

## CLINICAL PAPER

# Pregnancy-related pelvic girdle pain: the influence of pain science on the understanding of its causes and treatment choices

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### Abstract

Physiotherapists have historically considered pregnancy-related pelvic girdle pain (PPGP) to be caused by biomechanical issues that are the result of hormonally mediated pelvic instability. There is mounting evidence that all musculoskeletal pain, including PPGP, is multifaceted in aetiology. This suggests that PPGP presents more as nociplastic pain rather than peripheral nociception caused by altered biomechanics. The aim of this study was to examine the influence of pain science on UK physiotherapists' understanding of the causes of PPGP and their treatment choices. This was a cross-sectional quantitative survey involving the collection of anonymized opinion data. Descriptive statistics and frequency distributions were calculated for each survey question using Microsoft Excel. One hundred and five physiotherapists completed the online survey. The demographic data were evenly distributed. Chosen by 90% and 92% of the participants, respectively, biomechanical and psychosocial causes for PPGP were almost equally popular. Just under 40% of respondents believed that pelvic joint distortion was a cause of the condition, but 60% indicated that stability of the pelvis is an important factor in PPGP. Less than half considered the autonomic nervous system to be a cause. Treatment choices following a biomechanical paradigm of increasing stability and biopsychosocial factors (e.g. explaining pain) achieved equally high levels of consensus. Physiotherapists almost equally recognize psychosocial and biomechanical issues as factors that can cause PPGP. However, there is less understanding of the involvement of the autonomic nervous system in pain. Treatments such as core stability training, addressing biomechanics and motor control remained popular choices for treating PPGP. While the reasoning behind this was not identified in the cross-sectional survey, it may imply a difficulty in translating a pain science view of causation to pain science management of PPGP, i.e. addressing other aspects of the person's life that may be contributing to their pain.

*Keywords:* biopsychosocial model, contemporary pain science, pregnancy-related pelvic girdle pain.

### Introduction

Pregnancy-related pelvic girdle pain (PPGP) is not well defined. It is commonly characterized as pain experienced during pregnancy around

the posterior pelvis from the iliac crest to the gluteal fold, and can include pain experienced at the pubic symphysis and groin (Kanakaris *et al.* 2011; Meijer *et al.* 2020; Simonds *et al.* 2022). The literature describes a great deal of variability in its prevalence, which is probably a result of the different methodologies employed

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in the relevant studies. A multinational study reported a UK-specific point prevalence of 84% (Gutke *et al.* 2018). More recently, a prevalence of 44% was reported in Australia (Cepnija *et al.* 2021). The condition is correlated with a significant cost burden because of high sick leave rates and associated healthcare costs (Dørheim *et al.* 2012; Malmqvist *et al.* 2015). Pregnancy-related PGP commonly has an onset around the end of the first trimester, and in the majority of cases, spontaneously resolves postpartum (Kanakaris *et al.* 2011; Clinton *et al.* 2017). For some women, pain can continue well into the postpartum period (Albert *et al.* 2001; Wu *et al.* 2004; Elden *et al.* 2016).

Historically, PPGP was considered to be a result of hormonal changes, predominantly in relaxin levels, which were thought to result in instability of the pelvic joints that, in turn, causes biomechanical variation and altered load transfer through the pelvis (Vleeming *et al.* 2008; Meijer *et al.* 2020). The European guidelines for the diagnosis and treatment of PGP support this view (Vleeming *et al.* 2008). This advice has been cited over 1000 times, which highlights the significant impact that it has had on clinicians and researchers worldwide. As a result, treatments and management strategies for PPGP have focused on biomechanical adaptation, and exercises that are considered to improve stability and motor control (Vleeming *et al.* 2012; Jones *et al.* 2017). Since the publication of these guidelines, the evidence to support this theory has been inconsistent, conflicting and limited (Gutke *et al.* 2015; Almousa *et al.* 2018; Stuge 2019). Specifically, education and exercises aimed at addressing perceived biomechanical changes, and exercises intended to prevent the neuromuscular and biomechanical changes during pregnancy theoretically causing PPGP have not been proven to make a difference to either its prevalence or severity (Eggen *et al.* 2012). Moreover, the premise that relaxin causes instability that results in PPGP has not been substantiated (Aldabe *et al.* 2012).

Significant predictors of persistent PGP and disability have been identified: fear avoidance (Fernando *et al.* 2020); somatosensory amplification, which is associated with depression and anxiety (Yıldırım *et al.* 2019); pain catastrophizing and maladaptive cognitions related to pain (Olsson *et al.* 2009, 2012); emotional distress (Bjelland *et al.* 2013); and a belief that the pain will not improve (Vøllestad & Stuge 2009). There are also significantly higher rates of anxiety and depression in women with PPGP than in pregnant

women who do not suffer from this condition (Elden *et al.* 2016). It is not known if anxiety and depression are causative factors for PPGP or *vice versa*. The risk factors associated with it do not support a biomechanical instability theory. In fact, the American Physical Therapy Association antepartum PGP clinical practice guidelines highlight the psychosocial nature of risk factors for the development of PPGP (Clinton *et al.* 2017). This comprehensive systematic review reported the significance of work dissatisfaction, previous pelvic trauma, a history of low back pain (LBP) and/or PGP from a previous pregnancy, and emphasized the potential negative impact of fear associated with the risk of developing PPGP (Clinton *et al.* 2017). Clinicians have been prompted to consider PPGP within the wider context of the biopsychosocial model, which incorporates a contemporary understanding of pain science, i.e. that cognitions and the social environment can influence pain (Beales & O'Sullivan 2011; Hodges *et al.* 2019). There is strong empirical evidence that pain science education can treat persistent LBP and other musculoskeletal pain disorders (Moseley & Butler 2017). Specific to PPGP, a recent Delphi study on expert opinion identified the highest consensus for the use of pain science education in the treatment and management of PPGP (Aldabe *et al.* 2022). This is pertinent since it is well documented that following a biomedical model may further enhance fear avoidance and catastrophizing (Domenech *et al.* 2011).

The incorporation of pain science into treatment is known to be challenging (Beales *et al.* 2020; Holopainen *et al.* 2020). It also conflicts with current published educational content and management advice promoted by reputable medical and physiotherapy organizations; for example, the Royal College of Obstetrics and Gynaecology (RCOG 2022), and Pelvic, Obstetric and Gynaecological Physiotherapy (POGP) (POGP 2015, 2018; Jones *et al.* 2017). Previous studies have highlighted this challenge for clinicians in both Canada and Ireland (Dufour & Daniel 2018; Clark-Smith *et al.* 2019), as well as for experts working in this field (Hodges *et al.* 2019).

The purpose of the present study was to build on previous research by further exploring clinical decisions made about PPGP from a pain science perspective. The participants were physiotherapists practising in the UK who worked in both public and privately-funded care settings. The present authors sought to answer the following questions: (1) What are the current beliefs and

clinical practices of physiotherapists in the UK associated with women experiencing PPGP? and (2) How do these beliefs and clinical practices compare to the previous biomechanical model or a pain science understanding of PPGP?

### Participants and methods

The present study adopted a cross-sectional descriptive approach to explore the influence of pain science on UK physiotherapists' understanding of the causes and treatment of PPGP. Participants who were treating women with PPGP and registered with the Health and Care Professions Council were recruited via social media advertising, and asked to complete an online survey. The primary outcome measure was an assessment of their responses to questions about the aetiology of the condition. Five factors associated with a biomechanical interpretation of PPGP were presented: degree of stability/instability, back pain, distortion of pelvic joints, core strength and a high body mass index. Four factors associated with a contemporary pain science/psychosocial interpretation of PPGP were suggested: pelvic trauma, fear, emotional stress and autonomic nervous system (ANS) balance. The secondary outcome measure was an assessment of the respondents' responses to a question about treatment. There were three biomechanical treatment approaches, i.e. biomechanics, core stability and manual therapy, and three contemporary pain science approaches, i.e. explain pain, address fear and lifestyle factors. In addition, there were two treatments that could be applicable to both approaches depending on interpretation: pelvic floor muscle exercises and general exercise. The survey data were quantitative, with participants offering their opinion on structured statements using a Likert scale. Open-ended questions were available to allow them to further comment, if required, but because of the similar nature of the responses, these were collated into common themes and analysed as quantitative data.

### Recruitment

An anonymous survey was conducted using Typeform online software (Typeform, Barcelona, Spain). The present authors wanted to reach physiotherapists who treated pregnant women. Pelvic, Obstetric and Gynaecological Physiotherapy is a professional network of the Chartered Society of Physiotherapy (CSP), and a registered charity that provides education

and resources for physiotherapists working in the field of obstetrics, gynaecology and pelvic health. The primary advert was posted on the members-only POGP Facebook page ([www.facebook.com/groups/1652693234997631](http://www.facebook.com/groups/1652693234997631)), which gave the study potential access to approximately 700 interested physiotherapists. This group was specifically targeted because it is likely that a majority of members of POGP treat or have treated women with PPGP. The advertisement was subsequently shared on other social media sites with the aim of gaining access to physiotherapists who may not be members of POGP, but treat women with PPGP. Ethical approval for the present study was obtained from the committee of the Hamilton Integrated Research Ethics Board, McMaster University (Project 1625). Only those who were based in the UK were eligible, and only those who had access to social media and saw the advertisement for the study had the opportunity to take part. The research team followed the principles of Dillman's method to enhance recruitment (Hoddinott & Bass 1986). The survey was first listed on 3 December 2020 on the POGP members-only Facebook page, and a follow-up listing was posted on 5 January 2021. It was shared on Twitter by one of the present authors (A.F.), and retweeted by the POGP journal account on 13 December 2020. The social media advertisement displayed a link that took respondents to the survey letter of information (see "Appendix 1"). This letter described the purpose of the study, the risks and benefits of participation, the process used for data collection, the process used for obtaining informed consent, and how participants could contact the researchers.

### Materials

The electronic survey was based on a tool that had been used in previous studies that examined PPGP practice patterns and clinical decision-making (Clark-Smith *et al.* 2019). The survey was adapted and updated based on the current available literature regarding PPGP, and was administered using Typeform (see "Appendix 2"). Since it was adapted from a tool that had previously been used in two research studies, no pilot testing was performed. The first four questions were used to determine participant demographics with regard to their geographical location, level of education, and views on causation and treatment. The respondents were not made aware of the categories of biomechanical

or pain science causation and treatment, and the options were offered in no order.

**Procedure**

Information related to the present study was summarized in the advertisement, and a link to the survey was included. Once potential participants clicked the link, the first page of the survey platform was the letter of information. Participants had to click the “I agree” icon, consenting to participation, before they were led to the survey. The letter of information clearly indicated that participation was voluntary and anonymous. Consenting participants completed the online survey through Typeform. It took approximately 10 min to complete. All survey data were treated in accordance with the principles of the EU General Data Protection Regulation. Data were exported to a spreadsheet (Microsoft Excel, Microsoft Corporation, Redmond, WA, USA) on a password-protected computer. There were no participant identifiers, and any uniform resource locator identification was removed. Descriptive statistics and frequency distributions were calculated for each survey question.

**Results**

One hundred and five UK physiotherapists completed the online survey. It is not known how many saw the survey but did not complete it, or how many who treat PPGP may not have been aware of the study and, therefore, unable to participate.

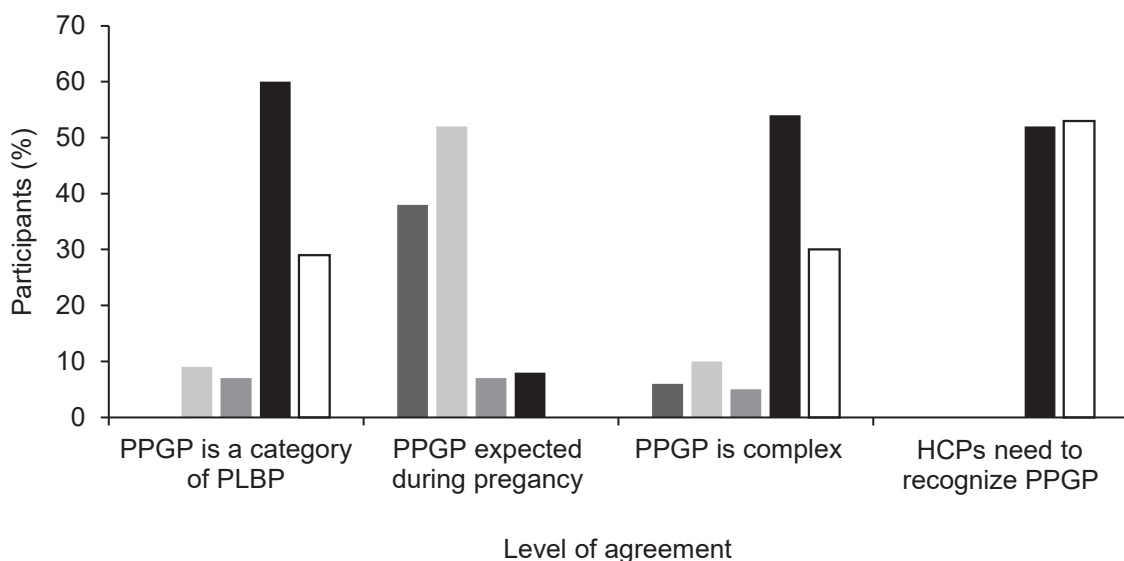
The demographic data revealed that 55% of respondents had a BSc in physiotherapy, and the

remaining 45% had either a postgraduate MSc or PhD. Some 69% and 31% had been practising physiotherapy for over 10 or under 10 years, respectively. There was a representative public and private practitioner split, with 43% of participants working solely in a National Health Service setting, 33% solely in a private practice setting, 19% in a combination of both, and 5% in a combination of university education and clinical practice. In total, 64% worked solely in an urban environment, 15% in a rural setting, and 21% in a combined rural and urban setting. Overall, this indicates a reasonable cross-section of UK physiotherapists.

All participants either agreed or strongly agreed that healthcare professionals who treat women with PPGP should be able to recognize the condition. The majority (80%) either agreed or strongly agreed that PPGP is a complex presentation that requires early intervention. Furthermore, 85% either agreed or strongly agreed that PPGP is a specific category of lumbopelvic pain with distinct characteristics (Fig. 1).

**Causation**

The participants were asked to identify what they believed to be the contributory factors to PPGP from a list of options that were divided by the present authors into biomechanical and psychosocial/pain science categories (Table 1). The division between biomechanical and psychosocial/pain science factors was not indicated to the respondents. The level of agreement on causative factors can be seen in Figure 2.



**Figure 1.** Participants’ views on what pregnancy-related pelvic girdle pain (PPGP) is, and whether healthcare professionals (HCPs) need to recognize it: (PLBP) pregnancy-related low back pain; (■) strongly disagree; (▒) disagree; (░) neither agree nor disagree; (■) agree; and (□) strongly agree.



**Table 1.** Biomechanical and psychosocial/pain science factors that may contribute to pregnancy-related pelvic girdle pain

Biomechanical	Psychosocial/pain science
Degree of pelvic stability or instability	Pelvic trauma
Back pain during pregnancy	Fear
Distortion of the pelvic joints	Emotional stress
Degree of core strength	Degree of balance of the autonomic nervous system
High body mass index	

The participants identified both biomechanical and psychosocial/pain science contributory factors for PPGP. The three most popular were among the psychosocial group, i.e. pelvic trauma, fear and emotional stress, which were each selected by 74% of the respondents. Selected by 44%, the psychological factor of degree of balance of the ANS was less popular, and the physical factor of distortion of pelvic joints was chosen by only 37%.

Four of the five biomechanical factors were also popular. Between 64% and 70% of participants agreed that the following were causative factors for PPGP: degree of pelvic stability or instability; back pain during pregnancy; degree of core strength; and a high body mass index.

In the space for additional comments, 26 respondents said that hypermobility and biomechanics are causative factors, and 18 identified psychological issues. One person added sleep interference as a possible component.

### Treatment

The participants were asked to select treatments for PPGP from a list of biomechanical and psychosocial approaches, as shown in Table 2. The

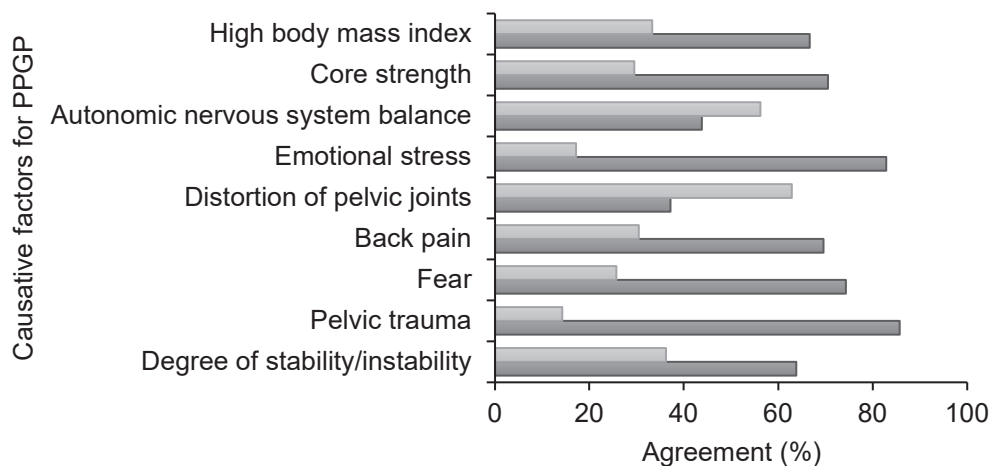
distinction between the two groups was not indicated to participants.

Figure 3 shows that the three psychosocial treatment options were the ones most frequently selected by the respondents, but all treatment options offered within the questionnaire were popular. Biomechanical treatment choices were also frequently chosen: addressing biomechanics (89%); addressing core stability (92%); and providing manual therapy (82%). In the space for additional comments, 30 participants suggested the use of a pelvic belt.

### Discussion

The purpose of the present study was to build on previous research about PPGP by further exploring the clinical decisions made by UK physiotherapists in relation to pain science. The present authors sought to identify: what the participants understood to be the aetiology of PPGP; what treatment choices they considered; and whether recent guidelines (Clinton *et al.* 2017) and pain science were being incorporated into clinical practice in the UK. This is important because clinicians' beliefs are transferred to their patients, which can, in turn, influence perceptions of illness and behaviour (Beales *et al.* 2020). Implying that a pregnant woman's pelvis is unstable can suggest that certain activities may be unsafe for her and possibly her baby, and also that no management will be possible until after the birth (Pulsifer *et al.* 2022).

A significant finding was that most participants (85%) either agreed or strongly agreed that PPGP is a specific category of lumbopelvic pain with distinct characteristics. While it is a common condition, the consensus was that PPGP should not be expected to occur during pregnancy. This

**Figure 2.** Participants' views on causative factors for pregnancy-related pelvic girdle pain (PPGP): (□) not mentioned; and (■) specified as yes.

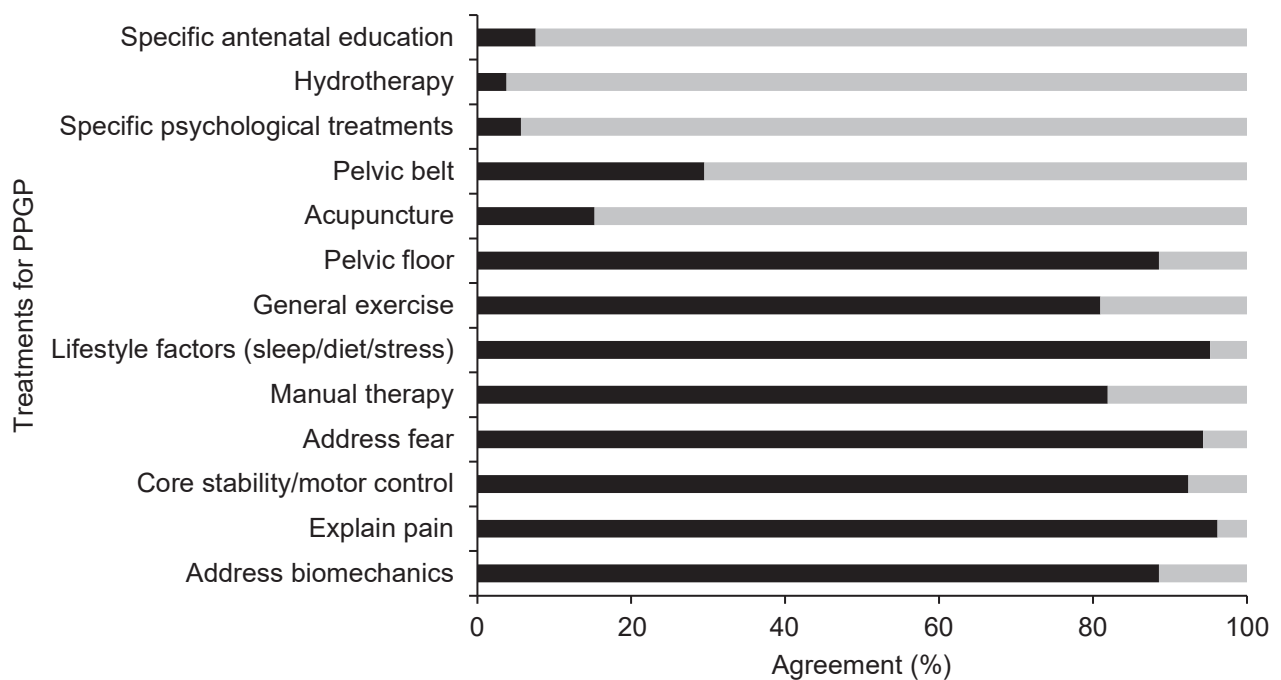
**Table 2.** Biomechanical and psychosocial/pain science treatment approaches offered as choices for the participants

Biomechanical	Psychosocial/pain science
Biomechanics	Explain pain
Core stability	Address fear
Manual therapy	Lifestyle factors
Pelvic floor muscle exercises	Pelvic floor muscle exercises
General exercise	General exercise

supports the notion that, although it may have distinct differences to lumbopelvic pain, the scientific literature about lumbopelvic pain and contemporary pain science is applicable to PPGP. Advances in pain science have altered the understanding of the aetiology of LBP, and previously held pathoanatomical beliefs have been supplanted by a biopsychosocial interpretation (Mosely & Butler 2017) and a neuroplastic conception of pain (Clarke *et al.* 2019).

While an awareness of developments in knowledge about non-specific LBP and pain science exists, recent research indicates that clinicians continue to consider PPGP through a pathoanatomical lens (Clark-Smith *et al.* 2019; Hodges *et al.* 2019). This means that they believe that the condition is caused by nociception from biomechanical and postural adaptations in response to hormonal changes (Meijer *et al.* 2020). Applying a pain-science-based understanding of PPGP to the management of patients with this condition may be challenging for clinicians, particularly since clinical education previously focused more

on a primary nociceptive biomechanical model (Lee 2016; Jones *et al.* 2017). The results of the present study suggest that this is the case. Physiotherapists were approximately equally likely to identify causes of and treatments for PPGP that were related to pain science as those associated with biomechanical issues. Almost 40% of the participants believed that pelvic joint distortion is clinically relevant to the aetiology of PPGP, and over 60% thought that the stability of the pelvis was relevant. While there was less consensus than has previously been reported (Clark-Smith *et al.* 2019), the present findings still highlight the prevalence of this theory in clinical practice. Perhaps this is understandable given that Clinton *et al.*'s (2017) clinical practice guidelines were not initially open access, and therefore, only available by subscribing to the *Journal of Women's Health Physical Therapy* or purchasing the PDF. Furthermore, publications about PPGP issued by professional bodies in the UK (e.g. POGP 2015, 2018; RCOG 2022) describe it as being caused by instability, and also promote treatments and management options that are in line with biomechanical theory. If a biomechanical model of PPGP is adopted, distortion of the pelvic joints would be viewed as instability, necessitating treatment with stabilizing exercises (Meijer *et al.* 2020). There was significant consensus on treatments that reflect this: 92% of participants would address core and/or motor control; and 89% would influence biomechanics.



**Figure 3.** Participants' views on treatments for pregnancy-related pelvic girdle pain (PPGP), including other non-specified treatments added by them: (■) in agreement; and (□) no agreement.

The findings are contrary to current expert opinion (Aldabe *et al.* 2022) and recent literature, which reports that targeted core exercises are not superior to general exercise (Liddle & Pennick 2015; Simonds *et al.* 2022). It should be noted that the present survey could not distinguish between the participants' interpretations of core stability and motor control, and these concepts were not operationally defined within the survey.

Historically, manual therapy has been considered in biomechanical terms. This option was chosen least frequently by the participants in the present study, a finding in agreement with previous research that found that physiotherapists preferred a hands-off approach to treating pregnant women (Beales *et al.* 2015). Recent clinical practice guidelines that were published after the present survey was conducted state that there is strong evidence for the use of manual therapy in conjunction with co-interventions for the short-term improvement of pain and disability in women with postpartum PPGP (Simonds *et al.* 2022). The rationale behind physiotherapy for PPGP can be contentious (Aldabe *et al.* 2022) since it has historically been utilized in a biomechanical context. To achieve the best possible outcomes, it is now recommended that treatments such as physiotherapy, general exercise and other therapeutic modalities are used in conjunction with pain science education (Shala *et al.* 2021; Simonds *et al.* 2022). This requires that clinicians have a clear understanding of what they may be influencing and what they are not (Louw *et al.* 2016).

The present survey demonstrates that there has been a slight shift in the overall picture since the previous collection of data in 2018 (Clark-Smith *et al.* 2019): more respondents now identify the involvement of a psychosocial component in PPGP. The greatest consensus about factors contributing to PPGP highlighted the psychosocial group of issues, i.e. pelvic trauma, fear and emotional stress. A consensus about treatments reflecting these factors was also found, with explaining pain, and addressing fear and lifestyle factors all being popular choices in the treatment of PPGP. It was interesting that the degree of balance of the ANS was only agreed to be a cause of the condition by 44% of the participants, but some added that sleep interference could be a contributory factor, which was possibly a result of a poor understanding of the question being asked. Contrary to this, a high consensus was achieved about the treatment choice of addressing lifestyle factors. It may be that the ANS is not being interpreted as directly

influencing pain, but there is an appreciation that it is indirectly involved. The involvement of the ANS as a mechanism for stress illness is a theory that has also only recently been applied to PPGP (Clarke *et al.* 2019), and it may be that this hypothesis has not been well disseminated yet. Understanding the reasoning behind these choices was beyond the scope of the present study. The increase in the psychosocial interpretation of PPGP and the treatment choices of the participants agree with a recent study of expert opinion on the management of PPGP (Aldabe *et al.* 2022). This highlighted that pain science education and addressing lifestyle factors are important when addressing the psychological factors involved in PPGP (Aldabe *et al.* 2022). Another recent systematic review and consensus study also reported that fear-avoidance beliefs, a known risk factor for persistent PPGP (Olsson *et al.* 2012), need to be considered and assessed with the condition (Remus *et al.* 2022).

### *Strengths and limitations*

The nature of advertising a survey on social media means that the present results are biased in terms of the participants having easy access to social media and an inclination to fill in an online survey. Cross-sectional surveys are unable to measure a wider range of opinions because of these limitations. It is not known how many people had access to the invitation. Given the small data set of 105 responses, between-group analysis was not performed. Despite this, the present authors believe that the data captured a representative sample in terms of the balance between physiotherapists working in public sector and those in private practice. The field of pelvic and women's health physiotherapy is not commonly a core undergraduate or newly qualified field of work. The demographics concur with this: most of the participants had been working in clinical practice for over 11 years. The cross-sectional quantitative data are limited: these cannot capture a deeper understanding or context, or allow the researchers to make causal inferences about which treatment is delivered. Further in-depth qualitative analysis would be beneficial to understand this better.

### **Conclusion**

Although the participants in the present study acknowledged the importance of factors that are outside the pathoanatomical model from a conceptual perspective, it is evident that they

appeared to have difficulty moving away from this paradigm when it comes to treatment management. The respondents also appeared to have only limited knowledge of nociplastic pain and the involvement of the ANS in the pain experience, which may be why they found it challenging to relinquish the previous model of instability. The implications of the present study are that further education about the biopsychosocial model and the contemporary understanding of pain would better equip physiotherapists who treat women with PPGP. Evidence-based practice should incorporate the “continuous use of current best practice from well-designed studies, a clinician’s expertise, and patient values and preferences” (Fineout-Overholt *et al.* 2005, p. 335). The present study identified current best practices from the literature as well as clinical expertise. It is also acknowledged that this survey does not include patients’ opinions about their understanding of what is wrong with them, and what treatments they either feel that they should receive or have been given for PPGP. Future research needs to consider this in order for clinicians to truly follow the contemporary biopsychosocial model of care.

### Ethical approval

Approval for the present survey was obtained from the ethics committee of the Hamilton Integrated Research Ethics Board (Project 1625).

### Funding

None of the present authors received any funding.

### Conflicts of interest

Dr Sinéad Dufour delivers privately hosted educational courses on PPGP. Alexandra Frankham is a POGP tutor who teaches the course entitled “Pregnancy-Related Physiotherapy: Assessment and Management of Musculoskeletal Conditions During and After Pregnancy – Advancing Your Practice”.

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*Dr Sinéad Dufour is an associate clinical professor in the Faculty of Health Science at McMaster University. She teaches and conducts research in both the School of Medicine and the School of Rehabilitation Science. Sinéad gained her MSc in physiotherapy at McMaster in 2003, and her PhD in health and rehabilitation science at Western University, London, Ontario, Canada, in 2011. She then returned to McMaster to complete a postdoctoral fellowship in 2013. Her current research interests include conservative approaches to the management of pelvic floor dysfunction, PPGP and interprofessional collaborative practice models of service provision to enhance pelvic health. Additionally, Sinéad has undergone Institute of Functional Medicine training in functional medicine, and is currently completing a full-certificate programme with Dr Aviva Romm.*

*Mags Clark-Smith MA PGCE BCPT BMCDip is a lecturer in movement and psychology, and a pain relief movement specialist. She is one of the editors of Psychophysiological Disorders: Trauma Informed, Interprofessional Diagnosis and Treatment, which was published in 2019. Mags teaches the resolution of chronic pain in both consultations and teacher training classes. She also takes part in research, and gives guest talks and lectures on the subject. Mags is a body control Pilates supervising teacher, and lectures on dance science on the University of Edinburgh MSc course.*

## Appendix 1

### Letter of information

Principal Investigators:

- Sinéad Dufour PT PhD, School of Rehabilitation Science, McMaster University, Canada
- Mags Clark-Smith MA, Resolving Chronic Pain Clinic, Edinburgh, UK, and Dublin, Ireland
- Alexandra Frankham MHPrac MCSP, Performance Physiotherapy, Jersey, UK

Dear Participant,

You are being invited to take part in a research study that is being conducted exploring pelvic girdle pain (PGP) in the perinatal period. This letter contains important information to help you decide whether to participate in this study. It describes the purpose of the study, explains what you will be asked to do, and outlines the risks and benefits of participation. Please take the time to read this carefully. Completion of the survey that follows implies consent for participation.

*Why is the study being done?* The purpose of this study is to better understand the perspectives of physiotherapists working in perinatal care regarding pregnancy-related PGP.

*What am I being asked to do?* Data for this study are only being collected at one point in time. You are being asked to participate in an online survey that will take approximately 5 min to complete.

*Who can participate in this study?* You can participate in this study if you are a UK, HCPC-registered physiotherapist who provides care to pregnant women. There are only minimal anticipated risks associated with this study, which include possible distress related to the lack of a clear perspective or clinical decision-making approach related to PGP.

*By participating in this study, participants may:* (1) Develop a greater understanding of their own clinical decision-making process related to PGP in the perinatal pain population. (2) Gain satisfaction from participating in research that may help to improve the assessment and management of PGP in the perinatal population.

*Will I be paid to participate in this study?* You will not be compensated for your participation in this research study.

*Will there be any costs?* Your participation in this research will not involve any additional costs to you.

*Is participation in this study voluntary?* Yes, participation in this study is voluntary. You may refuse to participate or refuse to answer any questions, or withdraw at any time. You may retain a copy of this letter of information for your records.

*What will happen to my personal information that will be collected?* This study is anonymous. This study does not collect any identifying information, and as such, there is no privacy risk. The results of this study may be used in presentations or published in scientific reports. If you have any questions, please contact Dr Sinéad Dufour (e-mail: [sdufour@mcmaster.ca](mailto:sdufour@mcmaster.ca)).

This study has been reviewed and has received ethics clearance through the Hamilton Integrated Research Ethics Board. If you have any questions regarding your rights as a research participant, please contact the office of the Hamilton Integrated Research Ethics Board (Tel: +1 905 521-2100, Ext. 42013).

## Appendix 2

### Survey questions

1. What is the highest level of education you have completed?

- BSc
- Post-registration MSc or similar
- PhD

2. How many years have you been practising as a registered physiotherapist?

- 0–5
- 6–10
- 11–20
- 20+

3. What is the setting you practice in?

- Rural
- Urban
- Academic

4. What is the type of workplace do you work in? Tick all boxes that apply to you.

- Public hospital (NHS) clinical
- Private practice clinical
- Mixed public and private caseload
- Academic
- Managerial

5. Pregnancy-related pelvic girdle pain (PPGP) is a specific category of lumbopelvic pain with distinct characteristics.

Please identify whether you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree.

6. A degree of PPGP is “expected” during pregnancy, and thus, no treatment is indicated.

Please identify whether you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree.

7. Pregnancy-related pelvic girdle pain is a complex presentation that requires early identification and associated care.

Please identify whether you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree.

8. All relevant healthcare providers who work with pregnant women need to be able to recognize a PPGP presentation.

Please identify whether you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree.

9. What are potential causes or contributing factors of PPGP?

Tick as many boxes as you believe to be relevant.

- Degree of pelvic stability or instability
- Pelvic trauma
- Fear
- Back pain during pregnancy
- Distortion of the pelvic joints
- Emotional stress
- Degree of balance of the autonomic nervous system
- Degree of core strength
- High body mass index

10. Can you think of any other causes of or contributing factors for PPGP?

Please add details on your rationale and clinical reasoning.

11. What are potential treatment approaches to help PPGP?

- Address pelvic mechanics and biomechanical loading
- Helping women to understand the mechanisms of pain response (“Explain Pain”)

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- Stability exercises (strengthen the pelvic, back and hip musculature)
- Addressing fear issues
- Utilizing manual therapy and mobilization techniques
- Addressing lifestyle factors such as sleep, nutrition and stress
- Prescribing general exercise
- Address pelvic floor musculature as needed

12. Can you think of any other potential treatment approaches to help PPGP?

Please add details on your rationale and clinical reasoning.

13. In your opinion, what else is relevant regarding PPGP?

Thank you for taking the time to complete this survey. Please contact the principal investigators if you wish to have a copy of the results.