

Improving diabetic foot screening at a primary care clinic: A quality improvement project aimed at health care workers

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Abstract

Background: Foot screening is an important part of diabetic care as it prevents significant morbidity, loss of function and mortality from diabetic foot complications. However, foot screening is often neglected. This project was aimed at educating health care workers (HCWs) in a primary health care clinic to increase diabetic foot screening practices.

Methods: A quality improvement project using a plan, do, study, act (PDSA) cycle was used. HCW needs were assessed using a questionnaire; this was followed by a focus group discussion with HCWs, which was recorded, transcribed and assessed using a general inductive approach for common themes. Staff training was done using the Diabetic Foot Assessment Questionnaire. Patient information pamphlets and screening tools were made available to all clinical staff. Thirty-two consecutive diabetic patient folders were audited to compare screening in 2013 to that in the first half of 2014 after initiation of the PDSA cycle.

Results: HCW confidence in conducting foot screening using the Diabetic Foot Assessment Questionnaire improved markedly after initial training. Diabetic foot screening practices increased from 9% in 2013 to 69% in 2014 after the first PDSA cycle. A strengths, opportunities, aspirations and results (SOAR) analysis showed promise for continuing quality improvement cycles.

Conclusions: The findings showed a significant improvement in the number of diabetic patients who received foot screening. A feedback session was held with the team of HCWs involved in the project to discuss their experience and for future improvement planning. Using strategic planning with appreciative intent based on SOAR, proved to be inspirational and will be used in the planning of the next cycle.



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“Declaration

I, the undersigned, hereby declare that the work contained in this assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree. I also declare that ethical approval for the study was obtained from the Health Research Ethics Committee of Stellenbosch University (Reference number: S14/01/021).”

Signature:

Date: 26 June 2014

Introduction

Diabetes is a growing problem worldwide. In South Africa more than 2.6 million people have been diagnosed with diabetes, and a further 1.5 million are undiagnosed.¹ People with diabetes have a lifetime prevalence of developing a foot ulcer of about 15%.² The majority of foot complications can be prevented by appropriate diabetic management, foot care and footwear. Marked morbidity, loss of function and mortality are associated with diabetic foot complications. More than half of lower extremity amputations in the United States of America (USA) are in diabetic patients.³ The USA has also found that amputations are more than 10 times as likely in poorer communities.⁴ This correlates with high rates of amputations in African countries.⁵ Diabetic foot ulcers are proven to result in high 5 year mortality rates of 18-55% depending on underlying cause of ulcer.⁶ In 2009, it was estimated that diabetes in South Africa resulted in 78 900 Years Lost due to Disability (YLD). 6% of these were directly from amputations.⁷

International, national and local guidelines recommend the minimum of an annual foot screening for all diabetic patients.⁸⁻¹⁰ Foot screening aims to detect, prevent and manage problems early in order to prevent many of the serious foot sequelae experienced by diabetic patients.

A study done in 2008-2009 in the Western Cape, South Africa, showed an increased prevalence of diabetes in the coloured community and a high prevalence of undiagnosed diabetes.¹¹ The Society for Endocrinology, Metabolism and Diabetes of South Africa (SEMDSA) quotes the prevalence of type 2 diabetes in the coloured community of around 10.8%, which is supported by other studies conducted in similar communities.^{11,12}

Klapmuts primary health care clinic (PHC), where the quality improvement cycle was done, serves a predominantly coloured community (more than 64%) within the Cape Winelands District.¹³ The Cape Winelands District includes an annual comprehensive foot screening in its chronic disease management plan.⁸ This is in accordance with American Diabetes Association and SEMDSA guidelines, which both recommend annual comprehensive foot examination and assessment.^{9,10}

The annual Integrated Audit for Chronic Disease Management done at Klapmuts clinic in 2013 showed that no diabetic patients had foot screening done in accordance with current regional and international guidelines. This finding generated the need for this quality improvement project. The aim was to improve diabetic foot care through increased diabetic foot screening practices by health care providers at the primary care clinic. The health care workers (HCWs) at the clinic were involved in a quality improvement cycle using the plan, do, study, act (PDSA) cycle.¹⁴ (See Figure 1.)

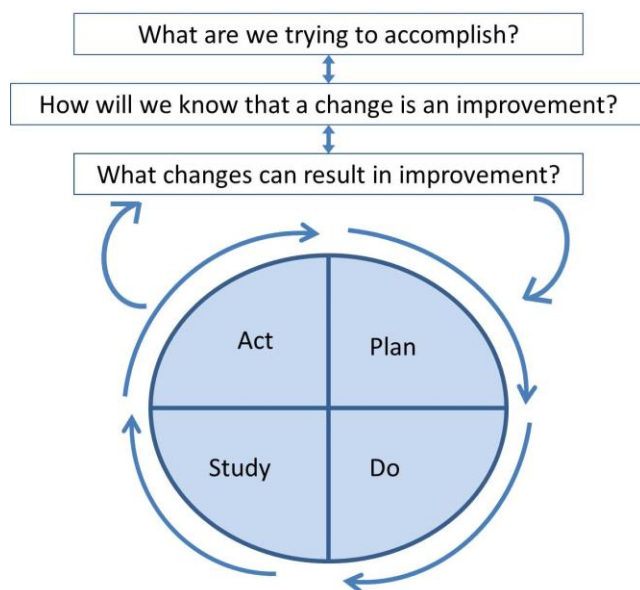


Figure 1: PDSA cycle model for improvement¹⁵

Methods

Ethical Issues

Ethical approval was given by Health Research Ethics Committee 1 of Stellenbosch University (Reference No. S14/01/021). Permission to proceed with the study was obtained from the Western Cape Health Department, Cape Winelands District Health services and the operational manager of the facility. All of the staff who participated signed informed consent. (See Addendum 1.) The data obtained from patient folders were coded and no identifying data were used in the data collection process. The researcher is actively involved in the primary clinic but no financial gain or conflict of interest was present.

Design

A quality improvement cycle using PDSA (see Figure1) was used.

PLAN

Setting

The primary health care clinic is in the Stellenbosch sub-district of the Cape Winelands District. It serves a low- to middle-income population with a majority coloured population in a rapidly growing community of well over 12 000 people.¹⁶ The clinic operates every working day. Permanent clinic staff includes three clinical nurse practitioners, of whom one is the operational manager of the facility; one professional nurse, one staff nurse, one enrolled nursing assistant, one community health worker, one pharmacist assistant and one administration clerk. There are also two counsellors who work at the clinic, who are employed by a non-governmental organization. There are several community care workers working in the community who are employed by the local hospice.

Sample

The clinic staff was a convenient sample to participate in the research, and all clinic staff was invited to voluntarily be part of the quality improvement team. An initial questionnaire was completed by all clinic staff. A recorded focus group discussion (FGD) was facilitated by the researcher with a team of 11 participants including nursing staff, a community carer, the clerk, two counselors and the pharmacist assistant.

Qualitative data to inform the intervention

Prior to designing an appropriate intervention, the team completed a questionnaire to ascertain their knowledge and understanding of diabetic foot screening. They also identified potential foreseeable difficulties in implementing improved foot screening. The questionnaire contained several open-ended questions, and these qualitative data were summarised and manually analysed by the researcher (See Addendum 2). During the FGD the team discussed ideas for improving implementation of foot screening as well as education of staff and patients. The FGD was transcribed verbatim and the data were assessed manually using a general inductive approach.¹⁷

DO

Intervention

The intervention was planned based on information gathered from the HCW questionnaires and the FGD. The initial intervention involved staff training in foot screening technique and use of the Diabetic Foot

Assessment Questionnaire.¹⁸ This was done in small groups with each person being given an opportunity to show the others the full foot screening. Trouble-shooting was done during training. Education on the management of common diabetic foot ailments, foot care tips and footwear requirements were also given to the staff.¹⁹ All of the clinical staff were provided with a flip-file containing patient information leaflets in different languages and the diabetic foot assessment questionnaire. Monofilament is available in all consulting rooms as well as the triage area. One of the counselors who volunteered to address waiting room groups of patients on the importance of foot screening was given additional training in this regard by the researcher.

STUDY

Quantitative data

In order to detect a 30% improvement out of a total of about 300 diabetic patients at Klapmuts clinic, a minimum of 31 folders needed to be audited.

After the intervention, 32 consecutive folders of diabetic patients who went via the pharmacy, after being seen at the clinic over a week, were collected and audited to assess the following indicators (determined by the researcher with input from the FGD):

- Diabetic Foot Assessment Questionnaire completed in folder;
- Chronic disease management (CDM) flow sheet in folder;
- Foot examination on CDM flow sheet ticked;
- Foot screen done in 2013; and
- Foot screen done in (first five months of) 2014.

The quantitative data were captured in an Excel spreadsheet and analysed by the researcher and the statistician. The Standards for Quality Improvement Reporting Excellence guidelines for quality improvement reporting were used as a guide.²⁰

Evaluation

The quantitative data were used to assess change in the practice of foot screening by comparing results for 2013 to those for 2014 in the same folders. The researcher and an assistant trained in data collection captured the data in an Excel spreadsheet, which was then analysed by the researcher and statistician.

Trustworthiness of the qualitative data was improved by triangulation with questionnaires, summary of findings presented to and verified by the team participants, and recordings of the FGD for feedback from supervisor and an independent coder to compare themes using a general inductive approach.

ACT

Feedback session

A feedback session was held with the team to gain insight into their experiences as well as future improvement planning based on strengths, opportunities, aspirations and results (SOAR).²¹

Findings

Prior to any intervention, the HCW questionnaire showed that the team had a good understanding of the importance of foot screening and the benefits thereof. In most cases there was uncertainty of exactly how to do the screening, for example how to test for sensation in the foot and where to feel for foot pulses. The team also considered various enabling factors and barriers to foot screening (Table I).

Table I: Enablers and barriers to foot screening summarised from HCW questionnaire.

Enablers	Barriers
Health promotion and patient education	Time constraints
Education and training of staff	Lack of importance attached to foot screening
Empowering patients	Regular staff shortages
Clear definition of staff roles	Patient willingness to have their feet examined
Diabetes Care Day	Foot hygiene
Opportunistic use of all visits for screening	Insufficient staff training and expertise

FGD

The following five themes were identified from the FGD using a general inductive approach and two independent coders: patient education; health worker education; equipment and stationery; clinical care considerations; and facility support and processes.

Patient education

Patient education needs identified by the team included: healthy lifestyle, effect of diabetes on feet, importance of good foot care, importance of foot screening, appropriate footwear, and how to take care of their feet. The team suggested that the counselors could be primarily responsible for group education to patients in the waiting room. Another place identified as a possible entry-point for group education was the alternative distribution site where pre-packed medication is given to patients at the nearby primary school.

The team showed a lot of enthusiasm around the idea of organizing a 'Diabetic Day' to be held at the clinic with advertising and comprehensive diabetic education, but the required planning and preparation would mean that this will be a long-term project. The available screen and video player has never worked, but was considered to be a possible route for education. The group also felt that every interaction with diabetic patients can be used for patient education and potentially for foot screening, i.e. not just chronic visits.

HCW education

A need for expanding the number of people trained to do foot screening was discussed by the group. All health care nurses, including carers in the clinic and in the community, were considered as potential foot

screeners. All of the clinical staff, but in particular the counselors, should be trained to provide patients with information on diabetic foot care.

Equipment and stationery

A list of stationery required for foot screening can be seen in Table II. Latex gloves and monofilament are readily available at the clinic. The use of stickers on folders to more easily identify which patients need foot screening was considered in the group.

Table II: List of stationery requirements as discussed during FGD comparing availability and use before and after intervention.

Stationery	Previously available & used	Currently available & used
Patient education leaflets	No	Yes
Foot screening questionnaires	Yes (not used)	Yes
Chronic disease flow sheets	Yes	Yes
Chronic disease register	Yes (not used)	Yes (not used)
Educational posters	No	No

Clinical care considerations

The potential for patient embarrassment regarding foot odour as well as foot care or problems was considered. Potential solutions discussed included having foot cleaning facilities available; providing patients with disinfectant spray and paper towels to clean their feet; gloves for staff protection; adequate patient preparation, for example, patients coming to the clinic prepared because they know it is time for a foot screening; and supportive staff attitudes towards patients.

Triage was considered a good entry-point for addressing foot screening needs and screening for undiagnosed diabetics. Although a busy triage area was not considered the place for conducting the foot screening, the group felt that it could be a place to flag patients requiring a foot screen by attaching the screening questionnaire in front of the patient's folder.

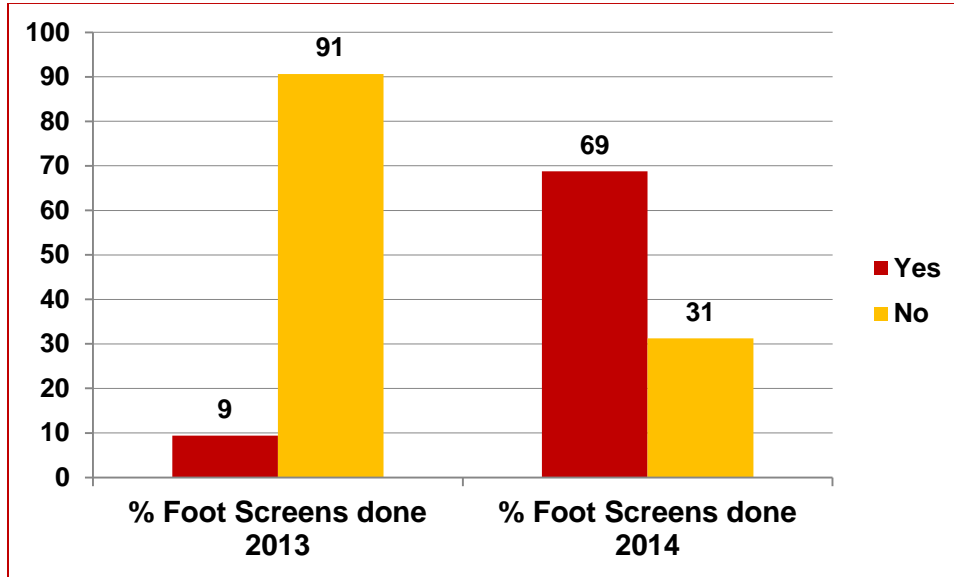
Facility support and processes

Improved triage functioning with a junior and senior staff member at all times was considered. The clinic's high workload and disruption due to building, with upheaval of the filing area, staffing challenges and long hours, were discussed. Recruiting community health workers was an avenue that needs to be explored. Staff training was to be done by the family medicine registrar at the clinic.

Quantitative data analysis

Thirty two folders were audited, and all contained the CDM flow sheet. There was a marked increase in the number of patients who had undergone foot screening from 2013 to 2014 (see Figure 2). Clinical notes were also evaluated to look for evidence that a foot screening had been done. No Diabetic Foot Assessment Questionnaires were found in the files from 2013. The binomial sign ('exact') test was used and the results in Figure 2 showing an increase in foot screening were statistically significant, with $P < 0.001$.

Figure 2: Results comparing foot screening in 2013 to foot screening in 2014 (n=32)



In 2013, the CDM audit (which only looks at 10 diabetic patient folders) did not have any patients who had received a foot screen. The 2014 CDM audit done in February showed 10%.

Results from the feedback session held with the team to gain insight into their experiences as well as future improvement planning based on SOAR analysis appear in Table III.²¹

Table III: SOAR analysis

Strengths
Motivated team
Simple training of staff helped to build confidence
Patient information pamphlets empowered staff to improve patient education as well as the patients to understand their illness and take responsibility.
Revised foot screening questionnaire with pictures
Folder in each consulting area with above resources available
Necessary equipment readily available (monofilament, latex gloves, alcohol swabs)
Clinic has a social media group for staff

Opportunities
<p>World Diabetes Day – 14 November</p> <p>Educating HCWs and patients at alternative distribution site and school</p> <p>Training community health workers who are involved in home delivery of medication to patients who struggle with mobility (e.g. patients who have had a stroke or previous amputations)</p> <p>Systems improvement:</p> <ul style="list-style-type: none"> • Triage system to include more experienced clinical staff • Appointments to be made in the afternoons to improve management of acute cases in morning • Re-initiation of club days, e.g. booked diabetic patients to come on Tuesdays • Improving efficiency and morale at the clinic • Foot screening questionnaire to be in all diabetic patient folders • Expanding social media group to include patients • Getting appropriate educational material and fix video player
Aspirations
<p>Further educating and empowering patients</p> <p>Continuous mindfulness of foot care and the ongoing shared health improvements with patients' involvement</p> <p>Yearly screening of hypertensive and high-risk patients</p> <p>All diabetic patients to have a minimum of an annual foot examination</p> <p>To run an annual World Diabetes Day program in the community on 14 November</p>
Results
<p>Provisional improvement of foot screening from less than 10% in 2013 to nearly 70% in the first half of 2014. (See quantitative data analysis.) Feedback from staff showed that their confidence in conducting foot screening as well as their enthusiasm for foot screening and patient education were much improved.</p>

Discussion

Summary

A dedicated group of health care providers focused on patient care can be empowered to embark on quality improvement journeys. Burnout, long working hours and a disrupted literal and figurative working environment can dampen efforts to improve health care. Despite these challenges, this quality improvement project showed marked improvement in foot screening practices by HCWs at the primary health care clinic. Combined with strategic inquiry and appreciative intent, with a focus on the positive aspects of the process and future potential, the team can go from strength to strength, even during challenging times.

Relation to other evidence

A study in Uganda on patients with diabetic foot complications found that in terms of their beliefs about health and knowledge on foot care and self-care, education was urgently needed.²² The FGD with clinic staff raised the important theme of patient education, with several suggestions to enable better education and foot care. Foot self-care education has been shown to improve foot care and reduce diabetic foot complications.²³ Similar studies using Plan-Do-Check/Study-Act cycles have shown comparable results.^{24,25} One of the many strengths of this approach is the ability for rapid implementation of consecutive or concurrent cycles to keep improvements continually happening. Some of the referred to studies had slightly more conservative results; for example improving foot examination from 40% to 64%.²⁵ This may be due to the larger group involved and individual team variables. Studies with a notable positive approach showed slightly better results.²⁶

Limitations and interpretations

A consecutive sample of patient folders was used due to time constraints. Taking into account the possibility of selection bias, the results still showed an overwhelming improvement, and future randomised sampling should verify this success and improve internal validity.

A target of improving foot screening practices by 30% was set the researcher. The need for a chronic disease register and a more accurate estimate of the number of diabetic patients will help with more precise power calculations for future studies.

The staff may have been more vigilant regarding foot screening during the time of folder collection. The statistics kept by staff are not of such a nature that diabetic patients could be identified from them for a retrospective consecutive sample to be collected without the knowledge of the clinical staff.

This relatively small quality improvement project showed a significant improvement in foot screening practices with simple and time-efficient interventions. The long-term benefit of improved diabetic foot care and reduced morbidity and mortality are beyond the scope of this study. Thus far the staff enthusiasm towards foot screening and practice thereof has increased significantly.

Although each primary health care clinic has a unique team of HCWs and working circumstances, there are marked commonalities which should mean that generalizability is possible. Many of the enablers and barriers will be similar to those at other clinics, useful equipment for foot screening will be the same, and the need for education of patients and HCWs would to varying degrees be required.

Current evidence of a reduction in diabetic foot complications (ulcerations, infections and amputations) from using the diabetic foot screening questionnaire is limited.²⁷

Recommendations

The recommendations are briefly listed as 'Opportunities' and 'Aspirations' in Table III.

Discussions regarding the World Diabetes Day for 14 November 2014 have already started. The staff, especially the counselors, should continue to provide group as well as individual counseling to the diabetic patients.

A target of 100% of diabetic patients to have foot screens by next year's CDM audit is expected to be reached. Auditing of diabetic patient folders should be done quarterly to improve internal validity and encourage sustainability, ongoing feedback and strengthening of the clinic teams' efforts. The integrated CDM audit takes place annually and will be a way of tracking whether the improvements seen in this study are sustainable, annual foot examinations for diabetics being one of the indicators in the audit.

Conclusions

Ongoing quality improvement efforts are essential to sustain changes and staff motivation. Shifting focus from a traditional problem-based, deficit-based approach to a strength-based approach requires ongoing training, practical experience and ongoing implementation requires support from health managers.

This quality improvement project aimed at HCWs has dramatically improved diabetic foot screening at this clinic. The results showed significant improvement in foot screening practices by the HCWs.

Acknowledgements

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Addendum 1:

Consent form

Focus groups, questionnaires, teaching and learning with clinic staff

You are hereby invited to participate in a quality improvement cycle on diabetic foot care surveillance/screening practices which will include questionnaires, focus group discussion and teaching and learning interventions. All the health care workers at Klapmuts clinic will be invited to participate over a period of 6 months.

Purpose of the study

The purpose of the quality improvement cycle is to improve diabetic foot care through increased diabetic foot screening practices by health care providers at a primary care clinic.

Study procedures

QUESTIONNAIRES. You will be invited to complete a short questionnaire which will serve to gain understanding of perceptions and learning needs and will serve as a starting point for a focus group discussion.

FOCUS GROUP DISCUSSION. This will, in more detail, explore the possibilities, barriers, ideas, beliefs and practicalities of improving diabetic foot screening practices.

TEACHING AND LEARNING. Based on findings of the questionnaires and focus group discussion, the necessary interventions will be done to achieve the purpose of the study. This will be an opportunity to improve your knowledge and skills regarding diabetic foot screening, education and care.

Confidentiality

No findings in this quality improvement process will be linked to individual participants. Participants will be asked to respect each other's confidentiality.

Health Care workers will not have access to other participant's questionnaires or to the researcher's notes. Data will be captured by the researcher and analyzed by the researcher and supervisor/co-supervisor and statistician.

Study monitors or members of the Research Ethics Committee or Stellenbosch University may need to inspect research records which will not contain identifying participant data.

Researcher's details

Name: Michelle L. Allen, MB, ChB
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Human Research Ethics Committee:

Research conducted upon approval by HREC.

HREC contact number: 021 938 9156

Participant's statement

This quality improvement cycle has been explained to me. I volunteer to take part in this research. I have had a chance to ask questions. If I have questions later about the research, I can ask the researcher above. I understand that I may refuse to take part or withdraw at any time during the process.

I agree to:

1. Complete a questionnaire
2. Participate in a focus group discussion
3. Have the focus group discussion recorded
4. Participate in teaching and learning activities to improve skills and competence with and practice of foot screening

Participant name _____

Participant signature _____

Date _____

(A copy of the consent form will be given to the participant and the original will be kept with the researcher.)

Addendum 2:

Ja/Yes Nee/No Weet nie/unsure

Is dit belangrik om diabetese voete te ondersoek?
Is it important to examine the diabetic feet?

Indien ja, hoekom? Noem 3 redes.
If yes, why? Name 3 reasons.

Indien nee, hoekom? Noem 3 redes.
If no, why? Name 3 reasons.

Hoekom dink jy word diabetese voete so min ondersoek?
Why do you think the diabetic foot examination gets neglected?

Wat kan gedoen word om dit makliker te maak om diabetese voete te ondersoek?
What can be changed to make it easier to do a diabetic foot screen regularly?

Weet jy hoe om te toets vir sensasie in die voet? Verduidelik hoe.
Do you know how to test for sensation in the foot? Explain how.

Weet jy hoe om die voet polse te voel?
Do you know how to feel for foot pulses?

Wat dink jy is die moontlike struikelblokke vir diabetiese voet ondersoek?
What do you think are the barriers to doing diabetic foot screening?

Het jy enige goeie voorstelle om diabetiese voet sorg te verbeter?
Do you have any good ideas for improving diabetic foot care?