Prevention of foot ulcers in patients with diabetes in home nursing: a qualitative interview study

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Summary

Diabetes mellitus and foot ulcer increase the risk of amputation, and prevention of foot ulcers are therefore important. Patients with diabetes and other concomitant diseases are often cared for in a home nursing service and the registered nurses (RNs) have the opportunity to practise preventive care to avoid foot ulcers. How prevention of foot ulcer is performed in home nursing settings has not been previously described.

The objective of this study was to explore RNs' professional work with foot ulcer prevention in home nursing settings for patients with diabetes mellitus.

Qualitative interviews were analysed, using manifest content analysis. The setting was four municipalities in Sweden (large and small cities, and rural areas). Fifteen RNs actively working in a home nursing service with more than two years' experience were recruited. The participants were all women, had worked as RNs for 3–41 years (median 25), and in home nursing for 2–18 years (median 8).

The results showed that the RNs work through leadership, coordination, education and evaluation. Health care assistants perform most of the nursing actions to prevent foot ulcers such as assessment of feet, off-loading, nutrition and hygiene. The RNs have medical and nursing responsibility but without the formal tools to execute this fully. The RNs' formal education was some years back and they relied mostly on experience-based knowledge.

It was concluded that patient assessment and nursing actions to prevent foot ulcers are mostly performed by health care assistants. The RNs need to be given formal responsibility in their role as leaders and educators, and need more education in pedagogy and leadership.

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Key words

diabetes; diabetic foot ulcer; education; elderly; foot care; foot health; nursing; home care; pressure ulcer; prevention

Background

The goal for registered nurses' (RNs') work with patients is to promote health, to prevent illness, to restore health and to alleviate suffering.[1] Patients in a home nursing service are dependent on others due to aging and health conditions such as cognitive disorders, impaired vision and impaired mobility.[2] Home nursing services differ in their organisation nationally and internationally, depending on local political and financial frames; the service can be managed by private or public financed care givers, and there are variations in geographical size and level of care.[3–6] In Sweden, a home nursing service is an integrated part of the primary care organisation, mainly organised by the municipalities under a medically responsible nurse. Patients eligible for a home nursing service are assessed for social and nursing needs and an individual care plan is created due to re-imbursement rules.[6] Physicians employed by the county council are available daytime at the health care centres. In evenings and at night, an ambulant physician is available in the region.[3] RNs in a home nursing service work under two legislations: the Health and Medical Service Act[7] and the Social Service Act.[8] The RNs are responsible for the nursing process, while health care assistants (HCAs), besides their duties of providing a social service, are performing many nursing tasks after written delegation from the RN in accordance with patient safety.

One diagnosis that has increased among patients who are dependent on home nursing is diabetes mellitus. With its long-term complications, such patients may constitute 10–20% of the home nursing population.[9–12] A European multicentre study showed that about 17% of all patients with diabetes and a new foot ulcer were in assisted living facilities, or were dependent on a home nursing service.[13] A risk classification has been developed to prevent diabetes related amputations and foot ulcers. It states that patients with diabetes and neuropathy need education or help to perform daily foot inspections, washing the feet daily, use of foot cream and use of appropriate shoes.[14] There are several descriptive studies stating that regular inspections, appropriate footwear and off-loading are important in foot ulcer prevention; however, how to realise this in clinical practice has not been presented.[15–17] A recent compilation of studies on nurses' work with foot care showed that few studies regarding nurses' knowledge and skills about foot care have been published. However, all of the assessed studies stated the importance of identifying the foot at risk.[18] How this preventive work takes place in home nursing settings has not been described. It seems that prevention of diabetic foot ulcer performed by

RNs working in patients' homes has been a neglected area of research.

Significance of the problem

Prevention of diabetic foot ulcers in home nursing settings can reduce suffering and improve quality of life for the patient.

Aim

The aim of this study is to explore the registered nurses' professional work with foot ulcer prevention in home nursing settings for patients with diabetes mellitus, and how this work can be improved in the future.

Methods

Four municipalities out of 33 in a southern Sweden region of 1 200 000 inhabitants were selected to obtain demographic and socio-economic variety. The municipalities represented a big city inner district, a small city and two rural municipalities. Eligible participants were RNs who had at least two years' experience of a home nursing service, and who were presently employed by a municipality's public home care nursing organisation. All RNs (n=168) in each municipality were contacted through the medically responsible nurses who sent out an email with an invitation to participate. Fifteen RNs accepted the invitation. (Table 1.) The participants were all women, had worked as an RN for 3–41 years (median 25), and in home nursing for 2–18 years (median 8). Nine of the nurses had a specialist exam in district nursing, one had a specialist exam in another specialty and three had a shorter (15 credits) course in diabetes nursing. The interviews were carried out individually during 2009.

Thirteen interviews took place at the RNs' offices in connection with their regular work, one took place in the RN's home and one in a public place. In order to obtain extensive information of present and past experiences, a qualitative interview method with open questions was chosen.[19] The interview questions were explorative and were created according to the researcher's pre-knowledge as RN in prevention of the diabetic foot.[14] In a pilot interview with six people working in a specialist diabetes foot clinic, the questions were tested prior to the study. The questions were thereafter analysed by the research group, all RNs, and evolved into three overarching general questions: *What do you do to prevent ulcers on the feet of patients with diabetes? How did you learn this? How can the work with prevention of diabetic foot ulcers be improved, locally or in an extended context?*

District	Inhabitants	No. of registered nurses employed in home nursing	No. of participating registered nurses
Big city/ Inner city district	290 000/ 32 000	25	5
Small city	40 000	105	5
Rural area I	18 000	23	1
Rural area II	13 000	15	4

Table 1. Settings and number of participants

The open-ended questions were followed by more targeted questions, based on the researchers' pre-knowledge of diabetes and a home nursing service. For example: *What does your staff education consist of? How is your documentation system organised?* The interviews lasted for 35–64 minutes (mean 43 minutes), and were taped and transcribed verbatim by the interviewer as soon as possible after the interview.

A directed manifest content analysis as described by Hsieh and Shannon[20] was used in order to identify nursing actions for foot ulcer prevention, as described in the interviews. By systematically categorising the described work using the formal requirements in the competence description and the nursing process, the very different working tasks could be sorted and merged into categories. A recording scheme to systematically categorise the described work into the pre-determined categories and themes was developed prior to the study, based on RNs' competency description[21] and the nursing process.[22] (Table 2.) The themes with subcategories were: leadership (formal/informal/executive tools); nursing practice (assessment/planning/nursing action/evaluation); education (patient/next of kin/HCA/content/educational method); and research and development.[21] Quotes and statements that expressed the categories were merged under each theme. Any doubts about which category a statement best belonged to were discussed in the research group until consensus was reached. The results are presented under each theme and are exemplified by quotes that express a general opinion of the interviewed nurses.

This study was approved by the Regional Ethical Board in Lund, Sweden (Dnr 2009/27).

Results

The results are presented according to the themes: leadership; nursing practice (assessment, planning, action, and evaluation); education; and research and development.

Leadership

The RNs expressed their leadership role as supervising the HCAs for

medical issues as these perform most of the assessment of patients' needs, nursing actions and evaluations on a daily basis. Mutual trust was therefore necessary, as the HCAs constituted the eyes, ears, nose and hands of the RNs. RN: *'It seems the HCAs have really good observation by sight: so there is a lot of trusting the staff.'*

The RNs described that they worked in a context of medical and nursing responsibility but without the formal tools to execute this fully, as they were not formal managers of the HCAs. RN: *'It seems that the people in charge can't recruit enough staff. We are not responsible for recruitment. It is at another level.'*

The interviewed RNs' leadership was described as executing various strategies such as formal and informal meetings, written instructions, evaluation of signature sheets, and through an extensive education programme. This requires developed strategies of communication between the RNs and other people involved in the patient's care. The overall main tools for communication were cell phones and written instructions. Personal meetings with HCAs were also considered valuable for the exchange of information. RN: *'They can call on the telephone, or they can knock at my door, or every morning we meet in our home care groups. And they know that they shall inform about it [changes in foot status].'*

Leadership	Quotation
Formal	RN: 'We are not responsible for recruitment. It is at another level'
Informal	RN: 'There is a lot of trusting the staff'
Executive	RN: 'They can call on the telephone, or they can knock at my door, or every morning we meet in our home care groups'

Table 2. Example of the recording scheme

Nursing practice

The interviewed RNs stated that foot ulcers in patients with diabetes were not very common. They described their dependency on reliable HCAs to report changes in the health condition of patients, and to perform many of the nursing actions.

Assessment of patients' needs. Assessment of needs was mainly executed by the HCAs according to the interviewees. They also relied on the HCAs reporting any change in the patient's general health or foot status as soon as it was noticed. RN: *'How do I get to know? Well, I know it if I get a signal from the health care assistants; otherwise I do not know it.'*

The RNs stated that they performed an assessment of the patient's medical status before calling upon a doctor, after being alerted by an HCA. The RNs considered that a stay in the hospital constituted a major risk of obtaining a foot ulcer, especially heel pressure ulcers, and they avoided sending the patient into the hospital unnecessarily. RN: *'They came here with pressure ulcers.'* Interviewer (I): *'From the hospital or from their homes?'* RN: *'They came from the hospital.'*

Planning. Patients coming home from the hospital need a predischarge care plan, but the interviewed RNs were not always able to participate in this care planning due to lack of time. In some municipalities it was delegated to an RN working exclusively with care planning, in others it was performed on the telephone, or there was no predischarge plan made. This created problems when patients were discharged for rehabilitation in the home but without a rehabilitation plan. The interviewed RNs said that they could spend a lot of time calling the hospital to get in contact with the responsible person to get information, sometimes even threatening to send the patient back to the hospital. RN: *'Discharge notes go to the general practitioner after three weeks, so then they have no idea, and none of us really knows anything to support us. So we keep on insisting: "We want the medical discharge notes, otherwise the patient will go back to the hospital".'*

Nursing action. The RNs agreed upon the necessity of appropriate footwear. However, according to the interviewed RNs, the responsibility to obtain shoes was put on the patient, next of kin, or HCAs. Few of the RNs mentioned shoes from the hospital's orthopaedic shoe maker. Referring to the orthopaedic shoe maker was associated by the nurses with administrative paperwork and extra visits to the hospital for the patients, and therefore avoided. RN: *'Protect the feet? Yes, but it is important that they have the right shoes, that they do not walk in too tight shoes.'*

The RNs said that coordination of visits to the chiropodist was delegated to the HCAs. Patients in assisted living facilities received chiropody from visiting self-employed chiropodists, with different skills and education. Some reluctance towards them was stressed by the RNs as the chiropodists sometimes caused foot ulcers by cutting the patient's toes too deeply. The RNs interviewed did not cut toenails, and HCAs were not allowed to, because of the risk of causing foot ulcers in sensitive feet. RN: *'And do you know what I think the chiropodists do? They cut a little too deep, it very easily becomes an ulcer.'* I: *'By the chiropodist?'* RN: *'Yes, that is my opinion. It is difficult to talk to them about it also. One intrudes into their space. So afterwards the patients come to us and we have to change dressings and fix things.'*

One overarching nursing action described in the interviews was to

keep the patients mobilised, to avoid pressure ulcers. Off-loading in the bed with pillows was used as well, together with turning charts. The RNs stated that they had good access to other professionals such as physiotherapists and occupational therapists who provided the patients with wheelchairs and pressure-relieving mattresses. RN: *'I get the HCAs to email the occupational therapist. I do not deal with those things, they do. And there are lambskins if one wants them. And there are off-loadings for the heels.'*

Other actions mentioned were to maintain a good nutritional status and good metabolic control for the patients. A holistic view of the patients was emphasised, also for non-ulcerated patients with diabetes. RN: *'When there are really high-risk patients one must inspect both feet even if there is not a hole in the contra lateral. But it is important with the feet even if there is no ulcer on them. One must see the whole picture.'*

Evaluation. From the interviews it was revealed that actions to prevent foot ulceration were not evaluated in a structured form. Ongoing ulcers were checked by the RN at least once a week, to make sure that they did not deteriorate, and to inspect the other foot. HCAs performed daily dressing changes and were instructed to report any changes in foot status. The work was documented in computerised record systems, separately for social service actions based on social welfare legislation, and for medical and nursing actions based on health care legislation. It was stated by some of the RNs that the overall legislation of documentation does not apply to this patient group as their health status is complex, and many different professions are involved in their daily care. RN: *'HCAs document according to the social welfare legislation; I never do that. I always document according to health care legislation.'*

The interviewed RNs described an awareness of the fact that most patients in home nursing are near the end of their lives. A good quality of life for their patients was therefore considered as their main priority.

Education

The interviews revealed that the RNs' leadership required them to evaluate the individual HCA's competence and previous education, prior to a formal delegation of nursing tasks, mainly regarding delivery of medication. Education could consist of blood glucose measurements and insulin injections, delivering pre-packed daily doses of tablets, and dressing changes for ulcerated patients – more seldom about foot ulcer preventive actions. RN: *'Our goal, I will say it is our main goal, it is to educate staff.'*

The RNs described how they spent a lot of time and effort educating patients and next of kin, but most of all HCAs. Most of the patients have concomitant diseases that make education challenging. RN: *'There is a little bit of dementia, and those who don't really understand; patients with psychiatric problems. And I don't think that the information really was understood.'*

However, the RNs stated that they used different pedagogical strategies such as repeated information and involving the next of kin. A substantial number of patients had no relatives.

The interviewed RNs were not always aware of the formal or real competence of the HCAs, and this was considered a problem in the educational situation. The RNs stated that some of the HCAs lacked formal competence, while others had extensive experience-based knowledge in addition to upper secondary school education. RN: *'It can be anybody [summer substitutes]. Here there are many who know nothing. Nothing.'*

In the four municipalities, educational activities were organised differently. Education was centrally organised for all HCAs in the two cities. The interviewed RNs stated that they had no influence over these courses. The courses were complemented by bedside instructions by the RN who signed the written delegation. The rural municipalities' education for HCAs was arranged within the assisted living facilities or on an individual basis. The main content focused on general knowledge about diabetes, blood glucose measurements and insulin injections. Prevention of foot ulcers was not a central issue in the written material, but all HCAs were instructed not to cut the toenails and to report any changes in foot status to the RN. RN: *'It includes how important it is to work before there is ulceration, the entire foot, … that you shall dry well between the toes so that a lot of dirt doesn't accumulate. Everything is written there: good shoes; chiropody.'*

The bedside education of HCAs was described as role modelling, showing and imitating practical tasks. After completing the centralised course, the HCAs were evaluated regarding blood glucose measurements, hypo- and hyperglycaemia and insulin injections by a written examination. Foot ulcer prevention was not consistently an issue for evaluation.

Research and development

Continuous professional development differed between the municipalities, as well as between the individual RNs, and their competence to take responsibility and perform their working tasks varied. The formal education to become an RN for most of them lay many years back, and the RNs mainly relied on their long professional experience. Lack of support from the managers for further education was mentioned as a problem. Their absorption of new research results varied from regular searches in scientific databases and nursing magazines, to Google and the daily newspaper. The interviewed RNs were not involved in any ongoing research project. I: *'Where did you learn staff education?'*

RN: *'Through my profession, through my professional knowledge, through my experience and I have read a lot.'* I: *'What have you read, then?'* RN: *'I try to keep myself updated, of course. Computer and internet are good. Different books.'*

RN: *'We do not get that direct continuous professional education.'*

Discussion

Leadership

The main results of this study show that RNs in municipalities' home nursing protect the feet of patients with diabetes by working through others: educating HCAs, leading and evaluating their work, and by avoiding sending patients to hospital unnecessarily. The RNs are dependent on competent HCAs to perform the nursing process. This situation has been described by Gustafsson *et al.* as being interdependently dependent.[23] The RNs reported diabetes foot ulcers as uncommon, that they treated few foot ulcers, and that foot ulcers mainly originated from hospital stays. This is in contradiction to results from Annersten Gershater *et al.*, who found that 21% of home nursing documentation mentioned ongoing foot ulcers, and Prompers *et al.* concluding that 17% of new patients at 12 European foot clinics were known as home nursing patients.[12,13] A recent study by Campbell *et al.* showed that, in patients going through orthopaedic surgery, pressure heel ulcers were developed in acute care in 17% of patients, whereas in community care no ulcers were observed.[24] Campbell's result, implying that foot ulcer prevention is possible, supports the stories of the interviewed RNs. This needs to be explored further.

The organisation and the diffuse number of patients for whom RNs are responsible reflect the paradigm of elderly care as social care with medical and nursing service added on top. Flynn *et al.* have shown that a more supportive nursing practice environment is associated with lower frequencies of pressure ulcers, recommending nurses to participate in organisational decisions, and continuing education opportunities to improve quality of care.[25] The RNs are by law obliged to provide prevention, but this is not recognised by the social service organisation,[26] which does not promote competency development.

Nursing practice

Fear of acquiring hospital-based pressure ulcers contributed to a reluctance to send patients into hospital. Burdette-Taylor *et al.*[27] and Campbell[28] described preventive measures to be performed, although aware of the fact that best practice is not always given in hospitals. Even though some hospitals have succeeded in reducing heel pressure ulcers in hospital wards,[29] this was not the experience of the interviewed RNs. They believed that it was in the best interests of the patient to remain at home as long as possible to avoid pressure ulcers on the heels and other suffering.

Foot ulcer prevention guidelines stress the need for regular visits to chiropodists.[14] Chiropodists in Sweden do not have a formal diabetes education, and are often self-employed. The RNs do not have formal control of their work, and fear that patients can be at risk of ulceration. On the other hand, the absence of chiropodists would in turn increase the risk of ulceration.[30]

Education, research and development

RNs in home nursing have an important educational mission, but the interviewed RNs mainly relied on experience-based pedagogical knowledge. A study from Norway[31] identified similar weaknesses in staff education in long-term care: unstructured and sometimes *ad hoc* with quality work fragmented rather than comprehensive and systematic. Educational strategies in home nursing settings need to be developed further.

Academic requirements for working in home nursing were not set by the municipalities. The only requirement set was a nursing degree. The interviewed RNs' formal education presented diverse specialty competencies and experiences, not always adapted to work in home nursing. The nurses stressed the importance of experience-based knowledge,[32] but did not connect the experience of working with ongoing foot ulcers to preventive work.

The results of the present study give the impression that the municipalities' goal is to make the RNs delegate their entire work to HCAs and instead cover up for the lack of physicians, yet retaining the ethical and legal responsibility for the nursing process of the patients. This situation has also been described by Nilsson *et al.* from other Swedish municipalities.[33] Aiken *et al.* showed that the quality of the care environment and nurses' work had an impact on patient mortality, and it has been suggested that, if RNs' staffing, education and care environments are improved, this will contribute to the best patient outcomes.[34]

Method discussion

The results from this study should be interpreted with caution as only 15 out of 168 potential nurses were included. There is a risk for bias when individuals volunteer to participate in a study; they may constitute a discontented group.[35] RNs in municipality home nursing settings are in general older than RNs on average,[36] which contributed to rich sources of professional experiences. Interviews give a deeper understanding, as they can provide information from past experiences. The interviewer's pre-knowledge of the RNs' working situation was valuable as their stories were understood; this might, however, have affected the interview questions and the interpretation, as naïve questions were

not posed. Reliability data require at least two coders, or pre-defined classification schemes.[20] The schemes were based on RNs' competence description.[21] A limitation using a pre-defined scheme is that contextual factors might be omitted and that more supportive rather than non-supportive data are reported.[20] However, by using their backgrounds as RNs, the research group acknowledged these risks when designing the schemes, and the group agreed on the coding. Data could also be confirmed by the interviewed RNs describing similar situations from their different contexts, and the narratives contained plenty of recurrent patterns: repeated experiences from their work as RNs in home nursing.[35]

The results of this study can, with some caution, be transferred to other home nursing settings in Sweden. All municipalities offer home nursing services regulated by the same legislation.[7,8] RNs work under the same competency description, including the nursing process, and legal requirements.[21]

Conclusion

There is a need for an improved structure in preventive work on diabetic foot ulcers. Home nursing organisation needs more long-term care planning, rather than acute interventions. The interviewed RNs work mainly through HCAs. They are informal leaders, educating the HCAs to assess patients' feet, report deteriorations, and perform offloading actions. Obtaining footwear and chiropody is delegated to HCAs. Evaluation of foot ulcer preventive interventions is not systematically done. There should be substantial economic savings for the municipalities to be made with structured diabetic foot ulcer prevention.[17] Maintaining undamaged feet until the end of a patient's life is in line with working to promote health and alleviate suffering and, to reduce future workload, the RNs' foot ulcer preventive work should be acknowledged in home nursing.

Declaration of interests

There are no conflicts of interest declared.

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