

# Awareness and practices of footwear among patients with diabetes and a high-risk foot

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## Key words

- Footwear awareness
- Footwear practices
- High-risk foot

## Article points

1. Foot complications are preventable but are given less attention by both patients and healthcare professionals.
2. The best way to combat these foot complications are adequate foot care, early detection of risk foot and appropriate selection of footwear.
3. Appropriate guidelines and protocols on risk stratification, foot care and footwear assessment in the care of the diabetics will prove effective in preventing foot-related complications.

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**In developing countries like India, diabetic foot complications have a huge economic impact and are responsible for high morbidity and mortality rates. An estimated 50% of non-traumatic amputations are performed among people with diabetes. Inappropriate footwear and improper foot care are thought to be the major contributors to problems in patients with a high-risk foot. Nurses play a significant role in preventing these complications as effective education is known to improve foot care practices. The objectives of this study were to assess the awareness and practices related to footwear among people with diabetes with high-risk foot, and also its association with demographic and clinical variables and the relationship between the awareness and practices of footwear. Using a quantitative descriptive design, the study was conducted at a tertiary hospital in South India. Simple random sampling was used to screen the patients with diabetes with high-risk foot using SIGN risk stratification (Stang and Leese, 2016). Consecutive sampling was used to assess the awareness and practices of footwear. Data were collected using an interviewer guided questionnaire. Descriptive and inferential statistics was used to interpret the data. Majority of the subjects (60%) had inadequate footwear awareness and 70.5% had inadequate footwear practices. Increase in footwear awareness correlated with corresponding increase in adequacy of practices ( $r=0.621$  at  $P<0.01$ ). The study revealed that the score value of the footwear had a strong association with the footwear awareness ( $P=0.007$ ) and footwear practices ( $P=0.005$ ). It was found there was a significant association between the footwear practices and the age of the subjects ( $P=0.023$ ). This study has clearly shown the deficiencies that exist in terms of the level of awareness and practices of the subjects with high-risk foot. It also highlights the demographic and clinical variables that influence the awareness and practices of the subjects. Diabetic foot complications are preventable with simple foot care and appropriate footwear practices. Hence, careful screening of people with diabetes for the high-risk foot and meticulous reinforcement on the needed skills of foot care, appropriate footwear and its use will be limb-saving and lifesaving. Nurses also need to innovatively address the influence of demographic and clinical variables. It is thought this will bring about significant reduction in the mortality and morbidity rates associated with foot complications in those with diabetes.**

**I**n developing countries, diabetes is one of the leading causes of mortality. India currently leads the world with an estimated 63.8m people with diabetes; this figure is predicted to increase to 109m by 2030 (Mohan et al, 2007). The mortality and morbidity rates associated with diabetes are so high in India due to the complications connected with this disease. One of the most significant complications

is that associated with the foot. The lifetime risk of a person with diabetes developing a foot ulcer could be as high as 25%, and it is believed that every 30 seconds, a lower limb is lost somewhere in the world as a consequence of diabetes (International Diabetes Federation, 2011). Of these, around 80–85% of patients with diabetic foot ulcers undergo lower-extremity amputations (Jude et al, 2001). Research

studies and clinical evidence show that proper footwear and therapeutic foot orthotics help in preventing these amputations (Chandalia et al, 2008).

In a developing country like India, the various sociocultural factors, such as bare foot walking, poor knowledge of foot care practices and lack of adequate and timely access to podiatry services, pose a major threat to the high-risk foot in people with diabetes. Giurato and Uccioli (2006) emphasised that patients with loss of protective sensation and those with foot deformities (high-risk foot among people with diabetes) require specially fitted footwear to minimise the risk of ulceration. High-risk foot is defined as history of previous amputation or ulceration or presence of two or more risk factors, e.g. loss of sensation (<11 sites), absent or diminished pulses, peripheral arterial disease, foot deformity with significant callous formation, pre-ulcerative lesions and end-stage renal failure.

The important risk factors identified for high-risk foot among people with diabetes are peripheral neuropathy, peripheral vascular disease and foot deformity (Boulton et al, 2004). Inappropriate footwear and improper foot care are thought to be important modifiable contributors to high-risk foot among people with diabetes (Apelqvist et al, 2008).

Although most people with diabetes assume they have healthy feet, they are at risk of developing foot complications at some point. Inadequate foot care and inappropriate foot wear selection poses a greater threat to these patients. Various contributing factors like sensory neuropathy, motor neuropathy and peripheral vascular diseases predispose them to life-threatening complications. Added to the above mentioned, the sociocultural and religious practices pave way for aggravating these ulcers and skin problems that are seen among the people with diabetes in our nation. It is highly imperative that the nurses take a lead in addressing these issues of this fast-growing disease epidemic. Foot-related complications cause a huge economic burden on people with diabetes.

One way to combat the problems associated with such complications is to prevent these complications with conscientious attention and preventive measures, which include patient education on adequate foot care practices, early detection of risk foot and appropriate selection of footwear. Nurses at various settings should be knowledgeable to educate patients and, thereby, prevent complications and promote their quality of life.

Nurses are actively involved in the early detection and prevention of diabetes and its complications. Most often, education on footwear practices are neglected by nurses. They have to take meticulous efforts to address this growing problem. Singh et al (2005) reported that the best way for prevention of diabetes foot ulcer is screening for loss of protective sensation using monofilament examination. By screening the clients, they can be stratified according to the risk status of their feet, which will enable the nurses to give meaningful patient education on proper foot care, foot wear specifications and modifications that are highly vital (Singh et al, 2005). Foot complications are preventable but are given less attention by both patients and by healthcare professionals. Nurses play a vital role in varied settings like clinics, community settings, primary care settings and tertiary care settings. Their contributions towards educating the patients would make a tremendous impact. Increasing the knowledge level can bring about changes in daily practices, thereby preventing disability and, thus, improving their wellbeing. Nurses can positively influence the patient outcomes and promote their quality of life by promoting maintenance of healthy feet, identifying the apparent problems and encouraging evidence-based self-care. Keeping in mind the probable increase in the burden of this disease in the future, protecting the foot in diabetes should be the aim of preventive strategy.

The objectives of the study were:

- To assess the footwear awareness among people with diabetes with high-risk foot
- To identify the footwear practices among people with diabetes with high-risk foot
- To determine the relationship between footwear awareness and footwear practices among people with diabetes with high-risk foot
- To determine the association of footwear awareness and footwear practices with demographic and clinical variables among people with diabetes with high-risk foot.

The hypotheses of the study were that there would be significant relationship between footwear awareness and footwear practices and there would be a significant association between awareness and practices of footwear and selected demographic and clinical variables.

## Methods and materials

Quantitative descriptive design was used to assess

the footwear awareness and footwear practices among people with diabetes with high-risk foot. The study was conducted in a tertiary care hospital in South India.

### Data collection instrument

The instrument consisted of four sections with Section A depicting demographic variables and clinical variables of the subject and section B identifying the Scottish Intercollegiate Guidelines Network (SIGN) risk stratification system (Stang and Leese, 2016). Section C describes the footwear awareness questionnaire, with four sub-divisions (selection of footwear, footwear specifications, footwear care and footwear practices), and 19 items with yes and no options. Section D is footwear practices questionnaire, which had 10 items; the first two questions had multiple choices with a single best option. The rest 8 items were statements with 'Always', 'Frequently', 'Often', 'Sometimes' and 'Never' options, which was scored as 4, 3, 2, 1 and 0, respectively. Content validity was obtained from the experts before the pilot study for the footwear awareness questionnaire and Footwear practices questionnaire developed by the investigator. The instruments had a content validity index of items ranging from 0.83–1 and content validity index of scales ranging from 0.95–1. Reliability of the instruments was also checked using interclass correlation coefficient. Footwear awareness questionnaire had a higher reliability with Cronbach's alpha — 0.74 and footwear practices questionnaire also had a higher reliability with Cronbach's alpha — 0.72. The SIGN risk stratification system screening tool was found to have diagnostic accuracy with sensitivity (95% CI) 95 (92–98), specificity (95% CI) 90 (89–91) and accuracy (95% CI) 90 (89–91).

### Protection of human rights

The study was performed after getting approval from the Institutional Research Committee. An informed consent was obtained from all the subjects after informing them about the details of the study. Privacy of the subjects and confidentiality of the information was maintained throughout the study.

### Data collection methods

Data were collected using an interview guided questionnaire. A total of 511 patients were screened using SIGN risk stratification system for high-risk

foot and were recruited using simple random sampling technique. Out of them, 105 subjects who fulfilled the study criteria were selected using consecutive sampling technique and were assessed for awareness and practices of footwear.

### Data analysis and interpretation

The data was analysed using the Statistical Package for Social Sciences (SPSS) Version 17.0. Descriptive and inferential statistics were used for the interpretation of the results. The mean and standard deviation of awareness and practices was measured. The awareness and practices scores were summed up and grouped into inadequate (<50%), moderately adequate (50–75%) and adequate (>75%). Pearson correlation coefficient was used to assess the relationship between footwear awareness and footwear practices. The association of footwear awareness and footwear practices with demographic and clinical variables was analysed using chi-square test.

### Results

The study findings revealed that the majority (69.5%) of the patients belonged to male gender. Age categorisation revealed that most of them (47.6%) belonged to the 41–60 year age group and 45.7% of them were more than 60 years of age. The majority of them (63.8%) had school education and only 1.9% had postgraduate education, while more than half of the subjects (53.3%) were unemployed. The majority of the subjects (72.4%) had a family income of INR5,000–15,000 per month. Analysis of the clinical variables revealed that majority (73.3%) of them did not have smoking habits; most of them (74.3%) did not have drinking habits. Around 41% of them had diabetes mellitus for (5–10) years and only 15.2% had diabetes mellitus for more than 15 years. More than half of the subjects (55.2%) had associated comorbidities. The majority of the subjects (54.3%) had visited a foot specialist and around 42.9% were using footwear with hard shore value. Shore value explains the hardness of the footwear. A higher shore value means harder substance, which is dangerous for a diabetic neuropathic foot.

The study revealed that majority of subjects (60%) had inadequate awareness and only 5.7% had adequate awareness (*Figure 1*). It was also found that 70.50% of them had inadequate practices (*Figure 2*). As footwear awareness

increases, there is an improvement in practice, with the Pearson's correlation coefficient ( $r=0.621$  at  $P<0.01$ ).

There is no significant association between footwear awareness and demographic variables (Table 1). Statistically significant association was found between footwear awareness and shore value of the footwear ( $p=0.007$ ) (Table 2). Table 3 reveals that there is statistically significant association between footwear practices and age of the subjects ( $P=0.023$ ). Table 4 reveals that there is statistically significant association between footwear practices and visit to foot clinic ( $P=0.018$ ), as well as between footwear practices and shore value of the footwear ( $P=0.005$ ).

### Discussion

The demographic variables of the subjects studied were age, sex, education, occupation, and family income, while the clinical variables were history of smoking, history of alcohol consumption duration of diabetes, presence of comorbidities, visit to foot clinic, shore value of footwear and the level of diabetes education received.

The researcher found that the majority of participants were male (69.5%); this is fairly similar to the study done by Desalu et al (2011), where 52% were male subjects. Age categorisation revealed that majority of them, i.e. 47.6% belonged to the age group of 41–60 years and 45.7% were more than 60 years of age. Only 23.8% of the subjects were illiterate, 63.8% had school education, 10.5% had graduate level education and 1.9% had postgraduate education. On the contrary, a study done in the UAE, found that 63% of the participants were illiterates (Al-Maskari et al, 2013). More than half of the subjects (53.3%) were unemployed and majority of the subjects (72.4%) had a family income of Rs 5,000–15,000 per month. Thereby, it was found that most of the subjects were not educated, not employed and belonged to a lower socioeconomic status. So the educational status, occupation and financial status of individuals play an important role in self-care of patients especially with chronic diseases.

The descriptive analysis of the clinical variables revealed that majority (73.3%) did not have smoking habits and most of them (74.3%) did not have drinking habits. Nearly half of them (41%), had diabetes mellitus for about 5–10 years and 15.2% had diabetes for more than 15 years. More

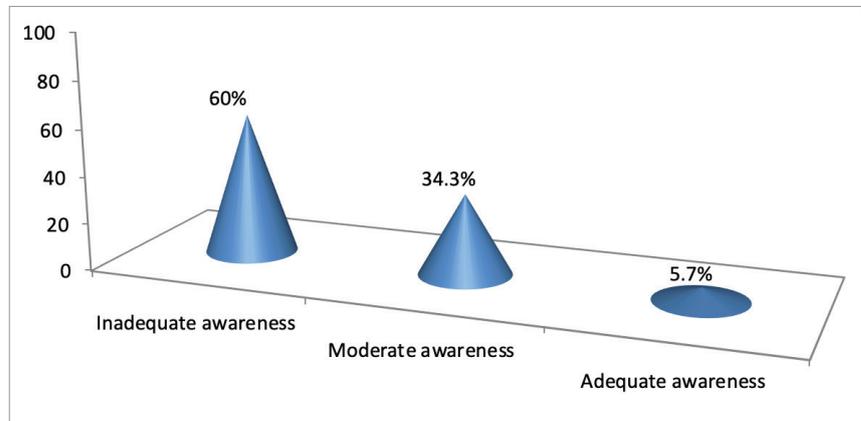


Figure 1. Footwear awareness among people with diabetes with high-risk foot (n=105).

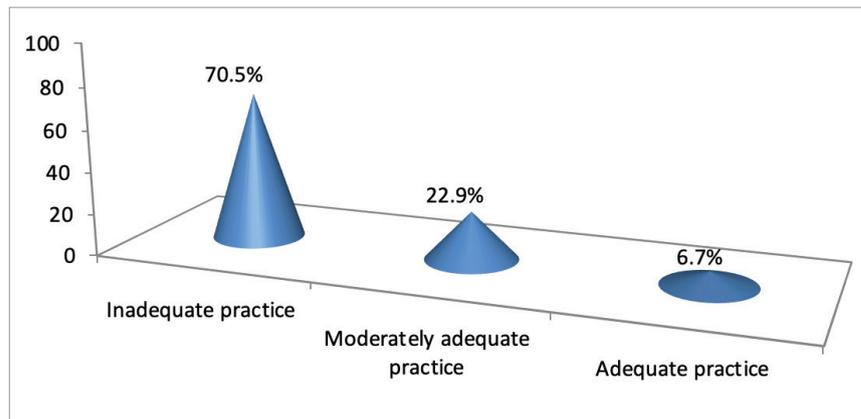


Figure 2. Footwear practices among Diabetic patients with high risk foot (n=105)

than half of the subjects (55.2%) had associated comorbidities and 44.8% did not have any associated comorbidities. Predominantly, 46.7% of the subjects had hypertension as a comorbidity compared to cardiac and kidney diseases. A study by Gholap et al, also says that 42% of the subjects studied did not have any associated comorbidities (Gholap and Mohite, 2013). Majority of the subjects (54.3%) had visited a foot specialist. Mostly subjects who had ulcers or amputations earlier had visited foot specialists, whereas around 30–35% of the subjects who had high-risk foot were not aware of their status of the foot and expressed their ignorance about visiting a foot specialist. It is highly imperative that foot examination becomes part of routine diabetic examination and all people with diabetes should visit a podiatrist irrespective of their feet status. An Italian study showed that more than 50% of the participants had not visited any foot specialist in their life time (Batista et al, 2005). In the present

**Table 1. Association between footwear awareness and demographic variables (n=105).**

Demographic variables	Footwear awareness						χ <sup>2</sup>	P-value
	Inadequate awareness		Moderate awareness		Adequate awareness			
	(n)	%	(n)	%	(n)	%		
<b>Age</b>								
26–40 years	5	10.71	1	14.28	1	14.28	2.939	0.568
41–60 years	28	56	20	40	2	4		
>60 years	30	62.5	15	31.25	3	6.25		
<b>Sex</b>								
Male	45	61.64	25	34.24	3	4.10	1.187	0.552
Female	18	53.25	11	34.37	3	9.37		
<b>Education</b>								
Illiterate	19	76	4	16	2	8	9.791	0.134
School education	38	53.71	25	37.31	4	5.97		
Graduate	4	36.36	7	63.63	0	0		
Postgraduate	2	100	0	0	0	0		
<b>Occupation</b>								
Unemployed	35	62.5	18	32.14	3	8.57	11.023	0.088
Laborer	25	53.19	11	23.40	1	2.12		
Professional	1	33.33	1	33.33	1	33.33		
Any other	2	22.22	6	66.66	1	11.11		
<b>Family income</b>								
<5,000	5	71.42	1	14.28	1	14.28	5.441	0.489
5,000–10,000	46	60.52	27	35.52	3	3.94		
11,000–15,000	8	57.14	4	50	2	25		
>15,000	4	50	4	50	0	0		

study, 89.5% of the subjects had received education on diabetes from different sources. Many of the subjects were aware of diabetic diet control, exercise, importance of medications, foot care etc. They had received information on various aspects of self-care in diabetes management but most of them were unaware of the footwear practices. Only 38.5% of the subjects studied used footwear with normal shore value. Most of them were using chappals (a type of slipper popular in India) with a hard shore value. Very few of the subjects had an understanding of the importance of the biomechanics of the footwear in preventing ulcers and disability.

**Footwear awareness**

One of the significant finding of the present study

was that the majority (60%) of the subjects had inadequate awareness about footwear. This finding was in agreement with the study done in Nigeria among people with diabetes attending three tertiary hospitals which reported that around 89.2% of the subjects had not received any advice on therapeutic footwear and 88.6% of the subjects failed to get appropriate size of the footwear (Desalu et al, 2011). Literature tells that use of ill-fitting footwear is the most common cause of foot ulcers; it increases the plantar foot pressures and causes mechanical stress on the dorsal and plantar surfaces, hence adequate awareness about the appropriate therapeutic footwear is vital for patients with high-risk foot in preventing detrimental effects and foot complications (Dominic et al, 2015).

**Table 2. Association of footwear awareness with clinical variables (n=105).**

Clinical variables awareness	Footwear						$\chi^2$	P-value
	Inadequate Awareness		Moderate Awareness		Adequate Awareness			
	(n)	%	(n)	%	(n)	%		
<b>Duration of diabetes</b>								
< 5 years	19	67.85	9	47.36	0	0	7.829	0.251
5 – 10 years	27	62.79	14	32.55	2	46.51		
11 – 15 year	7	38.88	8	44.44	3	16.66		
>15 year	10	62.50	5	31.25	1	6.25		
<b>Comorbidities</b>								
Absent	28	59.57	16	34.04	3	63.8	0.071	0.965
Present	35	60.34	20	34.48	3	8.57		
<b>Visit to foot clinic</b>								
Yes	32	56.14	19	33.33	6	10.52	5.395	0.067
No	31	35.41	17	35.41	0	0		
<b>Diabetes education received</b>								
Yes	53	56.38	35	66.03	6	11.32	4.934	0.085
No	10	90.90	1	9.09	0	0		
<b>Shore value of the footwear</b>								
Not Applicable	16	94.11	1	5.88	0	0	17.866	0.007*
Soft	2	60.66	0	0	1	33.33		
Normal	19	47.5	17	89.47	4	21.05		
Hard	26	57.77	18	40	1	3.84		

\*(P&lt;0.05)

**Footwear practices**

Another important finding of this study was that about 75% among the subjects studied around 70.5% had inadequate footwear practices. Subjects were highly ignorant of the footwear use and practices.

A healthcare provider's guide to preventing diabetes (National Center for Chronic Disease Prevention and Health Promotion, 2011) says that patients with high risk foot need to use therapeutic footwear and follow safe footwear practices. It also suggests that patients have to be counseled about appropriate footwear practices. It also emphasises that all people with diabetes need to pay attention to the fit and the style of their footwear.

A study done in Mumbai, projects that most of the Indian people with diabetes are ignorant of the good foot care and footwear practices. It is also highlighted in the article that most of the foot complications that the Indian people with diabetes suffer are because of

peripheral neuropathy, which could be easily prevented by appropriate foot practices (Chandalia et al, 2008).

The present study findings are in contradiction to the report given by Vishwanathan et al (1999) that most (72%) of the subjects had good knowledge about the use and appropriate type of footwear (Viswanathan et al, 1999).

Most of the subjects found it difficult to use footwear with sandals because it was uncomfortable. A larger number of the subjects had a misconception about micro cellular rubber (MCR). The benefits of an MCR chappal is that it has shore value that is safer for the diabetic foot. MCR footwear is used to heal diabetic foot problems. Chappals were used only when a patient developed ulcers. Some of them expressed that using a MCR chappal was expensive, and so they preferred to use the other stylish or modern or comfortable type of footwear. Use of footwear

**Table 3. Association between footwear practices and demographic variables (n=105).**

Demographic variables	Footwear awareness						χ <sup>2</sup>	P-value
	Inadequate awareness		Moderate awareness		Adequate awareness			
	(n)	%	(n)	%	(n)	%		
<b>Age</b>								
26–40 years	5	71.42	0	0	2	28.57	11.387	0.023*
41–60 years	33	66	16	32	1	2		
>60 years	36	75	8	16.66	4	8.33		
<b>Sex</b>								
Male	49	67.12	20	27.39	4	5.47	3.049	0.218
Female	25	78.12	4	12.51	3	9.37		
<b>Education</b>								
Illiterate	20	80	4	16	1	4	8.470	0.206
School education	48	71.64	15	22.38	4	5.97		
Graduate	4	36.36	5	45.45	2	18.18		
Postgraduate	2	100	0	0	0	0		
<b>Occupation</b>								
Unemployed	43	76.78	11	19.64	2	3.57	12.606	0.050
Laborer	25	67.56	10	40	2	8		
Professional	2	66.66	1	33.33	0	0		
Any other	4	44.44	2	22.22	3	33.33		
<b>Family income</b>								
< 5,000	4	57.14	1	14.28	2	28.57	9.865	0.130
5,000–10,000	57	75	15	19.73	4	7		
11,000–15,000	9	64.28	5	35.71	0	0		
>15,000	4	50	3	37.5	1	12.5		

\*(P<0.05)

indoors was considered to be unacceptable due to cultural values and beliefs (this is an interesting fact as if pressure redistribution devices are not used indoors this will have a major impact on healing). It was noted that most participants believed in mending their torn footwear and reusing them. They believed that they were saving money but were unaware that simple change of footwear and following appropriate footwear specifications would be limb saving. People were not aware of the financial stress that these foot complications can lead to. So footwear practices are highly influenced by financial, cultural and traditional factors.

Dorsal foot ulcers are usually related to footwear and this can be avoided by using a shoe/sandal of the appropriate size and depth. An excellent

footwear intervention can be a failure if the patient is not compliant in using it appropriately (Thomas et al, 2012). Thereby, this finding of the study emphasises the importance of footwear practices in patients with high-risk foot.

**Relationship between the footwear awareness and footwear practices**

The study done reveals that as awareness of the footwear increases, the footwear practices also increase (r=0.621 at P<0.01). Subjects who were aware of the therapeutic footwear had adequate footwear practices. Thus, the research hypothesis that there would be a significant relationship between footwear awareness and footwear practices was accepted. But it was a very small amount of the population who really understood

Table 4. Association between footwear practices and clinical variables (n=105).								
Clinical variables	Footwear practices						x <sup>2</sup>	P-Value
	Inadequate awareness		Moderate awareness		Adequate awareness			
	(n)	%	(n)	%	(n)	%		
<b>History of smoking</b>								
Absent	53	68.83	18	23.37	6	7.79	0.694	0.707
Present	21	75	6	21.42	1	4.76		
<b>History of alcohol</b>								
Absent	55	70.51	17	21.79	6	7.69	0.628	0.730
Present	19	70.37	7	25.92	1	3.70		
<b>Duration of diabetes</b>								
< 5 years	24	85.71	4	14.28	0	0	9.133	0.166
5 – 10 years	29	67.44	11	25.58	3	6.97		
11 – 15 years	9	50	7	38.88	2	22.22		
>15 years	12	75	2	12.5	2	12.5		
<b>Comorbidities</b>								
Absent	32	68.08	12	25.53	3	6.38	0.346	0.841
Present	42	72.41	12	20.68	4	6.89		
<b>Visit to foot clinic</b>								
Yes	35	61.40	15	26.31	7	12.28	8.004	0.018*
No	39	81.25	9	18.75	0	0		
<b>Diabetes education received</b>								
Yes	65	69.14	22	23.40	7	23.40	1.161	0.560
No	9	81.81	2	18.18	0	0		
<b>Shore value of the footwear</b>								
Not Applicable	14	82.35		17.64	0	0	18.370	0.005*
Soft	2	66.66	1	33.33	0	0		
Normal	20	50	13	32.5	17.5	100		
Hard	38	84.44	7	15.55	0	0		

\*(P&lt;0.05)

the mechanics of using footwear with good fit. Some of the subjects who had good education, expressed that though they are aware of the therapeutic footwear they were not using MCR chappals because of cosmetic effect. Having knowledge should enhance the practices. A research done by Edmond et al (1996) reported that the patient's subsequent ulcer relapse rates were 26% for those wearing therapeutic footwear whereas it was 86% for those who preferred to wear their own footwear. This explains that footwear awareness and footwear practices have a positive relationship. If the patients become aware

of the appropriate footwear and care, their practices will automatically improve, thereby reducing the complications that arise because of the biomechanics of the foot and the footwear.

A study done in India revealed that a very poor choice of footwear was made by both people with diabetes and without. An important component of good practices is awareness about the therapeutic uses of footwear. Most of those participants studied used an open-type of footwear called chappals, which predisposes the patients mainly for plantar and dorsal foot ulceration (Chandalia et al, 2008).

Figure 3. Example of Hawaiian-style chappals.



### Association of awareness and practices of footwear with demographic and clinical variables

#### Visit to foot clinic

The present study found significant association of foot care practices with visit to foot clinic ( $P=0.013$ ) and footwear practices with visit to foot clinic ( $P=0.018$ ). Around 52.7% of the subjects in this study with inadequate footwear practices had not visited any foot clinic. This explains that visiting a podiatrist or a foot clinic has a considerable effect on the footwear practices. Subjects who had never visited a podiatrist or a foot clinic were totally unaware of the impact of foot complications. Diabetes-related foot complications are the major cause of hospitalisation in patients with diabetes. And most of the subjects visit a podiatrist or have a foot examination done only when they develop a complication. They forget that prevention is better than cure. According to a study done by Larvey et al (2010) only 30% of the subjects with high-risk foot have visited a podiatrist. The Centers for Disease Control and Prevention (2011) suggests that even if the patient does not have any foot problems, people with diabetes irrespective of their status of the feet should visit a foot clinic/a foot specialist annually and patients with high-risk foot should visit a foot clinic/foot specialist every 3 months once.

#### Shore value of the footwear

There were statistically significant association between footwear awareness and shore value of the footwear ( $P=0.007$ ) and footwear practices and shore value of the footwear ( $P=0.005$ ). Around 41.6% of the subjects studied who had inadequate footwear awareness were using footwear with a hard shore value. The population studied was predominantly comfortable in using the Hawaiian-type of footwear (Figure 3) because it is cheap and easily available. It was also obvious that most of the subjects used their

footwear until they got damaged. Reuse of torn footwear after mending was common. Therefore, it gives a clear picture that subjects were unaware of the importance of the shore value of the footwear.

This finding is supported by the study done by Chandalia et al (2008), which found that a vast majority of the Indians use footwear called chappals (Hawaiian chappals), which have a hard shore value (Centers for Disease Control and Prevention, 2011). Because of poor footwear awareness patients choose footwear with inappropriate shore value. The present study also found that more than half (51.4%) of the subjects with inadequate footwear practices used footwear with hard shore value. This explains that inadequate footwear practices have a significant effect on the type of footwear they use, thereby contributing to the foot ulceration.

Experts say that it is not about wearing shoes which are hard or soft but making sure that they are right!! Avoiding walking without footwear and use of appropriate footwear have to be emphasised in patients with high risk. This will prevent them from developing major foot-related disabilities. Literature says that footwear with a shore value of 15° MCR gives satisfactory results in both preventing ulcers and ulcer recurrence in majority of the patients with high risk or anesthetic foot. The footwear of patients has to be tailor-made according to their risk of developing foot ulceration (Thomas et al, 2012). Hence, inadequate footwear awareness and practices will lead to use of footwear with poor shore value of the footwear which, in turn, will cause injury and trauma and lead to serious complications like amputation of the limbs.

#### Age

There was significant association between footwear practices and age of the subjects ( $P=0.023$ ). Age is a deciding factor in determining the good practices. Nearly half of the subjects (48.6%) with inadequate foot care practices belonged to the age group more than 60 years. So it was evident that with older age group there were poor practices. It could be mainly because of memory loss due to aging and also due to various responsibilities people tend to neglect to take good care of themselves.

A study done among the rural population in Puducherry, India, found that old age was one of the major risk factors for poor foot care practices (Saurabh et al, 2014).

Therefore, the research hypothesis that there would be a significant association between awareness and practices of footwear and selected demographic and clinical variables was accepted.

## Conclusion

The study has found that the awareness and practices regarding footwear were inadequate among people with diabetes with high-risk foot. It has also shown that there is a relationship between the footwear awareness and their practices. There was significant association between footwear awareness and footwear practices with shoe value of the footwear, footwear practices with age of the subjects, footwear practices with their visit to the foot clinic.

Thereby this study has clearly explained the deficiencies in the level of awareness and practices of subjects with high-risk foot. This study also highlights the demographic and clinical variables that influence the awareness and practices of the subjects. Diabetic foot complications are preventable with simple foot care and appropriate footwear practices. Therefore, careful screening of the people with diabetes for high-risk foot and meticulous reinforcement on the needed skills of foot care, appropriate footwear and its use will be limb saving and lifesaving. Nurses also need to address the influence of the demographic and clinical variables innovatively thereby it will bring about tremendous reduction in the mortality and morbidity associated with foot complications.

India continues to be the capital of diabetes mellitus adding on to the global burden of the disease. It calls for nurses to be professionally equipped in effectively taking care of these patients in all aspects. Besides exercise, diet and medications, appropriate footwear awareness and practices and adequate foot care awareness and practices plays a crucial role in preventing foot complications.

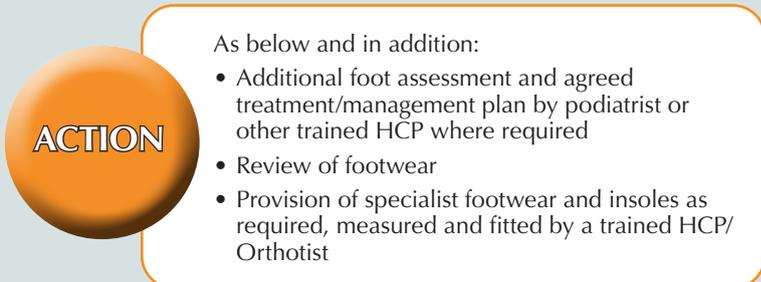
And it is important to understand the various factors that predispose to high risk foot in diabetes. Nurses enhance the patient's ability to deal with the multiple factors that influence their health status and healthcare needs. They have an impact on the health and life of societies in every imaginable situation providing solutions and imparting knowledge that leads to healthy wellbeing of individuals and prevention of complications.

Efforts should be made by physicians, nurses and other healthcare professionals to include foot

assessment as part of routine examination of any person with diabetes. It is also the responsibility of every healthcare member to educate all patients with diabetes on appropriate footwear awareness and practices, as well as adequate foot care awareness and practices, thereby preventing foot complications in diabetes. ■

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# Expert commentary: Awareness and practices of footwear among patients with diabetes and a high-risk foot



**ACTION**

- As below and in addition:
- Additional foot assessment and agreed treatment/management plan by podiatrist or other trained HCP where required
- Review of footwear
- Provision of specialist footwear and insoles as required, measured and fitted by a trained HCP/ Orthotist

Figure 1. Updated and as yet unpublished version of the SIGN guidelines.

I read with interest the article by Nancy et al (2020) and noted several interesting points. The first being that in India they attribute inappropriate footwear and improper footcare as a major contributor to problems in patients that are high-risk. I feel as a clinician with over 30 years' experience of treating patients with diabetes that improper footwear can certainly ring true. I would say that most problems in the UK attributed to inappropriate footwear are likely due to lack of patient education and, historically, the inability for patients to be supplied with aesthetically acceptable footwear that they feel comfortable wearing.

Hopefully, there is a much more proactive strategy being adopted in the UK, with the emphasis on the prevention of primary ulceration and recurrent ulceration, for those in remission, with the provision of insoles and footwear.

As far back as 2016, the World Health Organization released a statement saying: "Therapeutic footwear for people with diabetes designed to help prevent ulceration relapse has been shown to be effective. It is not known how effective prescribed footwear and orthosis are in those patients identified as 'at risk' in the prevention of new ulcers. However, it would be sensible to assume that prescribed therapeutic footwear would

have some efficacy" (van Acker and Baker, 2016).

I also note that this article references the SIGN116 Traffic Light System (Stang and Leese, 2016). The 2016 version of this is actually an updated version that is not yet published in the latest SIGN guidelines but does actually place a much greater emphasis on prevention, especially with regards to assessment of footwear and the provision of insoles and prescription footwear for those patients at risk who, following assessment, require it (*Figure 1*).

We are in the very fortunate position in the UK that most 'at-risk' patients undergo an assessment by a podiatrist, who — with increasing capability levels aligned to increased risk levels — implement a treatment/management plan according to that risk.

According to the article from Nancy et al, most of the care of at-risk patients is undertaken by nurses and I am not sure what is available to them if they discover that the patient has inappropriate footwear?

In the UK, the provision of insoles and footwear is sporadic at best and, in my opinion, this will not change unless large, well-run clinical trials are carried out to prove once and for all that, following a structured assessment, the provision of insoles and footwear according to need are beneficial in preventing, or delaying, primary ulceration.

In my opinion, if this could be proved and imbedded into the normal care pathway, it would be a massive step towards not only reducing ulceration and amputation rates but also mortality rates. ■

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