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SHORT COMMUNICATION

Prevention of diabetic foot in the biggest adult with Diabetes Mellitus

Prevención del pie diabético en el adulto mayor con Diabetes Mellitus

Luis Emilio Morales Serrano[1], Adnaloy Hernández Baños[1], Yanet Adaris Escalona Espinosa[2], Alexis Rivera Echaide[3], Ana Isabel Picos Gómez[4]

[1]Universidad de Ciencias Médicas de Pinar del Río, Policlínico Universitario "Hermanos Cruz". Pinar del Río, Cuba.
[2]Universidad de Ciencias Médicas de Pinar del Río, Policlínico Universitario "Luis Agusto Turcios Lima". Pinar del Río, Cuba.
[3]Universidad de Ciencias Médicas de Pinar del Río, Facultad de Ciencias Médicas "Dr. Ernesto Guevara de la Serna". Pinar del Río, Cuba.
[4]Universidad de Ciencias Médicas de Pinar del Río, Hospital General Docente "Abel Santamaría Cuadrado". Pinar del Río, Cuba.

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Correspondence Author
Luis Emilio Morales Serrano

ABSTRACT

Introduction: the diabetic foot is a frequent complication of Diabetes Mellitus, especially in the biggest adult, with high impact in the quality of life and in the systems of health.
Objective: to integrate knowledge on the prevention of diabetic foot in bigger adults with Diabetes Mellitus from the Attention would Prevail of Health, emphasizing in the education, the precocious diagnosis and the integral handling.
Method: Bibliographical revision of descriptive character, the scientific databases were consulted as PubMed, SciELO, Scopus, OMS, Google Scholar, national programs of APS, published among 2017 at the 2024, with critical analysis of international guides and excellent clinical studies.
Results: specific factors of risk are identified in the biggest adult (neuropathic, outlying vascular illness, fragility, comorbidities), more common clinical manifestations (ulcers, infections, amputations), preventive strategies (education, periodic exam, appropriate footwear, metabolic control) and multidisciplinary boardings.
Conclusions: the prevention of the diabetic foot in the biggest adult with DMK from the APS is essential to reduce the incidence of ulcers and amputations. Continuous education, precocious diagnosis and handling integral multidisciplinary are fundamental pillars to improve the presage and the quality of life.

Keywords: Diabetic Foot; Older Adults; Diabetes Mellitus; Prevention.

RESUMEN

Introducción: el pie diabético es una complicación frecuente de la Diabetes Mellitus, especialmente en el adulto mayor, con alto impacto en la calidad de vida y en los sistemas de salud.
Objetivo: integrar conocimientos sobre la prevención del pie diabético en adultos mayores con Diabetes Mellitus desde la Atención Primaría de Salud, enfatizando en la educación, el diagnóstico precoz y el manejo integral.
Métodos: revisión bibliográfica de carácter descriptivo, se consultaron las bases de datos científicas como PubMed, SciELO, Scopus, OMS, Google Scholar, programas nacionales de APS, publicadas entre 2017 al 2024, con análisis crítico de guías internacionales y estudios clínicos relevantes.
Resultados: sse identifican factores de riesgo específicos en el adulto mayor (neuropatía, enfermedad vascular periférica, fragilidad, comorbilidades), manifestaciones clínicas más comunes (úlceras, infecciones, amputaciones), estrategias preventivas (educación, examen periódico, calzado adecuado, control metabólico) y abordajes multidisciplinarios.
Conclusiones: la prevención del pie diabético en el adulto mayor con DM desde la APS es esencial para reducir la incidencia de úlceras y amputaciones. La educación continua, el diagnóstico precoz y el manejo integral multidisciplinario son pilares fundamentales para mejorar el pronóstico y la calidad de vida.

Palabras claves: Pie Diabético; Adulto Mayor; Diabetes Mellitus; Prevención.

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INTRODUCTION

Diabetes mellitus (DM) is a chronic disease with a high global incidence and is considered by the World Health Organization to be among the leading causes of morbidity and mortality in older adults. More than 200 million people worldwide have diabetes mellitus.[1,2,3]

Every year, the number of people over the age of 60 increases, a trend that poses a challenge if the right social policies are not implemented. Aging is not synonymous with being sick, nor are older adults passively accepting medical services; hence, the World Health Organization is committed, through the Decade of Healthy Aging (2020–2030), to stimulating and maintaining functional capacity in this population group.[4]

Population aging has increased the proportion of older adults with diabetes who are at increased risk of complications due to frailty, the presence of comorbidities, and decreased functional capacity. Foot problems pose a threat to everyone with this disease. More than one million lower limb amputations are performed each year worldwide because of diabetes, indicating that a lower limb is lost every 30 seconds because of this disease. This alarmingly high number is unacceptable.[5,6,7]

Diabetic foot disease, defined as infection, ulceration, or destruction of deep foot tissues associated with neuropathy and/or peripheral arterial disease, is among its most devastating complications; it represents a public health problem because of its high prevalence and disabling consequences. It is estimated that between 15 % and 25 % of patients with DM will develop foot ulcers during their lifetime, and a significant proportion of these patients will require amputation.[8] In older adults, these complications have a considerable economic and social impact, affecting quality of life and autonomy. Frailty, polypharmacy, and decreased functional capacity increase vulnerability. Foot ulceration in people with diabetes occurs in 15 % of patients at some point in their lives and affects older adults to a greater extent.[8]

As age increases, the prevalence of risk factors also increases, with peripheral vascular disease being the leading cause of amputation. Therefore, it must be prevented throughout life by paying special attention to glycemic control, treating hypertension and dyslipidemia, and avoiding smoking.[8,9]

Strategies are being developed to prevent lower limb amputation in patients with diabetic foot disease, including the identification of risk factors, timely and effective treatment of acute foot ulcers, and the prevention of future complications.[8]

Primary health care (PHC) plays an essential role in the prevention of diabetic foot because of its proximity to the community and capacity for continuous follow-up; early identification of risk factors and patient and family education are ideal for implementing preventive strategies. Preventing diabetic foot not only reduces the number of amputations and hospitalizations but also improves quality of life; it is the most cost-effective strategy for reducing the incidence of ulcers and amputations in older adults with DM.

Therefore, the objective is to integrate knowledge on the prevention of diabetic foot in older adults with diabetes mellitus into primary health care, emphasizing the importance of education, early diagnosis, and comprehensive multidisciplinary management.

METHOD

Design

Descriptive literature review aimed at synthesizing the available evidence on risk factors in older adults, clinical manifestations, prevention strategies within primary health care, and comprehensive multidisciplinary management.

Sources consulted

Scientific databases such as PubMed, SciELO, Scopus, WHO, Google Scholar, and national PHC programs, published between 2017 and 2024 on the subject under study.

Inclusion criteria: Original articles, systematic reviews, clinical guidelines, and studies addressing preventive, clinical, and therapeutic aspects of diabetic foot in older adults.

Analysis

Synthesis of preventive strategies and reported clinical outcomes.

DEVELOPMENT

Diabetic foot in older adults represents one of the most serious complications of diabetes, where factors such as peripheral neuropathy, vascular disease, functional frailty, comorbidities, and poor glycemic control significantly increase the risk of ulceration, infection, and amputation.

Risk factors in older adults[10,11]

- Peripheral neuropathy and loss of protective sensation:[11,12] diabetic neuropathy causes a loss of sensitivity to pain, heat, or pressure, which promotes the development of ulcers because of repeated trauma that goes unnoticed; decreased reflexes and muscle strength alter the biomechanics of the foot, creating pressure points
- Peripheral vascular disease and reduced perfusion:[10,13] peripheral artery disease reduces blood flow, hindering healing; tissue hypoxia increases the risk of necrosis and infection; and in older adults, the coexistence of atherosclerosis accelerates disease progression
- Frailty and decreased functional capacity:[10] geriatric frailty is associated with reduced mobility, loss of muscle mass, and dependence; this limits foot self-care and early detection of lesions, and functional decline also increases the risk of falls and trauma.

- Comorbidities (hypertension, renal failure, heart disease):[10,13] hypertension, renal failure, and heart disease increase vascular risk; chronic renal failure is associated with increased susceptibility to infections and poor wound healing; and multiple comorbidities increase patient overall vulnerability.
- Poor glycemic control and polypharmacy:[10] sustained hyperglycemia impairs immunity and tissue repair; polypharmacy increases the risk of drug interactions and adverse effects, hindering metabolic control; and treatment nonadherence is common in older adults receiving multiple treatments.

Diabetic foot in older adults results from the convergence of multiple interacting risk factors; early detection of neuropathy and vascular disease is needed. It is essential to implement self-care education programs, daily foot inspection, and the use of appropriate footwear. The approach must be multidisciplinary: endocrinology, geriatrics, podiatry, and rehabilitation are essential to reduce the burden of this complication. Comprehensive care must prioritize early detection and timely intervention, as prevention is more cost effective than treating advanced complications.

The most common clinical manifestations of diabetic foot disease include plantar and dorsal ulcers, recurrent infections with a risk of osteomyelitis, distal necrosis with the possibility of amputation, and gait abnormalities that predispose patients to falls. These conditions reflect the complexity of managing geriatric patients with diabetes mellitus.

Clinical manifestations

- Plantar and dorsal ulcers.
- Recurrent infections and osteomyelitis.
- Distal necrosis and risk of amputation.
- Gait disturbances and falls.

Plantar and dorsal ulcers are the most common initial manifestations of diabetic foot. Their onset is associated with peripheral neuropathy, bone deformities, and repeated mechanical pressure. In older adults, decreased functional capacity and frailty make daily foot inspection difficult, which delays diagnosis and promotes the progression of lesions.[10] These ulcers serve as a gateway for serious infections.

Recurrent infections constitute another clinically significant manifestation. Sustained hyperglycemia compromises the immune response, increasing susceptibility to skin and deep tissue infections. Progression to **osteomyelitis** is common in older adults because of delayed treatment and the coexistence of peripheral vascular disease, which hinders healing and infection control.[10]

Distal necrosis is a consequence of critical ischemia in the context of advanced peripheral arterial disease. This condition significantly increases the risk of amputation, which is associated with high mortality and a loss of quality of life in older adults. Necrosis typically occurs in the toes and distal regions of the foot, serving as a warning sign requiring immediate intervention.[14]

Finally, gait disturbances and falls are indirect clinical manifestations, but they have a significant impact. Peripheral neuropathy and foot deformities alter gait biomechanics, causing instability. In older adults, frailty and decreased muscle strength increase the risk of falls, which can aggravate existing injuries or lead to new ulcers. These complications directly affect patient independence and functionality.[14]

The clinical manifestations of diabetic foot in older adults are varied and complex, ranging from superficial lesions to serious complications such as osteomyelitis and distal necrosis. Early identification of these manifestations is essential to prevent progression to amputations and preserve quality of life. The approach must be comprehensive, considering both metabolic control and multidisciplinary care, with an emphasis on prevention and self-care.

Community health education is an essential strategy for preventing foot complications in older adults with diabetes. Given its high morbidity and risk of amputation, diabetic foot requires a participatory approach that involves both the patient and their caregivers and family members. Educational efforts should focus on preventing ulcers, infections, and falls; ensuring adherence to the use of appropriate footwear; and fostering the active participation of the support network.

Prevention strategies for primary health care

- Patient and family education on daily foot care: Community education should also address fall prevention, given that gait disturbances and instability are common in older adults with diabetic foot. Promoting adapted physical activity, glycemic control, and the removal of architectural barriers in the home are measures that reduce the risk of accidents and complications.[15]
- Periodic foot examinations during PHC visits.
- Use of appropriate footwear and community monitoring: Community education helps raise awareness among patients and caregivers about the importance of daily foot inspection and early consultation at the first sign of a problem.[11] Structured patient and caregiver education reduces the incidence of ulcers by more than 40 %. Regular clinical foot examinations help identify neuropathy and peripheral arterial disease in their early stages. The use of therapeutic footwear reduces the recurrence of injuries in patients with deformities. Multidisciplinary teams in primary care improve adherence and reduce the number of major amputations.[11] Adherence to appropriate footwear is a fundamental component of prevention. Wearing wide, comfortable shoes without internal seams reduces pressure and friction, preventing ulcer formation. Community education should emphasize proper footwear selection and the importance of avoiding barefoot, especially among older adults with a loss of protective sensation.[10]

- Promotion of healthy habits: glycemic control, physical activity, smoking cessation.
- Follow-up programs and home visits: Through primary health care (PHC), with a team-based, interdisciplinary, and intersectoral approach, actions are taken to promote healthy habits such as the systematic practice of physical activity, smoking cessation, maintaining glycemic control, and preventing other types of health damage and complications of diabetes mellitus.

The active participation of caregivers and family members is essential in older adults' context. Frailty and reduced functional capacity limit self-care; thus, caregivers must be trained in daily foot inspection, proper hygiene, and the detection of signs of infection. Family shared responsibility strengthens adherence to medical recommendations and improves clinical outcomes.[16]

Community follow-up programs and home visits help reinforce education, ensure adherence, and detect complications early. The involvement of health promoters and community workers facilitates active surveillance and continuous support, strengthening the prevention and management of diabetic foot disease in the community.[16]

Community education targeting older adults with diabetes and their caregivers is key for preventing foot complications. Promoting self-care, the use of appropriate footwear, family involvement, and community surveillance are effective strategies for preserving foot health and improving patients' quality of life.

This condition is a highly complex clinical complication that requires a comprehensive and multidisciplinary approach. The interaction of factors such as neuropathy, vascular disease, frailty, and comorbidities makes the coordinated participation of various health professionals indispensable. Management strategies include strict metabolic control, infection treatment, local wound care, surgical intervention in advanced cases, and rehabilitation with psychological support.

Comprehensive Multidisciplinary Management

- Strict metabolic control through diet, exercise, and pharmacological treatment: strict metabolic control through diet, exercise, and pharmacological treatment is the foundation of management. Adequate blood glucose control slows the progression of neuropathy and vascular disease, promotes healing, and reduces the risk of infections. Nutritional education and physical activity adapted to older adults are essential components of this strategy.[11] By following healthy lifestyle habits, it is possible to live with diabetes without a diminished quality of life.[17]
- Treatment of infections with targeted antibiotics: treatment of infections with targeted antibiotics is essential, given that diabetic foot ulcers often become complicated by recurrent infections. The choice of antibiotic should be based on cultures and bacterial sensitivity, avoiding the indiscriminate use of antimicrobial agents. In cases of osteomyelitis, prolonged treatment combined with surgery may be necessary.[10]
- Local wound care: debridement and specialized dressings: local wound care includes debridement of necrotic tissue, the use of specialized dressings, and offloading techniques to reduce pressure on the affected area. These measures promote healing and prevent the progression of lesions. The involvement of podiatrists and trained nursing staff is key to this process. Proper cleaning and medication for shallow or less complicated wounds should be sufficient for the wound to heal; however, for more complex wounds, the doctor will offer the most appropriate treatment.[18]
- Surgical intervention in advanced cases, prioritizing limb preservation: surgical intervention in advanced cases must prioritize limb preservation. Procedures such as revascularization, extensive surgical debridement, or partial amputation were considered depending on the severity of the case. The decision to proceed with surgery must be multidisciplinary, integrating criteria from vascular surgery, orthopedics, and geriatrics.[18,19]
- Rehabilitation and psychological support for social and occupational reintegration: rehabilitation and psychological support are essential for the patient's social and occupational reintegration. Functional loss and the risk of amputation have a significant emotional impact, which must be addressed through physical rehabilitation programs and psychological support. The patient's reintegration into their family and community environment is a priority objective of comprehensive management.

The management of diabetic foot in older adults requires a multidisciplinary approach that combines metabolic control, infection treatment, local care, surgery in advanced cases, and comprehensive rehabilitation. Only through this coordinated strategy is it possible to reduce morbidity, prevent amputations, and improve patients' quality of life.

Despite advances in understanding and management of diabetic foot, amputation rates among older adults remain high. The main challenges include early detection, training of healthcare personnel, and patient awareness of self-care. Future prospects include technological innovation (remote monitoring devices, smart dressings), continuing education, clinical research on biomarkers and regenerative therapies, and public policies that integrate diabetic foot care into national chronic disease control strategies.

Preventing diabetic foot in older adults requires a comprehensive approach that combines education, systematic screening, and the management of comorbidities. Primary healthcare is the optimal setting for these actions, but it faces barriers such as resource shortages, variability in staff training, and low adherence among frail patients. The integration of performance indicators and alignment with the SDGs help sustain results and ensure health equity.

CONCLUSIONS

Preventing diabetic foot in older adults with DM through PHC is essential for reducing the incidence of ulcers and amputations. Continuing education, early diagnosis, and comprehensive multidisciplinary management are fundamental pillars for improving

prognosis and quality of life. PHC must strengthen its prevention and follow-up programs, ensuring resources and training to address this challenge.

The prevention of diabetic foot in older adults must be a priority in PHC. Education, systematic clinical examination, and a multidisciplinary approach are fundamental pillars. Integrating these actions with the SDGs strengthens the sustainability of the health system and improves patients' quality of life.

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AUTHORSHIP CONTRIBUTIONS

Conceptualization: Luis Emilio Morales Serrano, Adnaloy Hernández Baños, Yanet Adaris Escalona Espinosa, Alexis Rivera Echaide, Ana Isabel Picos Gómez.

Data curation: Luis Emilio Morales Serrano, Adnaloy Hernández Baños, Yanet Adaris Escalona Espinosa, Alexis Rivera Echaide, Ana Isabel Picos Gómez.

Formal analysis: Luis Emilio Morales Serrano, Adnaloy Hernández Baños, Yanet Adaris Escalona Espinosa

Research: Luis Emilio Morales Serrano, Adnaloy Hernández Baños, Yanet Adaris Escalona Espinosa, Alexis Rivera Echaide, Ana Isabel Picos Gómez.

Methodology: Luis Emilio Morales Serrano, Adnaloy Hernández Baños, Yanet Adaris Escalona Espinosa

Project management: Luis Emilio Morales Serrano, Adnaloy Hernández Baños

Resources: Luis Emilio Morales Serrano, Adnaloy Hernández Baños, Yanet Adaris Escalona Espinosa

Supervision: Luis Emilio Morales Serrano, Adnaloy Hernández Baños

Validation: Yanet Adaris Escalona Espinosa, Ana Isabel Picos Gómez.

Visualization: Luis Emilio Morales Serrano, Yanet Adaris Escalona Espinosa, Ana Isabel Picos Gómez.

Writing – original draft: Luis Emilio Morales Serrano, Adnaloy Hernández Baños, Yanet Adaris Escalona Espinosa, Alexis Rivera Echaide, Ana Isabel Picos Gómez.

Writing–review and editing: Luis Emilio Morales Serrano, Adnaloy Hernández Baños, Yanet Adaris Escalona Espinosa, Alexis Rivera Echaide, Ana Isabel Picos Gómez.