8. O'Neil, S., *Make four the floor. Cited in Forbes, C, 'Managing Diabetic Hypoglycaemia'.* Journal of Community Nursing, 1998. 15(1): p. 14.

9. Phillips, P. and P. Popplewell, *Diabetes and Dementia.* Medicine Today, 2002. 3(11): p. 30-40.

10. Robins, M., *Short term complications of Diabetes*, in *Nursing Care of Older People with Diabetes*, T. Dunning, Editor. 2005, Blackwell Publishing: Oxford, UK.

11. Stevenson, V. and et al. *A poster presentation: 'The Alfred's Nursing Staff Evaluation of the hypoglycaemia in Diabetes Mellitus Guidelines'.* in *Annual Scientific Meeting of Australian Diabetes Society and Australian Diabetes Educators Association Meeting and Proceedings and Abstract Book*. 2003.

12. Yale, J., *Hypoglycaemia*, in *Evidence-Based Diabetes Care*, Gerstein and Kaynes, Editors. 2001, BC Decker Inc: London, UK.

13. Cryer, P., S. Davis, and H. Shamoon, *Hypoglycaemia in Diabetes.* Diabetes Care, 2003. 26: p. 1902-1912.

14. Reeves, S., *Diabetes Portfolio Summary.* 2005, Royal District Nursing Service of SA Inc: Adelaide, Australia.

15. Dunning, T. and M. Robins, *Mental Health, Depression, Dementia and Diabetes*, in *Nursing Care of Older People with Diabetes*, T. Dunning, Editor. 2005, Blackwell Publishing: Oxford, UK.

16. Chelliah, A. and M. Burge, *Hypoglycaemia in the elderly patients with diabetes mellitus: causes and strategies for prevention.* Drugs and Aging, 2004. 21(8): p. 511-530.

17. Omari, A. and S. Twigg, *Hypoglycaemia in type 2 diabetes: Diagnosis and management.* Diabetes Management Journal, 2004. 7: p. 14-15.

New Mental Illness / Diabetes Research Project

The RDNS Research Unit is commencing a new project in January 2006 entitled *"Improving Health Outcomes for Clients with Mental Illness and Diabetes".*

In collaboration with Andy Kelly (CNC Mental Health), Diana Sonnack & Jenny Taylor (CNC Diabetes), Caroline Amato (Divisional Director, Southern) and Santi Reeves (Project Coordinator, Southern), we will meet with 20 clients, their carers and relevant health professionals associated with that person (ie RDNS nurse, GP, social worker etc), and undertake a case study for each.

This project aims to answer the research question:

"Will formal collaboration between key services improve the health outcomes for people living in the community with a combination of a mental health disorder and diabetes?"

The objectives of the project are to:

•*Identify the needs of consumers with a mental health disorder and diabetes which will support and optimise their health outcomes*

•*Identify strategies for service providers that support clients to achieve maximum independence and acceptable health outcomes including optimal control of their diabetes*

•*Identify key stakeholders and collaborative strategies to support consumers through early identification, treatment and ongoing supported self management of their condition*

For further details about this project, please contact the Research Unit on 8206 0111 or email researchunit@rdns.org.au

The Pursuit of Excellence

RDNS RESEARCH UNIT

Issue No. 39 – December 2005 ISSN 1449-440X

A BALANCING ACT: Minimising the risk of hypoglycaemia while achieving recommended glycaemic targets

INTRODUCTION

What is the issue?

People living with diabetes learn over time to make daily decisions about food choices, level of activity and their medication management. They learn to balance the decisions they make in relation to the self care aspects of diabetes whilst being informed and aware of the consequences and risks of long and short term complications.

Our aim for this newsletter is to inform and support nurses to work with clients to improve client health outcomes, by appropriately and effectively managing the risk of hypoglycaemia. We discuss the issues surrounding hypoglycaemia, dispel some myths and describe the development and implementation of an educational program that aimed to assess and identify clients at risk of hypoglycaemia, and to implement best practice guidelines for the treatment of hypoglycaemia for people residing in the community.

This issue written by

Diana Sonnack and Jenny Taylor
RDNS CNC Diabetes; and
Dr Debbie Kralik
Director, RDNS Research Unit

The Research Unit is proudly supported by the RDNS Foundation.

Contact Details:
Research Coordinator, RDNS Research Unit
PO Box 247, GLENSIDE SA 5065
Ph: (08) 8206 0111, Fax (08) 8206 0011
Email: researchunit@rdns.org.au
Web: www.rdns.org.au/research_unit

© Copyright (2005) RDNS Research Unit, Adelaide, SA.
This work is copyright. Apart from any use as permitted under the copyright act 1968, no part of this work may be reproduced by means electronic or otherwise without the permission of the copyright holders.

What is the link between glycaemic control, hypoglycaemia and health outcomes?

Research findings have conclusively established that glycaemic control impacts on diabetes health outcomes. The UK Prospective Diabetes Study (UKPDS) [1] and the Diabetes Control and Complication Trial Research Group (DCCT) [2] demonstrated that with every 1% reduction in glycaemic control (glycated haemoglobin A1C) parallels with a significant reduction in diabetes related complications.

UKPDS: Type 2 Diabetes
1% reduction in A1C equates to
↓43% in peripheral vascular disease – related amputations
↓37% in microvascular complication and reduction in other significant risk factors, heart failure, myocardial infarction and stroke [3].

The A1C target recommended by Diabetes Australia and the Royal College of General Practitioners (RACGP) is $\leq$ 7%. In achieving recommended A1C of $\leq$7% the risk of hypoglycaemic episodes are increased, conversely hypoglycaemia appears to be a limiting factor in glycaemic management of diabetes.

Hypoglycaemia is at times perceived as a barrier in achieving recommended levels of glycaemic control. The experience of hypoglycaemia can induce fear in people. Daily living activities may be compromised as the symptoms of hypoglycaemia can place the individual at risk. The 'social consequences of hypoglycaemia may run the gamut from embarrassment to loss of a job or physical injury to self or others' [4 p.33] . It is not surprising that 'people with diabetes want to avoid the discomfort and embarrassment of these events at any cost. Not only does it affect them physically but their self confidence is shattered and often people will avoid social situations' [5] .

What is hypoglycaemia?

For the older person with diabetes, cognitive impairment, confusion or even a 'focal neurological deficit mimicking a stoke' may occur, placing the individual at significant risk.
Recurrent hypoglycaemic events may cause actual subclinical neurological compromise which in turn may lead to permanent multifocal brain damage [9,10] .

How can hypoglycaemia be managed in the community?

The Royal District Nursing Service SA Inc (RDNS) undertakes a systematic organisational risk assessment twice a year. Diabetes Clinical Nurse Consultants have identified the risk of hypoglycaemia as a major priority, in relation to staff skills and knowledge in the recognition and management of hypoglycaemia and associated risks, as well as the impact on client's health outcomes. One nurse reported....

'*I found Mr Jones sitting in the lounge looking very pale and drowsy. His blood glucose level was 2.8mml/L and I couldn't find anything in the house to treat his 'hypo' as all food containing sugar had been removed.'*

Creating awareness of the risk of hypoglycaemia

It was identified through surveying both clients and RDNS nurses that there was a real risk related to the apparent lack of general awareness, recognition and knowledge in the management of hypoglycaemia in the community. Clients often live alone, lack information about hypoglycaemia and/or had difficulty in recalling specific information relayed to them about hypoglycaemia. This was particularly concerning when people have been placed on diabetes medication, which may put them at increased risk of such an event. There is a commonly held myth by some health care providers and clients alike **'that only people on insulin can get a hypo.' This is simply not the case.**

These findings were supported by 'The Alfred's Nursing Staff Evaluation of the Hypoglycaemic Guideline' which found most staff had a sound knowledge of the objectives of hypoglycaemic care (98%) and treatment of the conscious client (88%), but only 21% of participants were able to identify the clients most at risk of hypoglycaemia [11]. Explanation for why only such a small number of nurses were aware of, and able to, identify the client most at risk, may be the lack of association between oral hypoglycaemic medication and their potential risk of causing hypoglycaemia [12,13] .

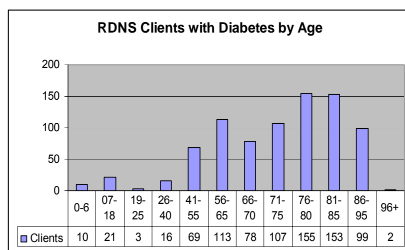
Who is at risk?

The diabetes population profile within RDNS is generally that of the older person, frequently living alone or with a carer who is also an older person. A considerable number of these clients with type 2 diabetes have complex needs due to the older age profile and associated co-morbidities such as hypertension, elevated lipids, heart disease and compromised renal function. A significant number of clients present with confusion, dementia or a mental health disorder.

Eighty five year old Mary lived alone with the support of her daughter and RDNS visiting twice a day for medication administration and blood glucose monitoring. She had diabetes for a number of years, suffered from a mental health condition and dementia. Her food intake was erratic at times and she was experiencing a number of hypoglycaemia events every week. In negotiation with her GP, her oral diabetes medication was reduced to minimise the risk of hypoglycaemia in the knowledge that her current glycaemic control (A1C 6.8%) would be compromised.

RDNS Client Profile

Currently 25% or 826 of RDNS total client population have a diagnosis of diabetes mellitus. These clients have the following demographic profile: 85% are over the age of 55 years with a significant number being over the age of 76, see graph below.



What are the risks of hypoglycaemia for older people?

Hypoglycaemia can be a potentially serious hazard for older clients with diabetes. Undetected and untreated it may result in transient cognitive impairment, confusion, dizziness, possibility of fitting and eventual loss of unconsciousness. Falls are commonly associated with hypoglycaemia events, which may lead to severe injuries requiring hospitalisations [6,15] .

What are the predictors of hypoglycaemia in older people?

The predictors of hypoglycaemia in older people are related to:

- advancing age,
- recent hospitalisation, and
- polypharmacy.

All people with diabetes treated with specific oral hypoglycaemic agents and, in particular, sulphonylureas or insulin therapy, are at risk.

For example, in the older person in which renal impairment is common, glibenclimide may present with a longer than expected half life, and thus has the potential to significantly increase the risk of hypoglycaemia.

Increased Hypoglycaemia unawareness **further exacerbates** the risk in people with impaired renal and liver function or with prolonged duration of diabetes. Compromised renal function interferes with drug elimination and thus predisposes the older client to prolonged hypoglycaemia [6,16,9,17] .

Education remains to be the key in the prevention of severe hypoglycaemia. This includes education and management of hypoglycaemia in people who have dementia or Alzheimer's disease.

Karl, an older client with long standing diabetes and limited English, was found wandering the streets aimlessly, until picked up by the police and safely returned home. His family lived through hours of anxiety and fear for him, until he was found.

Both dementia and Alzheimer's disease appear to be much more common in people with diabetes. 'The risk of dementia is roughly doubled in people with diabetes over the age of 90 years' [9] .

Dementia makes diabetes management more challenging and conversely demands that clients with diabetes and dementia receive ongoing clinical and psychosocial support, especially when living independently in the community.

The Development and Implementation of a Hypoglycaemia Management Strategy within RDNS

As Clinical Nurse Consultants Diabetes, having worked in the community for a significant number of years, our professional experience, together with client and staff feedback, has highlighted that the recognition and subsequent management of hypoglycaemia required a coordinated approach, in order to minimise a client's risk and to demonstrate improved health outcomes.

Formal recognition of the risk of hypoglycaemia for RDNS clients occurred via RDNS's annual risk register. Organisationally, this risk was acknowledged and the necessary resources made available to set about minimising the risk of hypoglycaemia within the RDNS's client population with diabetes.

An educational program was designed to review staff knowledge and skills. The program focused on the recognition and treatment of hypoglycaemia. Furthermore, the development of an organisational strategy would allow us to capture all aspects of the development and implementation of such a strategy, as well as permit a thorough evaluation to take place.

A project brief was undertaken in January 2005 to monitor the impact of the education program within RDNS.

The objectives of the program were:

- To assess and identify clients at risk of hypoglycaemia
- To implement best practice guidelines for the treatment of hypoglycaemia in the community
- To provide an easily understood and accessible visual reference guide for clients, (placed on refrigerator) carers and the RDNS nurse, with information about signs and symptoms, treatment and the location of necessary items, eg glucose drink, GlucoGen IM injection

Through improving self-management of diabetes, it reduces the risks for clients and carers and the need for emergency service and hospital intervention.

The education program contained 5 elements outlined below:

1. Identification of the client at risk

A framework was developed outlining specific strategies for intervention, education and action.

The key nurse during the client admission process would identify those people at risk of hypoglycaemia; based on the oral diabetes medication and/or insulin they were prescribed.

Once identified, a communication alert was placed on the client's profile, serving to inform all RDNS staff visiting, of the client at risk and as a cue to ascertain the client's knowledge and management of hypoglycaemia via the implementation of a hypoglycaemia care plan. Furthermore, the communication alert of 'hypo risk' will allow for the generation of valuable data for auditing, both concurrent and retrospective, in December 2005 (3 months following implementation).

2. Hypoglycaemia Care Plan

A specifically designed hypoglycaemia care plan was implemented, guiding staff, in collaboration with the client, to evaluate current knowledge and management of hypoglycaemia.
Questions and statements within the care plan are directed at identifying and discussing any previous experiences of hypoglycaemia, the existence of any specific recognisable signs and symptoms, treatment and management options to be explored and, where indicated, to enter a process of re-negotiation, to concur with best practice in the management of hypoglycaemia. This served to identify specific areas for improvement with the aim of minimising the risk of such an experience.

3. Hypoglycaemia First Aid Flowchart

The negotiated client-centred approach was adopted in the development of the care plan, together with relevant education and the provision of a visual tool in the form of a 'First Aid Hypoglycaemia flowchart'. This flowchart was produced in consultation with the Low Vision Centre, as a significant number of clients are visually compromised as a result of diabetes.

The flowchart was produced in colour, laminated with a magnetic backing, making it suitable to be placed on the refrigerator, a most prominent place in most clients' homes.

The information contained within the 'First Aid Hypoglycaemia Flowchart' includes the different stages of signs and symptoms of hypoglycaemia, from mild through to severe. The negotiated individualised treatment option, incorporating evidence based practice combined with knowledge of the precise location of 'hypoglycaemia food' formed the basis of the flowchart [17] .

4. The Hypoglycaemia Events Form

A hypoglycaemia 'event' form was placed into the client's treatment folder, which is kept in the clients home at all times and thus easily accessible to both staff visiting and clients alike.

Each hypoglycaemic event was recorded and evaluated in terms of how, when and why it occurred. Outcome of treatment and possible follow up with the client's General Practitioner or treating Diabetes Specialist was also included.

5. Evaluation

A formal concurrent and retrospective organisation clinical audit will take place, to identify the implementation of the hypoglycaemia guide, care plan and First Aid Flowchart into practice. It will focus on the management of hypoglycaemic events in the community and ascertain whether the client's health outcomes have improved. This process aims to engage, support and educate clients in diabetes self-care practices.

Conclusion

Informal feedback received from nursing staff has included:

'The flowchart raised my awareness and skills in recognising and treating hypo's'
'I treated the hypo and used the flowchart to make sure I didn't miss anything! ..... felt reassured'

The 'First Aid Hypoglycaemia Flowchart' is being utilised as a visual educational tool for nurses during the discussion and negotiating phase with clients, for an individualised hypoglycaemia treatment plan.

Furthermore, the colourful First Aid Chart assists greatly in the management of clients with diabetes and dementia, allowing for frequent review and recall of information provided. It also provides very accessible information to carers and family members.

From a Clinical Consultant's point of view, the hypoglycaemia strategy is allowing us to focus on education, reviewing of skills and knowledge at each contact with nurses and/or clients. This commences with the induction/orientation process for nurses new to RDNS, through to joint consultative visits and during individual visits to clients who have been referred with complex clinical needs.

References

1. UK Prospective Diabetes Research Group, *UK Prospective Study 24: A 6 year, randomized, controlled trial comparing sulfonylurea, insulin and metformin therapy in patients with newly diagnosed type 2 diabetes that could not be controlled with diet therapy.* Annals of Internal Medicine, 1998. 128: p. 165-175.

2. Diabetes Complication and control trial Research Group, *The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin dependent diabetes mellitus.* New England Journal of Medicine, 1993. 329: p. 977-986.

3. American Association of Diabetes Educators, *Clinical Perspectives in Type 2 Diabetes Care: Optimizing Glycaemic Control with Insulin Therapy.* The Diabetes Educator, 2005. Supplement.

4. Irvine, A., D.N. Cox, and Gonder-Frederick, *The fear of Hypoglycaemia Scale. Cited*, in *Handbook of Psychology and Diabetes*, C. Bradley, Editor. 1994, Harwood Academic Publishers GmbH.

5. Connolly, M., M. Morrisey, and L. Jackson. *The epidemiology and impact of hypoglycaemia in an Australian population: evaluation by postal survey.* in *ADS & ADEA Annual Scientific Meeting*. 2003.

6. Australian Diabetes Educators Association (ADEA), *Guidelines for the management and care of Diabetes in the Elderly*. 2003, Australian Diabetes Educators Association: Weston, ACT.

7. NSW Health Department, *cited in Australian Diabetes Educators Association (ADEA).* 1997.