

Epidemiology of diabetic foot and management of foot problems

Nafseer TAM¹, Karthik KS¹, Kiran Shanker¹, Vindhya K H²

¹ Department of General Surgery, KVG Medical College and Hospital, Sullia, Karnataka, India

² Assistant Professor, Department of Community Medicine, KVG Medical College and Hospital, Karnataka, India

Abstract

This research study sought to identify approaches and techniques relevant to controlling foot-related diabetes and ascertain the challenges health care workers encounter during the treatment of the diabetic condition. Data were collected from 150 nurses using structured interviews that established broad-spectrum and antiseptics as effective in treating the condition.

Keywords: Foot problems, broad-spectrum, diabetic condition

Introduction

People with long-term pressure are more susceptible to the disease being studied, which is a growing diabetic condition that contributes to poor blood flow or feet numbness. The disease can be caused by anaerobic pathogens like Clostridium and Peptostreptococcus or aerobic bacteria like Enterobacteriaceae. In addition, internal lining sores infected with aerobic variants heal faster than those infected by the anaerobic pathogens that have a longer healing time. Some attributes associated with poor healing of the diabetic condition include oxidative stress markers like G-S Peroxidase, G Peroxidase, Catalase, Superoxide Dismutase, thiobarbituric acid reactive substance, and lipid peroxidation (Apelqvist 385; Bakker *et al.* 225; Ballard *et al.* 486). However, the management of diabetic foot infection poses several challenges to health care workers due to the presence of risk factors like poor health care resources, poor cognition of leg-oriented care activities, and wearing inappropriate footwear that increases the burden of the infections.

Objectives

The research study was founded on two goals that encompassed:

1. To identify approaches and techniques appropriate for the control of the diabetic condition.
2. To ascertain the challenges encountered by health care workers during the treatment of patients infected with the diabetic condition.

Literature Review

Diabetic foot problems can be managed through the use of antibiotics and antiseptics. For instance, severe infections require antibiotics like broad-spectrum cephalosporin, piperacillin-tazobactam and ampicillin-sulbactam, and imipenem-cilastatin (Driver *et al.* 22; Nather *et al.* 5731; Tan *et al.* 236). Alternatively, severely infected patients can be hospitalized and treated with the broad-spectrum antibiotics vital in managing the various bacteria illustrated in figure 1. Moderately and mildly infected patients can undergo treatment with antibiotics like clindamycin, moxifloxacin, amoxicillin-clavulanic, or cephalexin (Turns, The diabetic foot: an overview of assessment and complications 25; Viswanathan 124). Antiseptics are also effective in the treatment of the diabetic condition by destroying or inhibiting the growth of the pathogenic microbial on the living tissue.

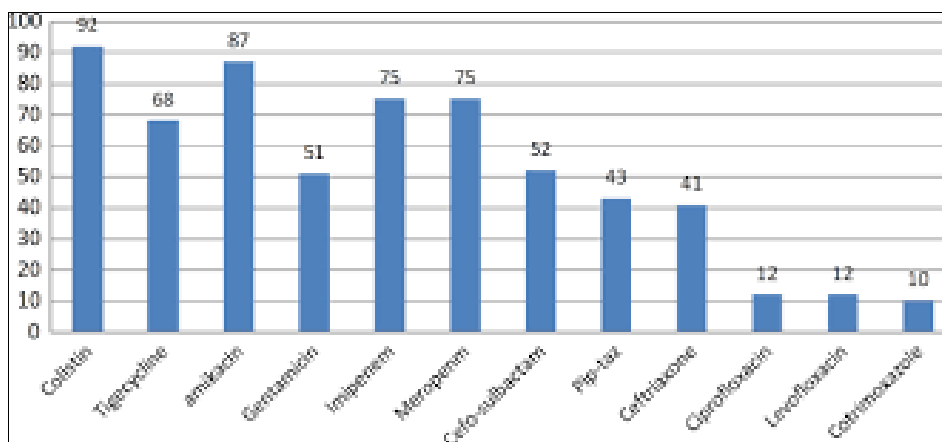


Fig 1: A graph showing various bacteria that cause diabetic foot problems (Source: Boulton, The diabetic foot: grand overview, epidemiology, and pathogenesis 6)

Conventional therapeutic interventions such as saline dressing were considered effective treatment and management of diabetic foot problems, but revolutionized

strategies are changing the health care trends. An example is Cadexomer iodine, a sterile antimicrobial dressing that allows for a sustained and gradual release of iodine into the

sore and maintains a prolonged antiseptic action (Turns, The diabetic foot: an overview for community nurses 423). This medical strategy differs from the traditional iodine dressing, where protein components consume the free iodine and eventually attenuate its effect.

Materials and Methods

The study was conducted at KVG Medical College Hospital, where a sample size of 150 health practitioners was

recruited for a structured interview. A questionnaire containing multiple-choice, rating scale, and open-ended questions was considered as essential in gathering primary data analyzed by coding to quantify the findings. The study was conducted according to the time frame in Table 1 and supported by quality secondary literature sources illustrated in Table 2 and obtained from various online databases like PubMed, ResearchGate, and ScienceDirect, among others.

Table 1: A grant chart showing the time frame

Activity	Months (2021)					
	J	F	M	A	M	J
Preliminary research	■					
Formulating research methodology		■				
Designing questionnaires		■				
Gathering of data			■	■		
Evaluation of the data				■	■	
Report compilation					■	■
Submission and dissemination of findings						■

Table 2: A table showing a sample of quality literature employed in qualitative analysis

Author and Publication Date	Relevance of Study	Objectives of the Research	Data Type
Frykberg (2002) [7]	Availability of knowledge necessary in the management of the condition.	The article aimed at investigating the treatment and pathogenesis of ulcers related to diabetic foot.	Article
Kalish and Allen (2010) [8]	Identification of relevant strategies for mitigating diabetic foot problems.	The journal aimed at analyzing the effective management of diabetic foot challenges.	Journal
Pendsey and Zulfiqarali (2007) [10]	Implementation of an effective model for the reduction of infections related to diabetic foot.	The report aimed at identifying a step-by-step initiative for minimizing challenges related to diabetic foot that could be competently applied in developing countries.	Report

Discussion

As demonstrated in figure 2, which shows increasing research on diabetic foot infections, this research study established that such knowledge was essential in effectively managing the condition. For example, chronic hyperglycemia is associated with declining tissue sensitivity to insulin and insufficient production of the hormone. These conditions contribute to an inadequate supply of insulin, and

its low production could cause tissue breakdown that could result in diabetic foot-infected patients becoming morbid and undergoing amputation. Research by Tantisiriwat and Siriporn reveals that between 0.03% and 1.5% of diseased persons with tissue breakdown undergo an amputation (1097). Conversely, the researchers further report that 90% of diabetic people lack foot ulcers.

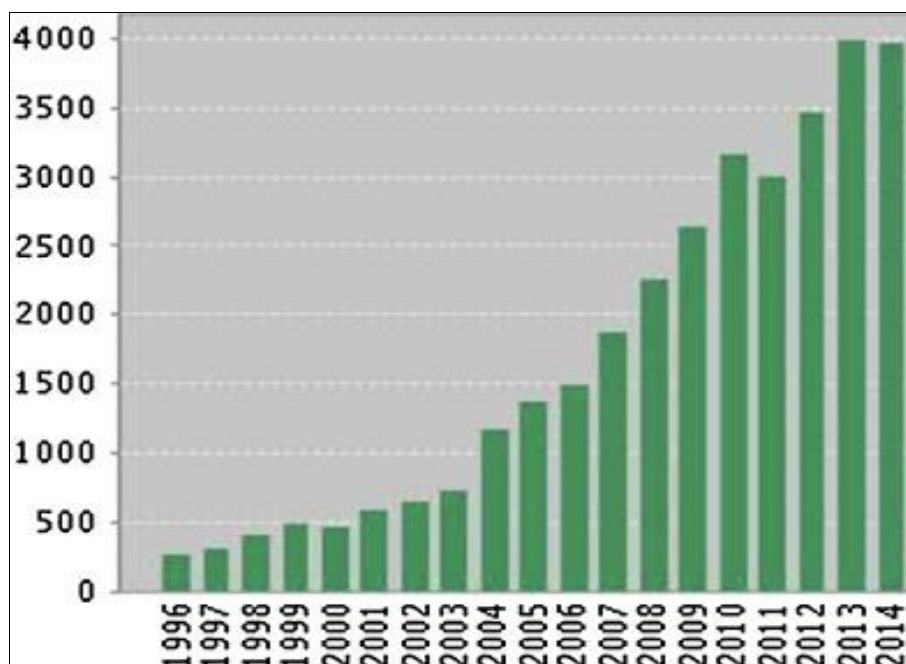


Fig 2: A graph showing increasing knowledge concerning diabetic foot problems (Source: Boulton, The diabetic foot: a global view 5)

Conclusion

From the results obtained from the 150 nurses, this research study determined that diabetic foot problems could be managed through broad-spectrum antibiotics and antiseptics alongside the use of Cadexomer iodine. Furthermore, the findings suggested that challenges linked with the management of the condition include poor health care resources, poor cognition of leg-oriented care activities, and the wearing of inappropriate footwear that increases the burden of infections. All in all, diabetic foot infection could cause amputation of infected organs and morbidity, especially when the patients have an inadequate supply and a low production of insulin hormone.

References

1. Apelqvist J. Diagnostics and treatment of the diabetic foot. *Endocrine*,2012;41(3):384-397. <https://doi.org/10.1007/s12020-012-9619-x>
2. Bakker K, Apelqvist J, Schaper NC: International Working Group on the Diabetic Foot Editorial Board. Practical guidelines on the management and prevention of the diabetic foot 2011. *Diabetes Metab Res Rev*,2012;28(Suppl 1):225-231.
3. Ballard JL, Eke CC, Bunt TJ, Killeen JD. A prospective evaluation of transcutaneous oxygen measurements in the management of diabetic foot problems. *J Vasc Surg*,1995;22(4):485-492. [https://doi.org/10.1016/S0741-5214\(95\)70018-8](https://doi.org/10.1016/S0741-5214(95)70018-8)
4. Boulton AJM. The diabetic foot: a global view. *Diabetes Metab Res Rev*,2000;16(Suppl 1):S2-S5. [https://doi.org/10.1002/1520-7560\(200009/10\)16:1+<::AID-DMRR105>3.0.CO:2-N](https://doi.org/10.1002/1520-7560(200009/10)16:1+<::AID-DMRR105>3.0.CO:2-N)
5. Boulton AJM. The diabetic foot: grand overview, epidemiology, and pathogenesis. *Diabetes Metab Res Rev*,2008;24(Suppl 1):S3-S6. <https://doi.org/10.1002/dmrr.833>
6. Driver VR, Fabbi M, Lavery LA, Gibbons G. The costs of diabetic foot: the economic case for the limb salvage team. *J Vasc Surg*,2010;52(3 Suppl):17S-22S. <https://doi.org/10.1016/j.jvs.2010.06.003>
7. Frykberg RG. Diabetic foot ulcers: pathogenesis and management. *Am Fam Physician*,2002;66(9):1655.
8. Kalish J, Hamdan A. Management of diabetic foot problems. *J Vasc Surg*,2010;51(2):476-486. <https://doi.org/10.1016/j.jvs.2009.08.043>
9. Nather A, Bee CS, Lin WK, Valerie CX, Liang S, Tambyah PA, Jorgensen A, Nambiar A. Value of team approach combined with clinical pathway for diabetic foot problems: a clinical evaluation. *Diabet Foot Ankle*,2010;1:5731. <https://doi.org/10.3402/dfa.v1i0.5731>
10. Pendsey S, Abbas ZG. The step-by-step program for reducing diabetic foot problems: a model for the developing world. *Curr Diab Rep*,2007;7(6):425-428. <https://doi.org/10.1007/s11892-007-0071-x>
11. Tan T, Shaw EJ, Siddiqui F, Kandaswamy P, Barry PW, Baker M. Inpatient management of diabetic foot problems: summary of NICE guidance. *BMJ*,2011;342:d1280.
12. Tantisiriwat N, Janchai S. Common foot problems in diabetic foot clinic. *Med Assoc Thai*,2008;91(7):1097. <http://www.medassocthai.org/journal>
13. Turns M. The diabetic foot: an overview of assessment and complications. *Br J Nurs*,2011;20(Sup8):S19-S25. <https://doi.org/10.12968/bjon.2011.20.Sup8.S19>
14. Turns M. The diabetic foot: an overview for community nurses. *Br J Community Nurs*,2012;17(9):422-433. <https://doi.org/10.12968/bjcn.2012.17.9.422>
15. Viswanathan V. Epidemiology of diabetic foot and management of foot problems in India. *Int J Low Extrem Wounds*,2010;9(3):122-126. <https://doi.org/10.1177/1534734610380026>