study after explanation of the study's purpose. Study subjects' privacy and confidentiality and the right to withdraw any time were assured.
- Data Collection: The program was conducted on four phases which include the following:

Assessment Phase: Before implementation of the foot self- care educational program, tool III, IV and V were used pre- the implementation and post implementation to determine the effectiveness of the program.

Planning Phase

Objectives and Content Preparation: General aim of the program is to improve their Knowledge and practice level regarding foot self-care.

In the planning stage, objectives were determined, selected appropriate interventions according to the problems identified in the assessment.

- A clear and simple explanation was offered to older adults about the study and expected outcomes for them. Each elderly was assessed individually using the previously mentioned tools.
- Educational materials preparation: Instructional materials as handouts, teaching aids and media (Computer, picture, handouts of learning materials) were provided to the elderly residents.
- The researcher prepared the training places, filament and tuning fork, equipment for foot hygiene & nail cutting.
- The researchers set a schedule for training the study subjects.

Implementation Phase of the Program:

- The elderly residents are divided into 2 groups 16 in each to ensure active participation during the program. Then subdivided into 4 groups 8 in each during the practice sessions.
- Four sessions were specified to theory and 20 sessions for practice. The program was introduced over a period of one month. The total time needed was 16 hours. 3 hours for lecture discussion sessions (One hour and 30 minutes for each group) and 13 hours for practice session (3 hours and 15 min for each group) Foot-care techniques were a combination of existing methods of the Nethersole Nursing Practice and Research Unit Evidence-Based Foot and Toenail Nursing Care Protocol [21].

Lecture Sessions
Objectives:

- Identify foot structure and functions
- Explain the importance of foot-care examination
- Repeat appropriate feet care practices in order to overcome feet problems.

Four sessions conducted as follows;

First Session: (Performed twice for both groups): Duration of each session is60 minutes. An introductory session for elderly residents is composed of the following:

- A short simple introduction explaining foot structure and function
- Highlighting the importance of practicing foot-care examination
- Recommending several appropriate feet care practices in order to get over feet problems.

Second Session: (Conducted twice for both groups): Duration of each session: 30 minutes. Objective: providing a content-repetition after completing one-week session in order to emphasize and ensure the elderly foot-care awareness.

Practice Sessions: 20 Sessions Allocated for Practice:

- Session one: Duration of each session: 30 minutes, (Performed 4 times for all four groups) - Objective: Demonstrating the role of foot care in maintaining skin hygiene and moisture.

Firstly, the elderly must observe cleanliness and maintain moisture. Principally, basic foot care is a fundamental care management, while the elderly should maintain high foot hygiene along the lines of having highly hygiene footwear, unclean footwear may be the main infection source.

Secondly, they should also maintain skin moisture at a normal status. In other words, physicians of the elderly generally recommend that their skin should be neither too wet nor too dry according in order to maintain a healthy skin. Therefore, a nurse or a caregiver can use a limited amount of alcohol for sweaty skin in order to cause vaporization of moisture retained between the toes and separate toes with gauze. As for dry skin, the elderly are advised to maintain skin moisture level by conducting basic foot care regularly, on a daily basis.

Thirdly, the elderly can broaden their knowledge through reading the Elderly Foot Health Education Booklet.

Fourthly, the elderly, a nurse or a caregiver should report any sort of suspected infection to the doctor for further management.

Session Two: Duration of each session: 30 minutes (Performed four times for all four groups):

Objective: Demonstrate foot care to reduce the discomfort or pain caused by corn and callus.

- Corns and callus are among the most common foot problems suffered by the elderly.
- Firstly, apply certain conservative measures such as the usage of warm bath as well as a pumice stone to remove corns and callus.

- Secondly, choose a proper corn pad or cut a suitable size foam pad and apply it onto affected areas in order to avoid or alleviate discomfort and incidence of corns and callus.
- Thirdly, the elderly can broaden and enhance their knowledge concerning Care of Corns and Callus with the Elderly (A detailed description in the Elderly Foot Health Education Booklet).

Session Three: Duration of each session: 30 minutes (Conducted four times for all the four groups).

Objective: Maintain an appropriate length and thickness of toenails.

Ageing feet commonly suffer the problem of thickened toenail. With the decrease in older adults' functional status such as poor eyesight, inability to bend the back, thickened toenails become quite hard to handle. In addition, another common foot problem is onychomycosis, or fungal infection of toenail. This condition causes the occurrence of a change in toenails' shape and structure. Hence, visible margins as well as straight edges of toenails are extremely necessary to prevent complications of infections and ensure feet comfort.

Firstly, an appropriate length of toenails should be maintained. It is recommended to check the length of nails once a week to detect possible ingrown toenail.

Procedure:

- Let feet soak in warm water for three to five minutes
- Use a special nail cutter to trim toenails

Secondly, maintain a regularly suitable thickness of toenails. Frequently, thickened toenails become quite hard to manage. Therefore, applying a nail file to file the thickened nail is far easier than cutting it using a different instrument. Filing nails is among the most important management strategies applied twice a week to limit toenails growth.

Techniques:

- Start applying the nail file first on the toenail head.
- Push forward the nail file avoiding backward motion as it may cause pulling up the toenail

Thirdly, the elderly can broaden and enhance their knowledge on Onychomycosis and thickened toenail care and prevention through referring to the Elderly Foot Health Education Booklet.

Fourthly, as for the severer or more acute ingrown toenail or thickened toenail, older adults should refer to a specialist or a podiatrist.

Session Four: Duration of each session: 45 minutes (Performed four times for all four groups)
Objective: Conducting the five foot assessment parameters:

- Inquire if there are neurologic symptoms such as prickling, tingling, numbness, balance and coordination disorders, weakness, hypersensitivity e.g., pain and discomfort stimulated even by a mere touch.
- Find: if there are any Skin Changes such as Calluses or corns, Ulceration, Infection, Skin dryness, Skin breaks – Check for Nail Disorders including Edema, thickened toenail, Claw toe, Hammer toe, bone structure Hallux Valgus (Bunion) and Flat foot.
- Look for: Foot circulation; Dorsalis pedis right, Dorsalis pedis left, posterior tibial right, posterior tibial left, changes in skin color and temperature
- Observe: Neuropathy; Monofilament (Right and left).
- Check footwear concerning Fitness, Condition and Style

Session Five: Duration of each session: 60 minutes (Carried out four times for all the four groups).

Objective No. 1: Demonstrating feet care in order to support and promote circulation of the lower limb.

On the whole, proper clothing and exercise can improve poor circulation;

Firstly, older adults should wear cotton socks so as to reduce the heat loss.

Secondly, the elderly must do some light foot exercises to enhance blood circulation. The Elderly Foot Health Education Booklet contains a detailed description of several foot exercises.

Thirdly, old adults can broaden and increase their knowledge concerning care of foot edema through referring to the Elderly Foot Health Education Booklet page.

Objective No. 2: Demonstrating feet care to reduce pain. Foot pain is mainly in three areas of foot: forefoot, mid-foot and heel. Their causes may differ because the concept of pain is quite complicated.

Firstly: A conservative measure using a soft pad as a cushion to alleviate the pressure on the feet.

Secondly: old adults should perform some light foot exercises (See Elderly Foot Health Education Booklet) to help in strengthening the feet

Thirdly: Above all, the care giver or the nurse should encourage old adults to put on proper footwear for everyday activities.

Fourthly, if feet pain becomes so intense, refer to the physiotherapist.

Evaluation Phase: Post the implementation of the foot self-care educational program, tool III, IV and V were applied subsequent to the implementation on two periods following the passage of a week and after a month to recognize the program effectiveness. Applying these tools will help determine outcome standard regarding the achievement of the above-mentioned objectives of the theory and practice sessions.

Data were collected during a period of three months starting from first January 2015 to the end of March 2015.

Statistical Analysis of the Data: Data were fed to the computer and analyzed using IBM SPSS software package version 20.0.(Armonk, NY: IBM Corp Qualitative data were described using number and percent Quantitative data were described using range (Minimum and maximum), mean, standard deviation. Significance of the obtained results was judged at the 5% level.

The used tests were:

- McNemar and Marginal Homogeneity Test:

Used to analyze the significance between the different stages.

ANOVA with Repeated Measures: For normally distributed quantitative variables, to compare between more than two periods or stages and Post Hoc test (LSD) (Bonferroni adjusted) for pairwise comparisons.

Friedman Test: For abnormally distributed quantitative variables, to compare between more than two periods or stages and Post Hoc Test (Dunn's) for pairwise comparisons.

RESULTS

Table (1a) shows distribution of the studied subjects according to their biological and sociodemographic characteristics. The mean age of the institutionalized elderly were 68.47 ± 5.84 years. The mean of their duration of residence in the elderly home was5.91 ± 4.20 years. Percentage of females was higher than males 59.4%and 40.6% respectively.

More than half of them were illiterate. Regarding their work before retirement; the highest percentage of the subjects 43.7% were workers. As for their social status; less than half of them 40.6% were widows. Concerning their monthly income more than three quarters of them stated that it is not enough. Around half of the subjects 46.9% were smokers. While none of them were alcoholics. More than half59.4% reported that they intake caffeine. Average of cups of caffeine drinks were around 3 cups per day.

Table (1b) shows distribution of the studied subjects according to their medical history. The displayed findings revealed that more than two fifth 43.8% were having hypertension while kidney disease was representing the lowest percentage 6.3%.

Table (1c) shows the distribution of the studied subjects according to physical condition. Most of the study subjects 87.5% had good hearing condition. More than half of them were having impaired vision either not using eye glasses or using eye glasses 34.4 and 21.9% respectively. Regarding mobility; more than half 53.1% were mobile independently while 40.6% were use wheel chair or walker. As for the health monitoring more than two third of the study subjects 65.6% were having health monitoring. Private physician if needed as a method of monitoring was represent the most 95.2% followed by health insurance 76.2%, then checking laboratory investigations regularly was 61.9% and an equal percentage 19.0% were among the physician of the elderly home and Private physician regularly.

Table (2) shows the distribution of the studied subjects according to the Manchester foot pain and disability index MFPDI before and after the program. Mean ± SD of the study subjects was 60.20 ± 18.04 before implementing the program and was 54.67 ± 16.02 after one week.

After one month was 34.67 ± 16.02. There were statistically significant differences regarding MFPDI before implementing the program, after one week, after one month and between after one week and after one month ($p1<0.001^*$, $p2<0.001^*$, $p3<0.001^*$) respectively.

Table 1a: Distribution of the studied subjects according to their biological and socio demographic data:

Biological and Socio demographic data	No. (n =32)	%
Elderly home		
Almogamae	18	56.2
El Saadah	14	43.8
Age		
Min. - Max.	60.0 – 82.0	
Mean ± SD.	68.47 ± 5.84	
Duration in elderly home residency		
Min. – Max.	0.50 – 18.0	
Mean ± SD.	5.91 ± 4.20	
Sex		
Male	19	59.4
Female	13	40.6
Educational level		
Illiterate	17	53.1
primary school	8	25.0
Finished secondary school	6	18.8
Finished university	1	3.1
Working before retirement		
Workers	14	43.7
Housewife	10	31.3
Employee	8	25.0
Marital statues		
Single	3	9.4
Married	9	28.1
Divorced	7	21.9
Widow	13	40.6
Monthly income		
Perceived Enough	7	21.9
Perceived not Enough	25	78.1
Smoking		
No	17	53.1
Yes	15	46.9
Alcohol intake		
Yes	0	0
No	32	100
Caffeine intake		
No	13	40.6
Yes	19	59.4
Average of cups:(cup /day) (n = 19)		
Min. – Max.	1.0 – 6.0	
Mean ± SD.	2.32 ± 1.20	

Table 1b: Distribution of the studied subjects according to their medical status

Medical status	No. (n =32)	%
Hypertension disease	14	43.8
Osteoarthritis	7	21.9
Respiratory diseases	4	12.5
Urinary incontinence	4	12.5
Diabetes Miletus	3	9.4
Stroke	3	9.4
Glaucoma	3	9.4
Kidney diseases	2	6.3

* More than one response was given

Table 1c: Distribution of the studied subjects according to physical abilities

Physical condition	No.(n =32)	%
Hearing:		
Good	28	87.5
Impaired hearing	4	12.5
Vision		
Good	14	43.8
Impaired -no eye glasses	11	34.4
Impaired -use eye glasses	7	21.9
Mobility/ambulation:		
Independent ambulation	17	53.1
Assisted ambulation	2	6.3
Use wheel chair- walker	14	40.6
Health condition monitoring:		
No	11	34.4
Yes	21	65.6
Method of health monitoring		
The physician of the elderly home	4	19.0
Private physician if needed	20	95.2
Private physician regularly	4	19.0
Laboratory investigations regularly	13	61.9
Health insurance	16	76.2

* More than one response was given

Table (3) shows distribution of the studied subjects according to brief clinical foot assessment at different phases of foot care program implementation. It can be noticed that there were significant improvements pre-implementation 61.66 ± 5.96 that indicates a poor foot condition to a fair foot condition after one week 49.78 ± 6.43 to 39.06 ± 6.86 after one-month post-implementation of the program, F=424.323and P<0.001*.

Table (4) shows the distribution of the studied subjects according to the knowledge level regarding foot care; There were significant differences and improvement in knowledge score of subjects, Pre- and post-implementation of the program phase. the mean percent total score of knowledge testing had been increased from 32.29 ±41.90 to 83.34± 25.40 and tp<0.001.

Table (5) shows the distribution of the studied subjects according to their practice for foot care: It was found that there was an improvement of elders practice of foot care in all items of foot care post the program. Majority of patients in the preprogram stage made inappropriate practice for foot care. There were significant differences between pre- and post-providing the program for the studied elderly; mean of the overall practice increased from 3.41 ± 3.91pre- implementation of the program to 15.19 ± 3.33post- implementation of the program tp<0.001*.

Table 2: Distribution of the studied subjects according tothe Manchester Foot Pain and Disability Index(MFPDI) before and after the program(n=32)

	Before		After one week		After one month			
The Manchester foot pain and disability index	No.	%	No.	%	No.	%	F	P
Low	9	28.1	12	37.5	26	81.3	298.079*	<0.001*
Moderate	11	34.4	14	43.8	6	18.8		
High	12	37.5	6	18.8	0	0.0		
Min. – Max.	26.32 – 92.11		26.05 – 78.68		6.05 – 58.68		Fr= 37.447*	<0.001*
Mean ± SD.	60.20 ± 18.04		54.67 ± 16.02		34.67 ± 16.02			

Sig. bet. Periods p_1<0.001*, p_2<0.001*, p_3<0.001*

p: p value for Friedman test for comparing between before, after one week and after one month

Sig. bet. Periods was done using F test (ANOVA) with repeated measures

p_1: p value for comparing between before and after one week

p_2: p value for comparing between before and after one month

p_3: p value for comparing between after one week and after one month

*: Statistically significant at $p \leq 0.05$

Table 3: Distribution of the studied subjects according to the mean foot assessment at different phases of program implementation

	Before	After one week	After one month		
Items of foot assessment	(n =32)			F	P
1. Ask: Neurologic symptoms; Numbness, Tingling, Prickling, Hypersensitivity to touch, Pain and discomfort may be stimulated by even light touch, Weakness, Balance and Coordination Disturbances					
Min. – Max.	8.0 – 15.0	5.0 – 13.0	3.0 – 13.0	56.669*	<0.001*
Mean ± SD.	12.09 ± 1.75	10.34 ± 2.09	8.56 ± 2.82		
Items of brief clinical foot assessment	Before	After one week	After one month	F	P
2. Look: Skin Changes. Infection, Ulceration, Calluses or corns, Skin breaks –dryness, nail disorders thickened toenail, Edema, Bone structure (Hallux Valgus (Bunion), Hammer toe, Claw toe and Flat foot)					
Min. – Max.	15.0 – 23.0	10.0 – 21.0	6.0 – 19.0	188.677*	<0.001*
Mean ± SD.	19.97 ± 2.32	14.78 ± 2.83	11.22 ± 3.03		
3. Check: Foot circulation Dorsalis pedis left, Dorsalis pedis right, Posterior tibial left, Posterior tibial RIGHT, Temperature and Changes in skin color.					
Min. – Max.	14.0 – 22.0	10.0 – 21.0	5.0 – 20.0	140.741*	<0.001*
Mean ± SD.	19.97 ± 1.93	16.75 ± 2.79	13.0 ± 3.66		
4. Test: Neuropathy Monofilament * leftand Monofilament *right					
Min. – Max.	5.0 – 8.0	2.0 – 8.0	1.0 – 8.0	49.009*	<0.001*
Mean ± SD.	7.09 ± 1.03	6.25 ± 1.48	5.19 ± 1.60		
5. Assess: Footwear Style, Condition and Fitness.					
Min. – Max.	0.0 – 3.0	0.0 – 3.0	0.0 – 3.0	52.713*	<0.001*
Mean ± SD.	2.53 ± 0.76	1.66 ± 0.90	1.09 ± 1.0		
Overall					
Min. - Max.	49.0 – 71.0	37.0 – 65.0	23.0 – 55.0	424.323*	<0.001*
Mean ± SD.	61.66 ± 5.96	49.78 ± 6.43	39.06 ± 6.86		

F: F test (ANOVA) with repeated measures for comparing between before and after1week, after 1month

*: Statistically significant at $p \leq 0.05$

Table 4: Distribution of the studied subjects according tothe knowledge level regarding foot care

	Before		After		
	No.	%	No.	%	^{McN}p
Items to test the knowledge level	(n =32)				
1.What do you know about foot structure and function?					
Don't know	24	75.0	10	31.3	<0.001*
Know	8	25.0	22	68.8	
2. Does the patient understand the importance of foot hygiene and care on health?					
Don't know	21	65.6	3	9.4	<0.001*
Know	11	34.4	29	90.6	
3. Can the patient identify appropriate feet care practices to overcome feet problems?					
Don't know	20	62.5	3	9.4	<0.001*
Know	12	37.5	29	90.6	
Level of knowledge					
<50 poor	22	68.8	3	9.4	<0.001*
50 - <75 fair	3	9.4	9	28.1	
≥75 good	7	21.9	20	62.5	
Total score					
Min. – Max.	0.0 - 3.0		0.0 - 3.0		^{t}p<0.001*
Mean ± SD.	0.97 ± 1.26		2.50 ± 0.76		
% score					
Min. – Max.	0.0 - 100.0		0.0 - 100.0		^{t}p <0.001*
Mean ± SD.	32.29±41.90		83.34±25.40		

^{McN}p: p value for McNemar test for comparing between before and after1week

t, p: t and p values for Paired t-test

*: Statistically significant at p ≤ 0.05

Table 5: Distribution of the studied subjects according totheir practice for foot care

	Before		After		
Practice level	No.	%	No.	%	^{MH}p
	(n =32)				
1. Perform foot assessment daily and notify the supervisors on any abnormalities					
Not done	22	68.8	2	6.3	<0.001*
Done partially	10	31.3	3	9.4	
Done complete	0	0.0	27	84.4	
2. Perform gentle foot exercises help to enforce the blood circulation.					
Not done	23	71.9	1	3.1	<0.001*
Done partially	4	12.5	2	6.3	
Done complete	5	15.6	29	90.6	
3. Foot wash is assumed as part of the bathing schedule: pay attention to the area between toes, where is a common area of fungal infection					
Not done	17	53.1	2	6.3	<0.001*
Done partially	7	21.9	1	3.1	
Done complete	8	25.0	29	90.6	
4. Moisturizer can be used if the feet is too dry or dry fissure can be seen on the heel area. Avoid putting moisturizer on the plantar surface, which may lead to fall					
Not done	22	68.8	5	15.6	<0.001*
Done partially	10	31.3	3	9.4	
Done complete	0	0.0	24	75.0	
5. Usage of warm bath and pumice stone to remove corn and callus.					
Not done	26	81.3	1	3.1	<0.001*
Done partially	4	12.5	2	6.3	
Done complete	2	6.3	29	90.6	

Table 5: Continued

Practice level	Before No.	Before %	After No.	After %	^{MH}p
6. Trimming toenail straight Maintain a suitable length and thickness of toenail Allow foot soaking in warm water (after testing the water temperature)					
Not done	26	81.3	4	12.5	<0.001*
Done partially	3	9.4	2	6.3	
Done complete	3	9.4	26	81.3	
7. Changing socks everyday					
Not done	23	71.9	7	21.9	<0.001*
Done partially	7	21.9	7	21.9	
Done complete	2	6.3	18	56.3	
8. Check shoes for foreign bodies to be removed					
Not done	25	78.1	2	6.3	<0.001*
Done partially	3	9.4	3	9.4	
Done complete	4	12.5	27	84.4	
9. Wear proper shoes					
Not done	22	68.8	8	25.0	<0.001*
Done partially	7	21.9	3	9.4	
Done complete	3	9.4	21	65.6	
Level of practice					
<50 poor	29	90.6	2	6.3	
50 - <75 fair	1	3.1	5	15.6	<0.001*
≥75 good	2	6.3	25	78.1	
Total score					
Min. – Max.	0.0 – 15.0		7.0 – 18.0		<0.001*
Mean ± SD.	3.41 ±3.91		15.19 ±3.33		

^{McN}p: p value for McNemar test for comparing between before and after t, p: t and p values for Paired t-test *: Statistically significant at $p \leq 0.05$

DISCUSSION

Effective programs of self-care can support and enhance healthy aging by engaging old adults with activated partners and making it possible for them to gain access to private and public resources and thus optimizing their functional abilities, maintaining their optimal personal independence and autonomy and promoting their quality of life as well as their sense of well-being [18]. Actually, foot problems negatively the mobility, quality of life and independence of the elderly negatively. Since caregivers are closely associated with the residential elderly, they are in a position to recognize and prevent several foot health problems of the elderly. What's more, older adults themselves should be able to check their feet on a regular basis [19-22].

Subsequent to an injury, the elderly may be experience foot pain. In addition other factors such as age-related changes of the foot and long-term overuse negatively affect the older adults causing them to experience reduced range of motion, feelings of discomfort, itchy dry skin, fungal infection, infection; otherwise a systemic disease which may involve any tissue of the foot, such as skin, bones, nails, tendons, ligaments, joints, muscles and nerves [2].

As regards foot pain; foot-care instructions can contribute to the wellbeing of the independent elderly, especially in preserving foot form and enhancing foot pressure and balance, which may provide a better insight and significant suggestions in preventing falling. Additionally, over 75% of the elderly, in other words, those whose ages exceed 65 years, complain of foot pain [23]. Results of the present study revealed that prevalence of foot problems with the elderly is considerably prominent as, according to Manchester scale, about 75% of the study residents suffered from foot pain. This finding agrees with another study, conducted in Alexandria governmental elderly assisted living facilities, in 2000. It affirmed that unhealthy skin condition of residents' feet is a common complaint [24].

Menz *et al*. [25] employed Manchester Foot Pain and Disability Index in order to assess or check feet problems of older adults. They found out that the Hallux Valgus, which affects the quality of life, was present in 36.3% of the population. Moreover, it was common particularly within females and older age groups. The current study has concluded that foot pain is the main complaint of most residents (Table 2).

Autrusson and Nabères [26] reported analogous findings in their study, entitled Foot Problems of the Elderly: Podiatric Assessment and Management. The study emphasized that the prevalence of foot problems frequently occurs in individuals aged over 75 years who can walk. Their foot problems include circulatory problems and painful foot with skin lesions. This is in addition to vascular disorders such as hyperkeratosis 30-70%, nail hypertrophy 12-30%, ingrown toenails 7-12%, oedema 11-15% and foot ulcers 1-5%. Other foot problems are foot deformity which involves toe deformity > 50% and Hallux Valgus 20-74%.

Riskowski *et al*. [23] their study entitled" Associations of Foot Posture and Function to Lower Extremity Pain" both foot morphology and plantar pressure distribution measurement by means of the Foot View Clinic device. The study checked foot movements, these included foot cramps, balance when walking/ standing, foot lift when climbing stairs, foot ground contact sensation, toe movement, coldness in feet, toe spreading, stumbling and tiredness when walking. On the other hand, the researchers applied in the present study a brief clinical foot assessment tool in order to determine

the effect of performing foot care. In fact, older adults were taught how to carry out foot assessment. Thus, the study findings have concluded that there were considerable improvements concerning pre-implementation from an unhealthy or poor foot condition to a fair foot condition after a week and following a month of post-implementation of the program.

Furthermore, the study has revealed that foot assessment has indicated poor condition in terms of the following parameters: monofilament test, skin changes, foot circulation, neuropathy, neurologic symptoms and footwear assessment. Additionally, other findings of the present study can validate poor foot condition as they have demonstrated that about50% of the subjects are smokers. Moreover, over half of the subjects have reported that they take in caffeine. Actually, the highest percentage of the subjects to be examined has had hypertension disease followed by osteoarthritis.

In this context, López *et al.* [27] stated that smoking causes a decrease in peripheral blood flow occurring in every instance, apart from the type of cigarette smoked. Following cessation of smoking, in some cases the peripheral blood flow continues to decrease; however, it begins in others to restore control levels.

Additionally, the California Podiatric Medical Association has reported that sometimes hypertension may cause decreased circulation. Actually, a careful examination is mandatory to determine if any of these conditions is present: absence of normal skin color, lower temperature of the extremities, or a reduced pulse in the feet [28].

Moreover, Waheida *et al.* [19] reported that 50% of study older adults were smokers. And Al-Wahbi [29] who stated that smoking is more common among males than females. These results are in agreement with the current study. Actually, this may be because approximately two thirds of the present study older adults were males who did not attend an educational program before. Definitely, smoking is unhealthy and harmful for everyone; however, it is particularly risky for older adults. Therefore, it is highly imperative for them to quit. This is because older adults have already an augmented liability of developing circulatory problems or cardiovascular diseases. Smoking aggravates their conditions and increases the probability of developing these diseases.

Older adults suffer various foot health problems. Therefore, about 20% of adults over 65 have non-traumatic foot problems. Actually, 60% of these problems are in the forefoot. Unfortunately, little is known about the best method to treat forefoot problems in the elderly. What's more, 31% of older people cannot cut their own toenails [30]. This is consistent with the present study, as 81.3% of the elders were not able to cut their nails properly. Likewise, 90.6% of the foot care practices of the study subjects were poor before implementing the program and improved considerably after completing the program, (Table 5).

Since older adults suffer various foot health problems and have a reported poor awareness of foot care; hence, there is an apparent need for developing preventative self-care programs. Nevertheless, to the best of our knowledge, there are no intervention studies examining the effect of applying foot-care instruction among healthy aged individuals. Furthermore, there is a lack of education concerning foot self-care and instructions about the risk factors for various conditions and the methods of preventing them and eliminating numerous potential problems. Furthermore, early identification of the problem is achieved by keeping a close observation of the feet [31].

Nevertheless, few self-care foot programs' studies have been conducted for healthy elder's feet. On the other hand, there are several studies carried out for diabetic foot. Definitely, Studies should provide qualified self-care foot programs along with simple care techniques and appropriate foot practice even for healthy and independent elders.

Moreover, the present study illustrated that approximately two thirds of the residents in the assisted living facilities had no knowledge of the appropriate practices of foot care before applying the foot care program. Table 4identifiesthe effect of foot self-care educational program on the condition of foot, as well as knowledge and practice among older adults.

These findings may be related to certain points. Firstly, the majority of the subjects was either illiterate or has completed primary education and has no information regarding the benefits associated with regular and appropriate foot care. Secondly, perceived insufficiency of income as reported by over three quarters of the study subjects may also strongly affect the ability of residents to buy any forms of therapeutic products such as a lotion, a moisture cream, or a necessary analgesics ointment. Thirdly, seniors may find caring for feet difficult as they may have other impairments that would prevent them from reaching, cleaning and checking their feet, or they may be less flexible. Accordingly, caregivers should encourage the older adults or intervene in these cases, particularly with seniors who have medical problems, including diabetes, poor vision and osteoarthritis. These health

problems can severely affect the feet; therefore, nurses or caregivers should ensure that feet and toenails are appropriately cared for. Additionally, lack of knowledge on the part of the elderly could be the main cause of lack of foot self-care [31, 32].

Earlier studies have evaluated the issue of foot disorders. Moreover, if basic foot care techniques are followed, they will be extremely effective and it would be possible to avoid many complications. Actually, this finding is in agreement with numerous studies confirming evidence that indicate that older adults' education can promote their health conditions and find preventive solutions for foot problems and thus help minimizing complications [33-37].

With reference to older adults' knowledge about foot care in particular, the present study demonstrates that all residents possessed poor knowledge about foot care before program implementation. Conversely, after the program clients knowledge improved greatly. Furthermore, the current study indicated considerable improvement in the implementation of foot self-care program. Table 4 shows that results correspond to the study conducted in Japan, 2014. In fact, Tan *et al.* [22] reported that a self-foot-care program which encompasses knowledge and practice can benefit the independent elderly, especially in maintaining foot form and improved foot balance and pressure. What is more, in a Meta-analysis, which included 11 interventional studies, there was as improvement in the knowledge of the intervention groups following the implementation of culturally proper health education. This finding agreed with Mersal and Mersal [38] who indicated the success of the intervention program in improving knowledge of the elderly in the study group. In fact, this improvement occurred subsequent to a follow-up period of three months after implementation of the self-care guidelines program.

Likewise, Hassan [39] illustrated that there was a statistically significant positive relationship observed between older adults' knowledge and the total mean scores of feet self- care practice following the implementation of the program. Additionally, Jinadasa *et al*. [40] reported a statistically significant difference between knowledge and practice, which improve the daily foot care regimens. Furthermore, Somaroo *et al.* [41] demonstrated that a significant association existed between provision of foot care education and appropriate foot care practice. This finding can be attributed to the fact that older adults' education can greatly improve even the worst foot problems.

CONCLUSION

The educational program about foot self-care showed an improvement of elderly' practice of foot care in all items of foot caring post the program and improvement in knowledge score of subjects, Pre- and post-implementation of the program. A significant improvement in the foot condition was ascertained by clinical foot assessment.

Recommendations:

- Provide self- care educational program for older adults about appropriate foot care and booklets about foot care should be available in Assisted living facilities and geriatric clinics in Arabic versions and should be given to each elderly adult for free.
- Design and implement in-service educational and training programs should be planned and offered on a regular basis to health care providers in Assisted Living Facilities to update their knowledge and improve their practice. These training classes should include knowledge and skills that required for effective foot care of older adults.
- Periodic foot examination and appropriate medical referral if needed.

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