

Research

Women with gestational diabetes mellitus want clear and practical messages from credible sources about physical activity during pregnancy: a qualitative study

Anne L Harrison ^{a,b}, Nicholas F Taylor ^{a,c}, Helena C Frawley ^{d,e}, Nora Shields ^a

^a School of Allied Health, La Trobe University; ^b Physiotherapy Department, Werribee Mercy Hospital; ^c Allied Health Clinical Research Office, Eastern Health; ^d School of Primary and Allied Health Care, Faculty of Medicine, Nursing and Health Sciences, Monash University; ^e Centre for Allied Health Research and Education, Cabrini Health, Melbourne, Australia

KEY WORDS

Physical activity
Gestational diabetes
Attitudes
Barriers
Enablers



A B S T R A C T

Questions: What are the attitudes of women diagnosed with gestational diabetes mellitus (GDM) towards physical activity during pregnancy? What are the perceived barriers to and enablers of physical activity during pregnancy in women with GDM? **Design:** A qualitative study with phenomenology and interpretative description as theoretical frameworks. **Participants:** Pregnant women experiencing an uncomplicated singleton pregnancy, diagnosed with GDM, and aged 18 to 40 years were recruited using purposive sampling. **Method:** Semi-structured interviews were recorded, transcribed verbatim and returned to participants for member checking. Three researchers independently and thematically analysed the qualitative data using an inductive method. Data were coded and compared, and themes were developed, discussed and defined. Recruitment continued until data saturation. Emergent themes were sent to participants and peer reviewed for confirmation. **Results:** The participants were 27 women, with mean age 32 years (SD 3), mean gestation 30 weeks (SD 5), mean pre-pregnancy body mass index 26 kg/m² (SD 5), and born in 10 different countries. The process of communicating information about physical activity (messaging) was the main theme to emerge. Sub-themes included: wanting information about physical activity from credible sources; wanting clear, specific information about safe physical activity during a GDM pregnancy; receiving information at GDM diagnosis because this event triggered women's desire to be more physically active; understanding why physical activity is important to improving outcomes for themselves and their babies; and wanting information about flexible, convenient and practical physical activity options. **Conclusion:** To feel confident and safe about being physically active during pregnancy, women with GDM wanted clear, simple and GDM-specific messages from credible sources. Health professionals can support women with a GDM pregnancy with targeted physical activity messages. [Harrison AL, Taylor NF, Frawley HC, Shields N (2019) Women with gestational diabetes mellitus want clear and practical messages from credible sources about physical activity during pregnancy: a qualitative study. *Journal of Physiotherapy* 65:37–42]

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Introduction

Physical activity (any movement produced by skeletal muscles that results in energy expenditure)¹ has substantial benefits and minimal risks for pregnant women,^{2–16} including those diagnosed with gestational diabetes mellitus (GDM).^{3,17–25} The benefits include a reduced risk of excessive weight gain,⁶ premature birth,⁷ low back pain,^{8,9} anxiety and depressive symptoms,^{10,11} and improved physical fitness,^{3–5} sleep,¹² and health perception.¹³ Physical activity also assists glycaemic control in pregnant women with GDM.^{17,20} Given these substantial benefits, guidelines recommend that pregnant women, including those with GDM, participate in physical activity.^{2,15,16,22}

GDM is defined as glucose intolerance of variable severity that occurs during pregnancy.^{26,27} It is a common complication of

pregnancy, with reports of its incidence ranging from 3.5 to 12%.^{18,19} The risks associated with GDM include maternal hypertension and pre-eclampsia,²⁷ birth trauma from macrosomia for the baby,^{18,28} and a longer-term risk of developing type 2 diabetes in both mother^{27–29} and baby.^{30,31} GDM is diagnosed through routine pregnancy oral glucose tolerance testing.²⁷ Usual management comprises diet therapy, self-monitoring of blood glucose levels, and insulin as required.^{18,19,28}

Physical activity is recommended for women with GDM because it improves glycaemic control,^{17,20} which is a critical factor in reducing the associated risks for the mother and her baby. When performed at a moderate intensity for 30 minutes on most days of the week, physical activity is a safe and effective adjunctive intervention for GDM.^{16,19–25,32} However, more than 60% of women with GDM do not participate in physical activity as recommended.³³ Therefore, to help

design appropriate interventions to improve engagement in physical activity, it is important to understand the factors influencing physical activity participation in these women.

A diagnosis of GDM introduces additional complexity to the pregnancy, due to the associated risks and requirement for active management. Experiencing complications during pregnancy, such as GDM, may influence women's attitudes to physical activity. It might present additional barriers to physical activity (eg, heightened perception of risk) or enablers to physical activity (eg, more frequent contact with health professionals providing advice about being physically active), compared with women experiencing an uncomplicated pregnancy. Few studies have explored the attitudes and perceptions of pregnant women with GDM to physical activity. A recent systematic review³⁴ found only three qualitative studies that explored^{35–37} barriers and enablers to physical activity for pregnant women with GDM. None of these studies reported data about attitudes to physical activity in women with GDM. Safety, lack of time and pregnancy symptoms, including tiredness,^{35–37} were reported as barriers; and benefits for the baby's health and social support were described as enablers to physical activity.^{35,36} Two studies included women predominantly of Asian ethnicity^{35,36} who were attending a clinic servicing a socially disadvantaged area.³⁶ The third study³⁷ had a very small sample size of five participants. These features suggest that the available data may have limited generalisability. To improve participation in physical activity in women with GDM, more data are needed to help clinicians better understand the attitudes of these women to physical activity during pregnancy, the reasons why they do not engage in physical activity, and enablers that could be harnessed. This information could be used to develop GDM-specific physical activity interventions that are relevant, realistic and acceptable to women with GDM and thereby help facilitate behaviour change and participation in this specific group.

Therefore, the research questions for this study were:

1. What are the attitudes of women diagnosed with GDM towards physical activity during pregnancy?
2. What are the perceived barriers to and enablers of physical activity during pregnancy in women with GDM?

Methods

Theoretical framework

Understanding women's attitudes and perceptions of barriers and enablers to physical activity in pregnancy is well suited to a qualitative method of enquiry. A phenomenological approach aims to explore lived experiences to help understand how people make sense of the world in which they live,³⁸ and provides a deeper understanding that may not be revealed through ranked responses.^{39,40} An interpretative description theoretical framework⁴¹ enables an understanding of the phenomena from a clinical perspective facilitating application of findings to clinical practice.⁴² These frameworks were applied in the current study to gain a deeper understanding of the perceptions of women diagnosed with GDM about physical activity and to help facilitate translation of the findings into practice.

Participants were interviewed following screening to confirm eligibility and receipt of written informed consent. The study was reported according to the Consolidated Criteria for Reporting Qualitative studies (COREQ) checklist⁴³ and the Standards for Reporting Qualitative Research (SREQ).⁴⁴

Participants

Pregnant women diagnosed with GDM, who met the eligibility criteria (Box 1), were recruited from antenatal clinics at two hospitals in Melbourne, Australia: one tertiary maternity hospital servicing north-east Melbourne and a general hospital in western Melbourne. Purposive sampling⁴⁶ was used to select participants from diverse

Box 1. Eligibility criteria.

Inclusion criteria

- Women diagnosed with gestational diabetes mellitus
- Aged 18 to 40 years^a
- Singleton pregnancy and a normal 18-week ultrasound scan^b
- Able to express their thoughts in English

Exclusion criteria

- Women considered to have a high-risk pregnancy^c
- Women with conditions affecting their ability to participate in physical activity

^a Old enough to legally provide informed consent and because pregnant women aged > 40 years are generally considered as having higher risk pregnancies.⁴⁵

^b As considered to be lower risk, therefore able to exercise without restriction.

^c Risk of premature labour, incompetent cervix, persistent bleeding, ruptured membranes, growth retardation, preeclampsia, severe anaemia, placenta previa after 26 weeks' gestation, haemodynamically significant heart disease or restrictive lung disease.^{2,15}

backgrounds to improve transferability of findings. Guided by previous studies in similar populations,^{47–50} in which saturation was achieved within 15 to 26 interviews, a sample of between 24 and 30 participants was expected to be sufficient to achieve data saturation. Data saturation occurs when no new data are obtained from subsequent interviews with new participants. In this study, sampling continued until data saturation.⁵¹

Data collection

Participant demographics

The following demographic details were obtained from each participant's hospital record: age, gestation, parity, body mass index, educational level completed, and country of birth. During the interview, information about each participant's pre-pregnancy physical activity levels was collected (see interview guide, Appendix 1 on the eAddenda).

Interviews

Semi-structured interviews were conducted face to face or by telephone, according to participant preference. The interviewer (AH) was a physiotherapist employed by the hospitals, with interview experience, and who was not involved in the clinical management of the participants. The other researchers (HF, NT, NS) were physiotherapists employed at universities with no connection to any participant. An interview guide (Appendix 1 on the eAddenda) of open-ended questions was used to cover key topics while encouraging women to share their experiences. Data collection and analysis were completed concurrently so findings from early interviews informed later interviews, enabling in-depth exploration of evolving themes.

Interviews were digitally audio-recorded and observations noted. Audio-recordings were transcribed verbatim, checked, and then sent to the participant to provide feedback. Each participant was assigned a pseudonym to ensure anonymity.

Data analysis

Data analysis followed an inductive thematic analysis method.^{52,53} One researcher (AH) entered the transcripts into NVivo³, a data management software program. Transcripts were independently analysed and coded by two researchers (AH and NS or HF) to improve reliability of the analysis. Initially, transcripts were read through in their entirety several times to gain a broad sense of the data. Transcripts were reviewed line by line, using an inductive approach. Each idea or concept emerging from the data was coded and descriptive memos written to explain and record the researchers' thoughts and interpretations. The coding phase was iterative, with several levels of analysis occurring as data were coded and constantly compared, and

themes and sub-themes were developed, discussed and defined. Three researchers (AH, NS and HF) then met to compare their independently identified codes, identify and discuss similarities and differences, and agree on the key emergent themes and sub-themes. To check accuracy, completeness and representativeness of the agreed themes, one researcher (AH) then re-read the transcripts and cross-checked with the data coded in NVivo³. Following this, a fourth researcher (NT) read transcripts and independently reviewed the coding and themes to ensure that data and nuances had been accurately interpreted and the context of the data was intact.

Participant demographic data were described using means and standard deviations (age, gestation, parity) or proportions (educational level, ethnicity). Pre-pregnancy activity level was determined according to whether the participant met physical activity recommendations of ≥ 150 minutes of at least moderate-intensity physical activity per week (active) or not (not very active).

As qualitative research involves immersion in the research process, it is recognised that completely avoiding personal bias is difficult. Therefore, information about the research team has been provided above to enhance reflexivity and credibility.^{44,54}

To enhance methodological rigour, detailed patient demographic data were reported so that relevance to other situations could be considered (transferability) and the process of data collection and analysis was recorded in detail (dependability). Member checking of transcripts and key emergent themes was completed to ensure that they accurately reflected the participants' lived experiences,³⁹ which enhanced confirmability. Confirmability was also improved by having the themes generated by the data analysis peer reviewed by a diabetes educator and a dietitian to check the clinical applicability of the interpretation. Verbatim quotations from participants have also been reported, linking the data to generated themes (confirmability). To address trustworthiness,⁵⁵ an audit trail was kept, analysis was augmented by keeping interpretive memos, an iterative process was followed involving independent coding and inter-coder comparison and discussion, and checking by an independent researcher.

Results

Participants

Twenty-nine women consented to participate and 27 completed an interview (Table 1). One withdrew as she was too busy and another did not attend for interview nor respond to a reminder email. The women who participated were born in 10 different countries and represented a range of ages, parity, gestational stages, pre-pregnancy body mass index, and educational backgrounds (Table 2 on the

Table 1
Characteristics of participants (n = 27).

Characteristic	Participants (n = 27)
Age (years), mean (SD) range	32 (3) 26 to 38
Gestation (weeks), mean (SD) range	30 (5) 20 to 37
Pre-pregnancy BMI (kg/m ²), mean (SD) range	26 (5) 19 to 38
Parity, n (%)	
primiparous	12 (44%)
multiparous	15 (56%)
GDM in previous pregnancy, n (%)	4 (15%)
Pre-pregnancy activity level, n (%) ^a	
active	16 (59%)
not very active	11 (41%)
Educational level, n (%)	
\leq high school	6 (22%)
$>$ high school	21 (78%)
Country of birth, n (%)	
Australia	9 (33%)
Asia	17 (63%)
other	1 (4%)

BMI = body mass index, GDM = gestational diabetes mellitus.

^a Women who met the physical activity guidelines were classified as active, whereas those who did less than the physical activity guidelines were classified as not very active.

eAddenda). The interviews were 30 to 45 minutes in duration. Data saturation was achieved by the 25th interview and was confirmed when two subsequent interviews found no new data.

Themes

The central theme that emerged was the process of communication of information (messaging) about physical activity specifically for a pregnancy complicated by GDM. The sub-themes that emerged related to practical aspects of messaging. The women reported that the shock of being diagnosed with GDM and their subsequent concerns for their health and pregnancy motivated them to 'be healthier', including being more physically active. They described needing information about physical activity from a credible source (such as a health professional) that was easy to understand, and clearly explained what type and how much physical activity was safe and relevant for their GDM pregnancy. Participants also described needing information to explain why physical activity was important for their pregnancy, especially for the baby, which was a strong motivator for them to be physically active. They talked about needing information that provided flexible, convenient, practical options to be physically active that could be tailored to meet their individual needs and fit in with their busy lifestyles (Box 2).

GDM diagnosis triggered women's desire to be more physically active

Women with GDM reported needing information about physical activity when they were first diagnosed. They described feeling 'shocked', 'upset' and 'guilty' when diagnosed with GDM. They reported that the diagnosis of GDM made them stop and think about the need to be healthier. Their sense of concern about their diagnosis and feelings of guilt that it might be their 'fault' that they developed GDM and that it might affect the health of the baby triggered in them the desire to be more active to help manage their blood sugar levels and improve the outcomes for themselves and particularly for their babies.

Shocked, disappointed, very disappointed, a bit worried about what it would mean for my baby and my birth. And pretty disappointed that I had a high risk of getting type 2 diabetes later on and my baby has the high risk as well. (Participant 8)

Women wanted information from credible sources

Participants said they needed information about physical activity during a GDM pregnancy to come from a credible source such

Box 2. Central theme and sub-themes arising from the study.

Central theme	Sub-themes
Messaging to women with GDM about physical activity	The GDM diagnosis triggered women's desire to be more physically active.
	Women wanted information from credible sources.
	Women wanted clear, specific information about safe physical activity during a GDM pregnancy.
	Women wanted to understand why physical activity was important for improving outcomes for themselves and their babies.
	Women wanted information about flexible, convenient and practical physical activity options.

GDM = gestational diabetes mellitus.

as a health professional. Some women said there was 'lots of information out there' about physical activity in pregnancy and that they sourced this information from family, friends and the Internet. However, they expressed a lack of confidence in available information as it was often inconsistent and they were uncertain of its applicability to their GDM pregnancy, particularly in terms of safety. Women described experiencing negative cultural influences toward physical activity in pregnancy from family members but reported that they placed more emphasis on information provided by a health professional.

One says it's a great idea, someone else says it's not, which is why I'll often ask a doctor, a midwife, a physio, rather than a gym person who's done a six-month course. (Participant 12)

My aunties, they're very traditional, they go ... and my mum, she goes you shouldn't be doing this, you shouldn't be doing that ... For me I just follow what the doctor said. If it's fine, it's fine. I'll just do that. (Participant 11)

Women wanted clear, specific information about safe physical activity during a GDM pregnancy

Although all participants expressed the attitude that physical activity during pregnancy was important and beneficial, they felt uncertain about the specific details of what and how much physical activity was relevant and safe for them. The participants described how they learnt about reducing 'carbs' or 'sugary foods' to help control their blood sugar levels at a GDM group education session, but reported receiving little information about the role of physical activity in managing GDM, except 'to walk after meals' to help their blood sugar levels, or for general health and wellbeing. They talked about being unsure whether they needed to walk after every meal or just occasionally, how long they needed to walk for and at what intensity.

I think exercise is critical, it's so important. (Participant 4)

There's all these stuff about eating well and stuff but I don't think there's anything about exercise. I don't think it's stressed enough as eating ... it's not as emphasised by everyone. (Participant 18)

Women with GDM said they wanted clear, 'simple' information about what type and how much physical activity was safe and beneficial for their pregnancy. In particular, they said they wanted information about improving outcomes for themselves and their babies.

I think that the information [about physical activity] just needs to be simpler and more black and white. Really simple ... you need to do this minimum amount, you know, put down the minimum and make it really, really simple. (Participant 12)

Women wanted to understand why physical activity was important to improving outcomes for themselves and their babies

The women talked about why they wanted to know about the importance of physical activity. They wanted to understand the risks and complications (both short-term and long-term) for themselves and especially their babies if they did not exercise and/or did not manage their GDM. They said knowing the risks, which they felt concerned and 'scared' about, motivated them sufficiently to overcome their pregnancy tiredness and to find time to increase their physical activity.

I just think about the baby and try and work it out ... I'll just suck it up and do what I have to do just to have a healthy baby. (Participant 11)

It was the baby that's the most motivating for me to be more active. (Participant 7)

Women wanted information about flexible, convenient and practical physical activity options

Participants described wanting physical activity options that were convenient and suited their individual preferences, such as physical activity that could be performed individually or with others, at home or at a specified location, and at a time to fit in with their lifestyle. Walking was the most common and preferred form of physical activity. They felt that walking was a 'very safe' and convenient exercise, and that it helped them to overcome their pregnancy fatigue and discomforts. Social support was a factor the women described as important in helping them to be active. This was either direct support, such as encouragement to do physical activity and/or company while doing exercise from someone (partner, family, child or friend) saying it made the exercise more 'enjoyable' and made the 'time pass more quickly', or indirect, such as support through minding other children so that they could go out and exercise.

I exercise in my house. I don't go out because sometimes it's too cold, sometimes wet. Being my son only 2 years old, I feel too hard, so after dinner I walk [inside]. (Participant 21)

Discussion

Women diagnosed with GDM believed that physical activity during pregnancy was beneficial and important, but they were concerned about safety. They expressed their need for clear, specific information about physical activity (messaging) relevant to their GDM pregnancy that was delivered by a credible source so they would feel confident being active. They wanted information that explained why physical activity was relevant and important to GDM pregnancy outcomes, especially for the baby, and about flexible physical activity options that could be tailored to fit in with their personal preferences and busy lifestyles. The women also identified the importance of social support as an enabler to participation. These findings are consistent with the findings from a recent systematic review about exercise in pregnancy generally,³⁴ and extend those findings by identifying the attitudes toward physical activity of women with GDM specifically. These findings also add to the understanding of the factors influencing physical activity participation in women with GDM, by identifying the need for specific messaging, including what information women require, and reinforcing the importance of the baby as a key motivator.

Our findings suggest that the general message about physical activity for health and wellbeing in uncomplicated pregnancies had been received because all participants expressed the attitude that physical activity during pregnancy was important and beneficial. This is important because attitude influences intention to action (physical activity).⁵⁶⁻⁵⁹ However, the diagnosis of GDM also triggered concerns about the safety of physical activity. Combined with uncertainty about what type and how much physical activity was safe in a GDM pregnancy, this appeared to create a disconnection between the women's intentions and their actions (a knowledge-to-action gap).⁶⁰ As proposed by the Theory of Planned Behaviour,⁶¹ factors additional to attitudes that hinder or enable behaviour may also influence intention and subsequent action.^{61,62} Inconsistency in information, specifically about physical activity for a GDM pregnancy and the lack of confidence in sources such as the Internet, were barriers hindering the women's participation in physical activity. Translating this into practice, clinicians may direct their efforts into focusing on overcoming these barriers to physical activity by harnessing what women with GDM identified as enablers (eg, improving messaging to facilitate a shift from intention to action) to improve participation in physical activity for pregnant women with GDM.

Health professionals such as physiotherapists are well qualified to provide messaging about physical activity recommendations to

facilitate more effective transfer of information from guidelines into practice, thereby assisting in bridging the apparent evidence-to-practice gap.⁶⁰ Clinical guidelines for GDM management^{22,28,32} recommend a moderate exercise program²⁸ aiming for 30 minutes of exercise at least 5 days a week,^{22,32} for example walking for 30 minutes after a meal to improve glycaemic control.²² High-level evidence from a systematic review²⁰ supports these guidelines, finding that exercise as an adjunct to standard GDM care is beneficial in glycaemic control in women diagnosed with GDM.^{17,20–22} However, the women's uncertainty about what and how much exercise was safe specifically for their GDM pregnancy suggests that in practice the information from these guidelines is not reaching women with GDM. As primary GDM healthcare providers, doctors, midwives, diabetes educators and dietitians appropriately focus on medical care and diet therapy; health professionals such as physiotherapists are needed to provide the necessary focus on exercise. Physiotherapists can translate clinical guidelines about physical activity in GDM into information resources with clear, simple and GDM-specific physical activity messages appropriate to women's needs. This information about physical activity for GDM needs to include why women with GDM need to exercise, and the importance for glycaemic control, health and wellbeing. It also needs to provide specific details about safe and appropriate physical activity interventions suitable for GDM, including dosage and considerations for the stage of pregnancy, any co-existing musculoskeletal limitations, and physical activity preferences.

Consistent with two qualitative studies of women with GDM,^{35,36} concern for the health and wellbeing of the baby was a powerful influencing factor and a key motivator. This knowledge could be applied by health professionals with skills in exercise prescription and behaviour change, to encourage women's participation in physical activity during pregnancy. Key drivers to be physically active were both positive and negative and related to health outcomes for the mother but particularly her concern for the baby. Drivers were: wanting to avoid a caesarean section, pregnancy complications and insulin injections; risk to the baby at birth from macrosomia; and the risk to both mother and baby of developing diabetes in the future. However, of all of these factors, the key motivating factor for these women during their GDM pregnancy was minimising risks to the baby's health now and in the future. This study focused on physical activity during a GDM pregnancy; however, the knowledge that the baby's health was the women's strong overriding motivator could be harnessed by clinicians in both pregnancy and postnatally. Women may be motivated to stay physically active for their own health and wellbeing in the longer-term if messaging also emphasises the importance of staying active and healthy to look after the baby throughout its childhood and adolescence.

As reported in other studies, the diagnosis of GDM shocks women^{35,36,63} and appears to be a trigger that makes them prioritise their health and lifestyle. However, the role of physical activity was not explicit in the GDM education sessions they received. There is a potential window of opportunity at diagnosis for health professionals (credible sources) to provide the information women reported needing about physical activity for their GDM pregnancy. The time period immediately after diagnosis was 'a teachable moment' when health professionals could message the benefits of physical activity at a time when women with GDM are very receptive to hear and act on those messages. Providing targeted physical activity messages to women with GDM at this time may help bridge the physical activity knowledge-to-action gap.

Strengths of this study were the diversity and detailed accounts of participant demographics, continuation of recruitment until data saturation, and the rigour of the qualitative process. This enhances the confirmability, trustworthiness, and transferability of findings to similar populations. Recruitment of only English-speaking women may have influenced findings and was a limitation but, despite this eligibility criterion, a range of ethnicities were represented, as seen in the breadth of birth countries (Table 2 on the eAddenda). The ethnicity of participants did not, however, include participants from

African-American or Hispanic backgrounds, which limits the generalisability of the findings to those populations.

Although clinical practice guidelines for physical activity in pregnancy are available, they are not explicitly conveyed to women with GDM at or soon after the time of diagnosis. Women with GDM described needing physical activity messages specific for their pregnancies complicated by GDM to be clear, simple, consistent information from a credible source, such as health professionals. They also wanted messages about physical activity to be explicit about what and how much they need to participate in specifically during their GDM pregnancy for their health and the health of the baby.

What is already known on this topic: Physical activity is recommended for women with uncomplicated pregnancies, including those with GDM. Despite recommendations to be active, many pregnant women with GDM are inactive. Data are lacking on attitudes, barriers and facilitators to physical activity for the group of pregnant women diagnosed with GDM who are at risk from inactivity.

What this study adds: Women with GDM want clear, simple, GDM-specific physical activity messages directly related to pregnancy outcomes that are delivered by a credible source with flexible options so physical activity can be tailored to fit in with their lifestyles. They also want messages to be explicit about what and how much physical activity they need to participate in during their GDM pregnancy for themselves and especially for the health of the baby, which is a strong motivator.

Footnotes: ^a NVivo 11. Version 11 2015. QSR International Pty Ltd.

eAddenda: Appendix 1 and Table 2 can be found online at DOI: <https://doi.org/10.1016/j.jphys.2018.11.007>.

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Correspondence: Anne Harrison, Physiotherapy Department, Werribee Mercy Hospital, Victoria, Australia. Email: AHarrison@mercy.com.au

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