



Juggling type 1 diabetes and pregnancy in rural Australia

Rosemary King, BA, MA, RN, RM (Lecturer and Co-ordinator Grad Dip Midwifery)*, Sally Wellard, BA (SocSc), MN, PhD, RN (Professor)

School of Nursing, University of Ballarat, PO Box 663, Ballarat, 3353, Victoria, Australia

*Corresponding author. E-mail address: r.king@ballarat.edu.au (R. King).

Received 23 June 2006; received in revised form 12 December 2006; accepted 26 January 2007

Abstract

Objective: to explore the experiences of women with type 1 diabetes, living in rural Australia, while preparing for pregnancy and childbirth. Additionally, we aimed to describe the women's engagement with, and expectations of, health-care providers during this period, and subsequently highlight potential service and informational gaps.

Design: qualitative research using a collective case-study design; seven women with type 1 diabetes who had given birth within the previous 12 months participated in in-depth interviews about their experiences of pregnancy and birth. Data were analysed thematically.

Setting: The experience of type 1 diabetes, preconception preparation and pregnancy among rural Australian women was explored, including interactions with health professionals.

Participants: seven women aged between 26 and 35 years agreed to be interviewed. The woman had one or two children and had given birth within the past 12 months.

Findings: rigid narrow control of blood glucose levels before conception and during pregnancy created unfamiliar body responses for women, with hypoglycaemic symptoms disappearing or changing. For example, some women mentioned developing tunnel vision or numbness and tingling around their lips and tongue as different symptoms of hypoglycaemia. Women needed information and support to differentiate between what might be normal or abnormal bodily processes associated with pregnancy, diabetes, or both. The women's preparation for conception and pregnancy was reliant on the level of available expertise and advice. Participants' experiences were coloured by their limited access and interactions with expert health professionals.

Conclusion: women with type 1 diabetes experienced significant hardship during their pregnancy, including a higher incidence of hypoglycaemic episodes, a loss of hypoglycaemic symptom recognition and weight gain. These difficulties were compounded by a scarcity of available information to support the management of their pregnancy and a lack of availability of experienced health professionals.

Implications for practice: national and international consensus guidelines emphasise the importance of preconception and pregnancy care for women with type 1 diabetes. Close clinical supervision and the development of closer co-operation and partnership between the women and health-care providers before conception and during pregnancy may improve outcomes for these women and their babies. Building confidence in professional care requires increased access to specialist services, increased levels of demonstrated knowledge and expertise and better general community access to information about preparation for pregnancy and birth among women who have type 1 diabetes.

© 2007 Elsevier Ltd. All rights reserved.

Keywords Type 1 diabetes; Pregnancy; Case study; Rural health

Introduction

Type 1 diabetes is the most common chronic illness that complicates pregnancy (Burrow et al., 2004), and presents significant risks to the woman and her baby. These risks include higher rates of congenital malformations and stillbirth compared with women who do not have diabetes (Ray et al., 2001; Temple et al., 2002). Additionally, as a result of the pregnancy, women with type 1 diabetes may experience accelerated progression of diabetes-related complications, including nephropathy, retinopathy and hypertension. There is also an increased incidence of pre-eclampsia and pre-term births among these women (Jensen et al., 2004). These risks can be markedly reduced with optimal glycaemic control (Temple et al., 2002).

Much has been published on type 1 diabetes and pregnancy; however, it is biomedical in focus, emphasising medical management, with current research and guidelines for practice to optimise clinical outcomes for women and their fetus (Hod et al., 2003; Reece et al., 2004). There is still a lack of consensus in international guidelines for the care of women with diabetes during pregnancy (Cutchie et al., 2006), with only minimal improvements in the outcomes for women and babies (Confidential Enquiry into Maternal and Child Health [CEMACH], 2005). The experience and effect of pregnancy for women with type 1 diabetes, and women's interactions with health-care providers has received less attention.

Care for women with diabetes once pregnant involves earlier monitoring, often resulting in time away from work, more likelihood of hospitalisation during pregnancy and juggling leave and other family commitments (Kay, 1996; Hod et al., 2003). Women who carry a 'high-risk pregnancy' require frequent consultations with specialist obstetricians and doctors in addition to specialist diabetic nurses, and dieticians (Hutcherson, 2003). However, the level of specialist maternity services available for women with diabetes is limited (Platt et al., 2002).

Living in rural communities is well accepted as leading to poorer health outcomes and having reduced access to health services (Australian Institute of Health and Welfare, 1998; Ricketts, 2000). Globally, there is a clearly documented imbalance in the geographical distribution of health-care specialists, with greater access to specialist care in urban settings (Zun et al., 2006). Therefore, women with type 1 diabetes living in rural communities are likely to face additional challenges when they plan for conception and pregnancy. We were unable to locate any

published work exploring this. This project investigated the pregnancy and maternity-care experiences of women with type 1 diabetes who live in regional and rural communities in Australia. The qualitative study design uses in-depth interviews (Patton, 1990) and thematic analysis (Thorne et al., 1997) to explore the women's experience of their preconception preparation and pregnancy, and to describe women's engagement with health-care providers during this period.

Methods

Setting

This is an Australian-wide study, and women responded from many areas of rural and regional Australia. In Australia, in 2003, a total of 252,584 women gave birth, with a crude birth rate of 127 per 1000. The average age of first-time mothers is 29.5 years. Some 30% of Australians live in rural or remote areas. Provision of services to these areas is often problematic owing to a shortage of appropriately qualified health professionals prepared to work in rural and remote areas and because of the vast geographical isolation of some Australians (Australian Institute of Health and Welfare, 2006).

Approach

A qualitative approach was considered to be the most appropriate, as it was important that the women were able to provide personal and individual insights into the context of juggling diabetes self-care and their preparation for pregnancy and childbirth. Using a 'collective case study' design (Stake, 1995), a series of in-depth interviews (Patton, 1990) were conducted over a 3-month period. Seven women with type 1 diabetes agreed to be interviewed by one of the authors (RK), either face to face or by telephone, at a place and time convenient to them. Women were asked to describe their preparation and experiences of their pregnancy, birth, and their experiences of health-care provision during this period. No specific questions were asked; rather, a number of pre-determined topics were included in a conversational style interview with each participant. Unstructured interviews allowed a focus on particular aspects of the study while allowing for freedom of participants' expression of their views (Kvale, 1996). Rapport was established through empathetic listening. During the interview, the interviewer verified participant's responses by regularly

re-framing and feeding back the responses (Thorne et al., 1997).

Inclusion criteria were as follows: had type 1 diabetes and had given birth in the past 12 months; English-speaking, residing in regional and rural Australia, and aged over 18 years. Before starting the study, ethical approval was obtained from the relevant university Human Research Ethics Committee. All potential participants were provided with a plain language information sheet explaining the study and what their participation would involve. Women were asked to sign a consent for their participation.

Sample and recruitment

A convenience sample was recruited between October and December 2005. Women were contacted by placing notices at local diabetes services and via a website providing information to young people with diabetes, 'Reality Check' (<http://www.realitycheck.org.au/>). The women who agreed to join the study were aged between 26 and 35 years, with a mean age of 30.42 years. They were all married; three women had one child each and the remaining four had two children each.

Data analysis

All interviews were audio-recorded and transcribed verbatim by a professional transcriber, with accuracy of transcripts checked by the researcher. Thematic analysis through repeated reading of transcriptions and listening to tapes allowed categorising and grouping of themes. Regularities and irregularities were identified and discussed by the team (Thorne et al., 1997).

Findings

During the interviews, the women talked about the discipline, stress, and sheer hard work involved in reducing and maintaining blood glucose levels to a level that signified minimal risk to both their fetus and themselves. Blood glucose management was a dominant feature in their conversations. It was linked to their preparation for pregnancy, their experience of pregnancy, and the quality of, and access to, specialist health services. Women also reported difficulties in access to appropriate information to support their pre- and post-conception management.

Preparing for conception and pregnancy

Each woman had approached pregnancy with their own personal experiences, concerns and memories influencing their emotional and physical preparation. Some women remembered information given to them by their doctors at the time they were first diagnosed with type 1 diabetes. The information given to them when they were young girls included that they may never be able to have children, and that they should have them early or that they would have to go to the major city in their State for care. As one participant recounted:

As a child when I was diagnosed, at that time, I was told that I may never have children and that if I was to have children that perhaps the last 3 months of pregnancy would be spent in Melbourne [major city], in bed and restricted and things like that, so having children was always a scary, scary thing for me.

Another participant stated:

There are some very high profile doctors here in [local community] that discouraged or said you shouldn't have children. Told not to [get pregnant] and told I wouldn't be supported here if I fell pregnant.

However, women reported their decision to have a baby and have a family was very affirming and empowering:

This is the course I'm taking this is what I have done. I was told I would never have kids, I've got two beautiful children so don't tell me I can't do this because I know I can.

The women reported being motivated to be as healthy as possible and ensure the best outcomes for their baby. The focus was on having a healthy baby. Many commented that, although they may not always have been as strict with their diet and lifestyle as recommended, once the decision was made, their preparation for pregnancy had been carefully considered. The women talked about some of the strategies they had used with the help of health professionals. These included changing to a different kind of insulin, and two participants had enquired into purchasing insulin pumps with limited success:

I approached a GP about a pump and I was basically told no, we can't support that here and it's too dangerous and you can die

The length of time of preparation varied, with some women reporting conceiving relatively

quickly with minimal preparation, and others taking up to several years.

A key aspect of the women's preparation for the pregnancy was getting better control over the blood glucose levels, which meant doing more exercise and eating more healthily. The women reported a need for getting control over their blood glucose because of the potential risks to their fetus. The potential risks caused them considerable stress and anxiety. In particular, the women worried about their baby being born with an abnormality, dying in utero, or being sick and needing medical care after birth.

The main indicator of glucose control was their monitoring a reduction of their blood glucose levels, or HbA1c, which they reported as taking enormous amounts of self-discipline. Participants monitored blood glucose levels many times daily and at night, often taking more than a year to be ready to conceive. One participant said:

It took 2 years of planning and preparation before my HbA1c level was satisfactory. The specialist said after a year that I could go ahead but just from my own research, I didn't like the margins that I had. It was too close for me.

Women changed jobs and some stopped employment to achieve the required level of control over their blood glucose levels:

I decided to give up work before I had children, because of the immense amounts of pressure to try and keep everything controlled and everything so tight.

The increased vigilance and successful maintenance of their blood glucose in a narrow range resulted in changes to their usual recognition of low blood glucose levels. One woman reported losing all recognition of hypoglycaemia when she was trying to conceive:

I could be walking around on 1.5 mmol and then just pass out, my whole life structure pretty much changed.

All participants relayed that it was worthwhile despite the effort and hard work. However, they commented that at times they would have appreciated more acknowledgment of their hard work by health professionals.

Limited access to information

The women in this study understood that their pregnancy would present complexity, and many sought additional resources to assist them in their

planning and subsequent management of their pregnancy. They also reported a need to understand what the worst case scenarios might be, as well as information about what to expect during the labour, birth and postnatal periods. A number of participants commented that their health professionals, particularly the midwives, were also in need of information about diabetes and pregnancy. All participants commented on a scarcity of information, and much of their knowledge was gained from international websites. Participant comments included:

... there definitely needs to be more information out there ... I was really surprised at first because there was just nothing there, you really had to dig deep to get anything

My basic support was a website based in America that was for diabetic pregnant mothers and type 1 diabetics and it was a sole lifeline. There were a lot of people I bounced things off, they were the people that I said well this is how things are or have these things happened to you and they used to do the same so it was a great support group both ways.

The experience of pregnancy

Generally, the women recognised that the pregnancy posed a significant strain upon them over and above that experienced by women without diabetes. Their pregnancy experience was dominated by blood glucose management and its consequent effects, including a loss of recognition of 'hypo' (hypoglycaemic episodes) symptoms, increased incidence of hypoglycaemic episodes (some resulting in loss of consciousness), and weight gain.

Managing hypoglycaemia in pregnancy was reported as difficult because the episodes were unpredictable and most women experienced a loss of recognition, altered symptoms of lowered blood glucose levels, or both. A loss in their ability to recognise 'hypo' symptoms undermined the women's confidence in their ability to manage their diabetes, to safely go about their daily life, and to look after other children in their care:

The first thing I noticed was I was getting like tunnel vision and then my reading was like 1.1 [mmol] and like I had never been that low with no other symptoms

A lot of women reported experiencing a lot of hypoglycaemic episodes, which they attributed to the rigid narrow range of control of their blood glucose. These hypoglycaemic episodes posed

potential health threats; one woman reported numerous collapses requiring assistance and two women reported experiencing a 'hypo' while driving. As one woman reported:

... my blood sugar was fine during the day but it went low ... I was driving home from a friend's place and that's why I had the car accident

In the second and third trimester of pregnancy, insulin demands became greater and more erratic, requiring some women to monitor glucose levels more frequently throughout the day and night. Some women reported that health professionals had high expectations of how blood glucose levels should be monitored and maintained, which in turn imposed considerable costs to women's mental and physical well-being:

For my first pregnancy my HbA1c was never above 6. It was always 5.3 that's where the obstetrician insisted it be ... I was hypoing day and night

It was the endocrinologist who said to me you will have to do readings every 2 hours, [to] set your alarm clock.

The women used insulin to maintain low blood glucose. This often resulted in them eating more food to stabilise the blood sugars when they overestimated their insulin requirements. One woman commented on her significant weight gain:

By 38 weeks I weighed 96 kilos and I was miserable and could barely walk, my insulin requirements were through the roof. After K was born I went from 96 to 56 kilos in 30 days.

Engaging with health-care providers and services

Pregnancy is a time of physical and emotional transition. For the women in this study, it was particularly challenging because they perceived a volatility and untrustworthiness in their body. They lost confidence in their capacity to manage these new situations where they could no longer safely interpret the signs and symptoms of hypoglycaemia, where insulin demands were erratic and they had the added onerous responsibility of a developing fetus.

Access to diabetes specialist care was variable for women in this study. There was limited choice of provider, and it was good fortune if there was an experienced local practitioner who had some expertise in diabetes and pregnancy and was prepared to provide care to them. Women reported

high levels of satisfaction when they were able to see experienced professionals who treated them as adults, acknowledged that the women were highly motivated, and that it was hard work to keep their blood glucose in control. The professionals who were prepared to work with these women, support them and liaise with other professionals as necessary, gave the women confidence. Strategies that improved communication included regular email and telephone calls.

Interactions with health professionals were not always useful. The women related that they were often confronted with professionals who were authoritarian in their approach, who could only lecture women about the need to control glucose:

Just don't get pregnant now because if something happens to the baby you will never forgive yourself.

Women found these messages depressing; undermining their confidence, and making them fearful for their baby. One woman reported being bullied by her obstetrician who demanded very strict control of the blood glucose levels:

With my first obstetrician, my pregnancy was made into a side show ... he went completely overboard ... I would be doing 13 tests a day and if I missed one. He'd have me in tears, [saying] don't you care about this child? ... Awful, it was an awful, awful pregnancy ... it was just a medical circus type thing.

Women also found significant gaps and discrepancies in the information health professionals provided, which possibly reflects the limited levels of experience and expertise rural health professionals had with diabetes and pregnancy. The women received very different messages from various health professionals about their progress, potential outcomes of their pregnancy, or both. One woman said:

The specialist there in the hospital he was great ... really good, really laid back, said '5.9 fabulous, you know your stuff if you need anything come and see me' ... but when we had a relieving doctor it was really difficult because I would always be confronted with a doctor saying oh you can expect to have a still birth, ... you're going to have a handicapped child ... oh lovely things

A number of women reported that some health-care professionals could only give them limited support because they themselves were motivated and reasonably well informed, and these health professionals were simply unable to tell them

anything more than they already knew. It was problematic for the women to realise that they were relying on health professionals who frequently did not know as much as they did about diabetes and pregnancy. Many health professionals seemingly felt unequipped to provide services to the women. Several participants reported that they were refused services in their local communities, which seemed to be related to concerns about the level of risk these women and their babies posed and the capability of the health services to respond:

There was a lot of fear and I guess that's because of a combination of a lack of knowledge, lack of resources, lack of networks and fear of litigation.

I met this couple from [town XX], he was a vicar, they were only in their late twenties and he said the GPs there had refused to support them, had told them she would be writing her own dispensations [the last sacraments] if she fell pregnant, so they moved to [major city]. They shifted everything and their careers just to get access to resources.

Those participants able to receive services locally perceived that the level of service was not as comprehensive as that available in metropolitan centres. Consequently, women reported that they had to take more initiative and responsibility in the management, or follow-up, of the diabetes during the pregnancy in lieu of the lack of expertise from their caregivers. Although their obstetrician would be able to provide care to the woman and fetus during the pregnancy, they had no expertise in potential problems related to diabetes:

I think you have to drive a lot of it, I felt that this obstetrician knew babies ... diabetes stuff they didn't know, so I had to become a bit of the driver ...

Most women had no access to an endocrinologist in their local area. Some of the women chose to travel long distances to larger centres where specialist services were offered:

Basically he's about the only endocrinologist on the Coast, you just don't have any choice here ... I've actually only seen him twice ... I would like to have someone to be talking to more regularly about the diabetes.

But some were able to access support from local experienced medical specialists with an interest in diabetes and pregnancy.

Discussion

The women resided in five separate states of Australia and, although a small qualitative study, the findings highlight common themes related to the management of blood glucose levels, women's informational needs and health-service provision. Some of these findings are consistent with previous studies and women's stories. Women with pre-existing diabetes understand that they will experience a different trajectory of obstetric care to other women (Kay, 1996; Nankervis and Costa, 2000). The normal feelings of anticipation, concern, and adjustment to pregnancy and birth are compounded by additional worries about the well-being of both baby and mother. The transition to motherhood has been identified as a particularly difficult and complex period for young women with type 1 diabetes (Rasmussen et al., 2001; Rasmussen, 2004). Transition periods are times when the self-management of diabetes becomes particularly problematic for young women (Rasmussen, 2004). Women appreciate acknowledgement from health professionals of the extra stress and strain they must bear in the context of diabetes, and are frustrated when their hard work is not acknowledged by health professionals (Kay, 1996).

A lack of available information for women about various aspects of diabetes management in relation to pre-pregnancy and counselling, planning pregnancy, and parenting has also been reported in other recent studies (Rasmussen et al., 2001; Rasmussen, 2004). Australian women speaking in a small anthology of diabetic women's voices commented that they would have appreciated more information about diabetes and pregnancy from both libraries and hospitals (Nankervis and Costa, 2000). Research in the UK also confirms that many women with type 1 diabetes are unsatisfied with their access to information, with recommendations that information could be placed in pharmacies and other community settings (Jardine-Brown et al., 1996).

Hypoglycaemia was a significant issue for women in this study, and they communicated a need for better access and quality of information to assist their management of this. In particular, their loss of recognition of hypoglycaemic events, together with changing symptoms, produced physical and psychological risks that at times were potentially life-threatening. These findings were reflected in Rasmussen's (2004) recent work with women with type 1 diabetes who reported the physical and emotional effect of hypoglycaemia, in particular the effect of unpredictable 'hypos', producing feelings of fear and emotional vulnerability. Hypoglycaemic episodes were physically exhausting,

often taking some days to recover (Rasmussen, 2004).

Many women had difficulties in accessing appropriately skilled medical and nurse diabetes specialists. Medical and consumer discourses about type 1 diabetes and pregnancy unanimously advocate the importance of women receiving pre-pregnancy counselling and stabilisation of blood glucose levels before conception. Women are recommended to speak to their 'team' of specialists before conception and during pregnancy (Australasian Diabetes in Pregnancy Society, 2002; CEMACH, 2005; McElduff et al., 2005). Yet, for many women who live in rural settings, this ideal of a health professional 'team' is problematic. Women in this study did not have access to teams of skilled diabetes clinicians to provide care in their communities. Service providers were not always well informed, or helpful, and the women often received contradictory information. Contradictory information undermined their trust and confidence in the expertise of health professionals and consequently contributed to them feeling insecure and anxious about their pregnancy. Other studies have reported women experiencing difficulties in accessing professionals with appropriate expertise or who were prepared to work with them and to share information at the level they expected (Rasmussen et al., 2001; Rasmussen, 2004).

For women living in rural communities, a 'high risk' pregnancy presented additional difficulties. Services were often not available locally owing to the levels of risk the pregnancies presented and limited staff expertise in the health-care organisations. Government policy and funding limitations placed on rural health services in Australia stipulate the level of infrastructure and staffing to support high-risk pregnancies and births, which results in few rural centres being able to support these women (Department of Human Services, 2004). This means relocation or considerable travel for many women with type 1 diabetes. For many women, this is not a practical option. Risks are associated for women driving long distances, particularly with the unpredictable, and often hard to recognise, hypoglycaemic events. In addition, they must contemplate the costs of separation from their family and temporary relocation in order to access a distant service.

Conclusion

Internationally, the management of pregnancy among women with type 1 and type 2 diabetes remains less than optimal (Australasian Diabetes in

Pregnancy Society, 2002; Diabetes and Pregnancy group, France, 2003; CEMACH, 2005; McElduff et al., 2005), despite evidence that better outcomes are achievable. The recognised benefits of professionals working in partnership with women (CEMACH, 2005) were absent in many of the stories of women in this study. In principle, medical consensus guidelines and protocols strongly recommend preconception counselling and stabilisation of blood glucose levels before conception for all women with diabetes (CEMACH, 2005; McElduff et al., 2005). Women who undertake pre-conception counselling have demonstrably better outcomes (McElduff et al., 2005), yet many women with diabetes do not attend these services before conception (CEMACH, 2005). The women in this study reported high levels of satisfaction with health-care providers who were very experienced and prepared to work in partnership with them; however, the women also identified some barriers to successful interactions with care providers, including authoritarian attitudes, inconsistent advice, health professionals with a poor knowledge base, and a limited availability of specialist services.

It is important that consumers and health professionals have ready access to information about type 1 diabetes during preconception and the pregnancy. This is a consistent theme throughout the literature (Jardine-Brown et al., 1996; Kay, 1996; Nankervis and Costa, 2000; Rasmussen et al., 2001; Rasmussen, 2004). Information needs to be readily available in a variety of formats for both consumers and health professionals. More work is required to identify optimal means for conveying this information, and web-based information clearing houses may provide access to a widely distributed audience.

Further research that identifies potential barriers and incentives to using preconception and pregnancy diabetes services for women from all socioeconomic and ethnic groups would be valuable. In addition, research that strengthens our understanding of women's informational and additional support needs during this profound physical and emotional transition may provide insights into how women with type 1 diabetes can be best supported by health professionals during pregnancy and childbirth.

References

- Australasian Diabetes in Pregnancy Society, 2002. Can I Have a Healthy Baby? <www.adips.org.au> (last accessed 20 June 2006).
- Australian Institute of Health and Welfare, 1998. Health in rural and remote Australia. AIHW Cat. No. PHE 6, AIHW, Canberra.

- Australian Institute of Health and Welfare, 2006. Health in rural and remote Australia. AIHW Cat. No. AUS 73, AIHW, Canberra.
- Burrow, G., Duffy, T., Copel, J., 2004. Medical Complications During Pregnancy. Elsevier, Philadelphia.
- Confidential Enquiry into Maternal and Child Health (CEMACH), 2005. Pregnancy in Women with Type 1 and Type 2 Diabetes in 2002–03, England, Wales and Northern Ireland. CEMACH, London.
- Cutchie, W., Cheung, N., Simmons, D., 2006. Comparison of international and New Zealand guidelines for the care of pregnant women with diabetes. *Diabetic Medicine* 23, 460–488.
- Department of Human Services, 2004. Rural Birthing Services: A Capability Based Framework. Rural and Regional Health and Aged Care Services, Victorian Government Department of Human Services, Melbourne, Victoria <www.health.vic.gov.au/ruralhealth/hservices> (last accessed 18 January 2007).
- Diabetes and Pregnancy group, France, 2003. French multicentre survey of outcome of pregnancy in women with pregestational diabetes. *Diabetes Care* 26, 2990–2993.
- Hod, M., Jovanovic, L., Di Renzo, G.C., De Leiva, A., Langer, O., 2003. Textbook of Diabetes and Pregnancy. Martin Dunitz, London, New York.
- Hutcherson, A., 2003. Does midwifery involvement in care have an effect on perinatal outcomes for insulin dependent diabetic women? *MIDIRS—Midwifery Digest* 13, 469–473.
- Jardine-Brown, C., Dawson, A., Dodds, et al., 1996. Report of the pregnancy and neonatal care group. *Diabetic Medicine* 13, S43–S53.
- Jensen, D.M., Damm, P., Moelsted-Pedersen, L., 2004. Outcomes of type 1 diabetic pregnancies: a nation wide population study. *Diabetes Care* 27, 2819–2823.
- Kay, E., 1996. Psychosocial responses to pregnant women with diabetes. In: Brown, F., Hare, J. (Eds.), *Diabetes Complicating Pregnancy*. Wiley-Liss, New York.
- Kvale, S., 1996. *InterViews*. Sage, California.
- McElduff, A., Cheung, N.W., McIntyre, H.D., et al., 2005. The Australasian Diabetes in Pregnancy Society consensus guidelines for the management of type 1 and type 2 diabetes in relation to pregnancy. *The Medical Journal of Australia* 7, 183.
- Nankervis, A., Costa, J. (Eds.), 2000. *Diabetes and Pregnancy: Women's Experiences and Medical Guidelines*. Miranova Publishers, Melbourne.
- Patton, M.Q., 1990. *Qualitative Evaluation and Research Methods*, second ed. Sage, California.
- Platt, M.J., Stanisstreet, M., Casson, I.F., et al., 2002. St Vincent's declaration 10 years on: outcomes of diabetic pregnancies. *Diabetic Medicine* 19, 216–220.
- Rasmussen, B., 2004. Turning points and transitions: experiences of young women with type 1 diabetes. Doctoral Thesis, Deakin University, unpublished.
- Rasmussen, B., Wellard, S.J., Nankervis, A., 2001. Consumer issues in navigating health care services for type 1 diabetes. *Journal of Cardiovascular Nursing* 10, 628–634.
- Ray, J.G., O'Brien, T.E., Chan, W.S., 2001. Preconception care and risk of congenital anomalies in the offspring of women with diabetes mellitus: a meta-analysis. *QJM Monthly Journal of the Association of Physicians* 94, 435–444.
- Reece, E.A., Coustan, D.R., Gabbe, S.G., 2004. *Diabetes in Women: Adolescence, Pregnancy and Menopause*. Lippincott Williams & Wilkins, Sydney.
- Ricketts, T.C., 2000. The changing nature of rural health care. *Annual Review of Public Health* 21, 639–657.
- Stake, R.E., 1995. *The Art of Case Study Research*. Sage, California.
- Temple, R., Aldridge, V., Greenwood, R., Heyburn, P., Sampson, M., Stanley, K., 2002. Association between outcome of pregnancy and glycaemic control in early pregnancy in type 1 diabetes: population based study. *British Medical Journal* 325, 1275–1276.
- Thorne, S., Kirkham, S., MacDonald-Emes, J., 1997. Interpretive description: a non categorical qualitative alternative for developing nursing knowledge. *Research in Nursing and Health* 20, 169–177.
- Zun, P., Dal Poz, M., Stilwell, B., Adams, O., 2006. Imbalances in the health workforce. Briefing Paper, World Health Organization, Geneva, 2002; <https://www.who.int/hrh/documents/en/imbalances_briefing.pdf> (last accessed 18 January 2007).

Available online at www.sciencedirect.com

