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ORIGINAL RESEARCH

The most impactful endometriosis symptom: An international, cross-sectional, two-round survey study

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Abstract

Introduction: There is considerable variation in the types of symptoms experienced by people living with endometriosis, and it is unclear which symptoms impact people the most. This study aimed to identify the specific symptoms that are "most impactful" to people living with the condition.

Material and Methods: Two sequential online surveys were conducted. Women aged over 18 years with a diagnosis of endometriosis were eligible to participate. Participants first provided a free-text list of all the endometriosis symptoms they experienced (Survey 1, Australian only). Responses were condensed into a shorter list by grouping symptom types and selecting the top 20 most common and most impactful. Survey 2 (international) participants reviewed the list and selected all that they had experienced in the last 3 months, nominated one as their single "most impactful symptom", and rated its impact on one of five randomized scale types.

Results: Survey 1 and Survey 2 had 195 and 983 responses, respectively. The mean age of respondents was 30.8 ± 7.9 years. There were 275 separate symptom descriptions from Survey 1, which were condensed into 104 groups, of which 25 met criteria for inclusion in Survey 2. The most commonly experienced symptoms were abdominal pain (93% of respondents), bloating (92%), and fatigue (90%), and the symptoms nominated as causing the most impact were pelvic pain (20%), abdominal pain (15%), and cramps (7%). Nearly everyone (99.7%) in Survey 2 reported experiencing at least one pain symptom. The symptoms that generated the highest impact scores were infertility (99.8/100), irregular menstrual cycles (95.3/100), and constipation (92/100). The average impact score was 87.5/100.

Conclusions: There was substantial variation in the symptom selected as causing the most impact, and the level of impact was high. A focus on measuring the "most impactful symptom" in future research may enable us to better capture and measure the true symptom experience.

Abbreviations: CAPTCHA, Completely Automated Public Turing test to tell Computers and Humans Apart; COPC, Chronic overlapping pain condition; EPHect, Endometriosis Phenome and Biobanking Harmonisation Project; NECST, National Endometriosis Clinical and Scientific Trials; PROM, Patient-reported outcome measure; WERF, World Endometriosis Research Foundation.

KEYWORDS
endometriosis, impact, questionnaire, survey, symptoms

1 | INTRODUCTION

Endometriosis is a chronic inflammatory condition in which tissue similar to the lining of the uterus (the endometrium) is present outside of the uterus.[1] It is a common condition and affects 10% of reproductive-aged women worldwide.[2] The symptoms associated with endometriosis are highly variable and are not dependent on the extent of physical disease present in the body.[3] This means that women with minimal observable disease may present with severe symptoms, while those with extensive pathophysiological disease can be asymptomatic.[3]

There is heterogeneity in the way in which outcomes are assessed in clinical trials of endometriosis interventions.[4] As such, an international consensus group developed an endometriosis core outcome set to standardize measurement reporting between trials.[5] They recommended that the change in the symptom of the highest priority for each individual should be assessed. Recent findings from a qualitative study found that "symptom impact" and therefore the nomination of the "most impactful symptom" is the most relevant construct for this prioritization.[6]

The experience of symptoms is inherently personal and is only known to the individual; therefore, a measurement tool that seeks to capture information from the patient or person themselves is the best method for capturing this information. A patient-reported outcome measure (PROM) is an example of this. While generic PROMs like the Measure Yourself Medical Outcome Profile[7] have been developed to prioritize symptoms across any health condition, no PROM has been specifically designed to assess for the endometriosis symptom that causes the most impact on one's life. Although other PROMs have been developed for endometriosis symptoms and their impact,[8] such as the Endometriosis Impact Questionnaire,[9] none seek to assess the primary symptom responsible for causing the most impact. Other recommendations for the measurement of the "most bothersome symptom" have been provided for health conditions, namely by the United States Food and Drug Administration, for trials relating to the symptoms of menopause[10] and migraine.[11] However, to the best of our knowledge, there is no evidence of any robust development and/or psychometric validation of these measurement instruments.

A PROM to measure the "most impactful symptom" requires a list of symptoms from which people can nominate their most impactful. Generating a symptom list from those with lived experience will ensure item relevance. This is important given the lack of consensus regarding which symptoms are attributable to endometriosis and the discordance between patients and clinicians in describing the symptom experience.[12] The objective of this present study is to identify the symptoms that have the most impact on people living with endometriosis. A secondary aim was to determine the types of response scales that people most prefer when rating the impact of their symptoms.

Key message

There is no single predominant symptom of endometriosis that impacts people living with the condition the most. Of those symptoms nominated as being the "most impactful", high levels of impact are reported.

2 | MATERIAL AND METHODS

We compiled a list of possible endometriosis symptoms (Survey 1), followed by the prioritization of those most often considered to cause the most impact (Survey 2).

Participants were eligible to complete the surveys if they were: aged over 18 years; fluent in English; self-reported either a definitive diagnosis of endometriosis via surgery or a suspected diagnosis via positive ultrasound or magnetic resonance imaging findings; had experienced symptoms of endometriosis in the past 3 months; had not been pregnant in the past 3 months; and had not given birth in the past 12 months. Participation in Survey 1 was limited only to those residing in Australia. All participants were instructed to read the Participant Information Sheet, and all provided informed consent. The study was approved by the University of Melbourne Human Research on 1 February 2023 (2023-25 369-39 051-6). The CHERRIES checklist for reporting the results of internet e-surveys was used (Appendix S1).[13]

A combination of convenience and snowball sampling methods were used. Participants for both surveys were recruited via social media, either through paid advertisements or posts in endometriosis-specific Facebook groups. The surveys were also advertised on the websites of relevant organizations (including Endometriosis Australia, Endometriosis New Zealand, and Endometriosis Foundation of America), and through word of mouth at public and professional endometriosis-related events. All advertisements contained a direct link to the survey (Appendix S2). Survey 1 was open between February and March 2023, and Survey 2 was open between April and August 2023. A sample size of 150 was selected for Survey 1 to capture a comprehensive spread of responses while minimizing burden on the research team due to the generation of a significant amount of uncoded, free-text data. A sample size of 1000 was chosen for Survey 2 to capture a variety of responses and allow for the randomization of scale types.

Surveys were developed with input from the research team and three individuals with lived experience of endometriosis to assess the appropriate language, usability, and functionality of the questionnaire. Both surveys were designed to prevent fraudulent answers through the inclusion of a Completely Automated Public Turing test to tell Computers and Humans Apart (CAPTCHA), a forced response feature for each question, blocking search engine indexing, preventing multiple responses from the same user through placing a cookie lasting up to 6 months on the web browser, and not including a back button to prevent participants from changing their answers.[14]

Both surveys collected demographic information in line with recommendations set by the World Endometriosis Research Foundation's Endometriosis Phenome and Biobanking Harmonization Project (WERF EPHect)[15] and the National Endometriosis Clinical and Scientific Trials (NECST) Network.[16] Survey flow logic was employed where applicable. The surveys were developed and hosted on the Qualtrics platform (Qualtrics Ltd.) (Appendix S3). Participation was voluntary, and no identifiable data were obtained. IP addresses were not collected.

Participants were not incentivized to take part in either survey. Australian participants were invited to share their email address through an unlinked Qualtrics survey if they wished to receive a copy of the results at the completion of the study and/or sign up for future emails regarding other studies being conducted by the research group.

2.1 | Survey 1

Survey 1 asked participants to list all the symptoms related to their endometriosis that they experienced in the past 3 months via free-text fields. Participants were then invited to select one of the symptoms that they had listed that had impacted them the most over the same time period. Content analysis was used to group symptoms belonging to the same symptom type or category. This process was undertaken independently by the primary researcher (AM), three members of the research team with clinical experience in managing patients living with endometriosis (HF, CC, and MH), and two individuals with lived experience of endometriosis. The primary researcher independently met with each person to discuss the rationale behind the groupings before proposing the final symptom groups. The final consensus of symptom groupings and associated terminology to be carried forward into Survey 2 was achieved through discussion between AM and KJC. KJC has extensive survey research and PROM development experience with people with pelvic pain, including endometriosis.

To be included in the symptom list in Survey 2, symptoms must meet one or more of the following criteria: (1) the top 20 most commonly experienced symptoms, (2) the top 20 "most impactful symptoms," (3) any symptom that had at least five participants reporting they had experienced it, and at least 50% of those had endorsed it as the "most impactful symptom."

2.2 | Survey 2

Participants in Survey 2 selected the endometriosis symptoms that they had experienced over the past 3 months and were able to nominate one additional symptom through a free-text response. Participants then selected a single symptom that had impacted them the most. The degree of impact of this "most impactful symptom" was rated on one of five scale types (Figure S1), allocated to them at random. Five satisfaction questions asked participants about their experience using the scale. Additionally, participants were asked if the symptom that had impacted them the most would have changed if the recall period were shortened to 1 month.

2.3 | Data analysis

All data were analyzed using Microsoft Excel. The missing data were not replaced. Descriptive statistics were presented as means, standard deviations, and ranges for continuous data, or numbers and percentages for categorical data. To make comparisons between "most impactful symptom" scores from the different scale types in Survey 2, data pertaining to level of impact were converted to a rating out of 100. For example, responses made using the 5-point Likert scale were multiplied by 20 to give a score out of 100.

3 | RESULTS

For Survey 1, 293 responses were collected. Of those, 47 were incomplete and 51 did not meet inclusion criteria, leaving 195 valid responses (Table S1). A total of 1256 responses were collected from Survey 2, with 85 incomplete and 188 not meeting inclusion criteria (Table S1), leaving 983 valid responses.

The mean age of respondents across both surveys was 30.8 ± 7.9 years, and the mean age at which endometriosis symptoms began was 16.2 ± 6.0 years (Table 1). Most participants had received a surgical diagnosis of endometriosis (87%), with the majority of those having had only one endometriosis-related surgery (56%). Participants in Survey 2 resided in 34 different countries, with most living in Australia (39%), the United Kingdom (20%), New Zealand (17%), and the United States of America (15%) (Table S2). Across both studies, all participants were fluent in English; however, 48 reported speaking a second language, with the most frequent being Spanish ($n=6$), French ($n=5$), and German ($n=4$) (Table S3). Chronic overlapping pain conditions (COPCs) were common, as participants reported an average of 2.9 and 3.4 conditions in Surveys 1 and 2, respectively (Table 2).

3.1 | Survey 1

From the 1344 free-text responses, 275 separate descriptions of symptoms were identified and subsequently grouped into 118

TABLE 1 Demographics of survey participants.

Characteristic	Survey 1 (*n* = 195)	Survey 2 (*n* = 983)
Age, years, mean ± SD (range)	32.97 ± 6.90 (20–56)	30.31 ± 8.07 (18–64)[a]
Age symptoms began, years, mean ± SD (range)	17.04 ± 5.96 (8–41)	16.05 ± 6.01 (1–46)
Method of diagnosis, *n* (%)[b]		
Surgery	175 (90%)	845 (86%)
Ultrasound	72 (37%)	319 (32%)
Told by a healthcare professional	44 (23%)	238 (24%)
MRI	7 (4%)	150 (15%)
Other	3 (2%)	1 (0%)
Country, *n* (%)		
Australia	195 (100%)	379 (39%)
United Kingdom of Great Britain and Northern Ireland		196 (20%)
New Zealand		170 (17%)
United States of America		148 (15%)
Canada		29 (3%)
Ireland		16 (2%)
South Africa		13 (1%)
Other[c]		32 (3%)
Language spoken at home, *n* (%)		
English	186 (95%)	944 (96%)
Other	9 (5%)	39 (4%)
Highest level of completed education, *n* (%)		
Postgraduate qualification	54 (28%)	216 (22%)
Undergraduate qualification resulting in a Bachelor's degree or higher	75 (38%)	320 (33%)
Tertiary qualification not resulting in a Bachelor's degree or higher	50 (26%)	285 (29%)
Secondary school	15 (8%)	150 (15%)
Primary school	1 (1%)	3 (0%)
Prefer not to say	0 (0%)	9 (1%)

[a] *n* = 982 (one respondent excluded from the analysis due to stating his/her age was 211 years).

[b] Participants may have selected more than one method of diagnosis; therefore, percentage totals are not equal to 100.

[c] All had ≤2 participants residing in each country (Table S2).

TABLE 2 Prevalence of Chronic overlapping pain conditions among participants.

Condition	Survey 1 (*n* = 195), *n* (%)[a]	Survey 2 (*n* = 983), *n* (%)[a]
Adenomyosis	52 (27%)	247 (25%)
Anxiety	91 (47%)	599 (61%)
Crohn's disease	2 (1%)	3 (0%)
Depression	64 (33%)	473 (48%)
Fibroid(s)	21 (11%)	111 (11%)
Fibromyalgia	13 (7%)	73 (7%)
IC/PBS	13 (7%)	80 (8%)
IBS	51 (26%)	362 (37%)
Migraine	60 (31%)	339 (34%)
ME/CFS	8 (4%)	67 (7%)
Ovarian cyst(s)	69 (35%)	497 (51%)
PID	8 (4%)	66 (7%)
PCOS	50 (26%)	172 (17%)
Restless leg syndrome	16 (8%)	79 (8%)
TMD	12 (6%)	64 (7%)
Ulcerative colitis	4 (2%)	8 (1%)
Vaginismus	12 (6%)	62 (6%)
Vulvodynia	5 (3%)	27 (3%)
None	29 (15%)	45 (5%)

Abbreviations: IBS, irritable bowel syndrome; IC/PBS, interstitial cystitis/painful bladder syndrome; ME/CFS, myalgic encephalomyelitis/chronic fatigue syndrome; PCOS, polycystic ovary syndrome; PID, pelvic inflammatory disease; TMD, temporomandibular joint disorder.

[a] Participants may have selected more than one COPC; therefore, percentage totals are not equal to 100.

different symptom categories. For example, descriptions of "tiredness" and "lethargy" were grouped into the category of "fatigue." Fourteen categories were excluded as they were not considered symptoms of endometriosis; for example, "pre-menopause" and "hysterectomy." On average, participants reported experiencing seven different endometriosis-related symptoms. Almost all participants (99%) reported at least one pain-related symptom. Thirty-six different symptoms were rated as "most impactful." Although the symptom of "pain" was the most common symptom and the most impactful symptom, it was not included in Survey 2, as its non-specific nature was considered to cause possible confusion for participants (for example, whether to select "pelvic pain" and "pain").

"Infertility" met the criteria for inclusion in Survey 2; however, it is not considered to be a symptom per se but rather a separate condition or consequence of endometriosis. Despite this, to reduce the risk of Survey 2 participants selecting "other" and free-text nominating infertility, we included "infertility" in Survey 2 and applied condition formatting so that participants selecting "infertility" would be prompted to also select their "second most impactful symptom."

In total, 25 symptoms met the criteria and were included in the list of symptoms in Survey 2 (Table 3, Table S4). Twenty-one symptoms met Criteria 1 (top 20 most commonly reported symptoms), as two symptoms were 20th equal. Three additional symptoms met Criteria 2 (top 20 "most impactful symptoms"), which were "ovary pain" (*n* = 4), "rectal pain" (*n* = 2), and "uterus pain" (*n* = 2). It was decided that only the top 16 "most impactful symptoms" would be included in Survey 2, as the remainder of symptoms nominated as "most impactful" were each selected by only a single participant. No symptoms met Criteria 3.

TABLE 3 Symptoms from Survey 1 which met criteria for inclusion in the list in Survey 2, $n=195$.

Criteria 1: top 20 most commonly experienced symptoms, *n* (%)[a]	Symptom	Criteria 2: top 20 most impactful symptoms, *n* (%)
93 (48%)	Bloating	8 (4%)
87 (45%)	Fatigue	8 (4%)
77 (39%)	Back pain	12 (6%)
75 (38%)	Cramps	27 (14%)
71 (36%)	Heavy periods	11 (6%)
60 (31%)	Nausea	5 (3%)
52 (27%)	Painful sex	3 (2%)
44 (23%)	Abdominal pain	24 (12%)
37 (19%)	Constipation	3 (2%)
35 (18%)	Pelvic pain	18 (9%)
35 (18%)	Period pain	12 (6%)
32 (16%)	Diarrhea	3 (2%)
32 (16%)	Leg/hip/groin pain	
29 (15%)	Spotting	
28 (14%)	Pain emptying bowels	
27 (14%)	Bowel dysfunction	
26 (13%)	Headache	
23 (12%)	Migraine	
21 (11%)	Irregular periods	
18 (9%)	Blood clots with period	
18 (9%)	Mood disturbances	
	Ovary pain	4 (2%)
	Infertility	3 (1%)
	Rectal pain	2 (1%)
	Uterus pain	2 (1%)

Note: Cells have been intentionally left blank where inclusion criteria were not met.

[a] Participants may have experienced more than one endometriosis-related symptom therefore percentage total is not equal to 100.

3.2 | Survey 2

Participants in Survey 2 reported experiencing an average of 16 different symptoms, with 99.7% indicating that they had experienced at least one pain symptom (Table 4). Most participants selected their "most impactful symptom" from the list provided (98%), with pelvic pain (20%), abdominal pain (15%), and cramps (7%) most common. A total of 109 participants (11%) used the free-text option to report other symptoms; however, only 17 (2%) selected this as their "most impactful symptom" (Table S5). There were 27 (3%) participants who indicated that infertility was the symptom that impacted them the most, and when asked to select a second symptom that had impacted them the most, pelvic pain ($n=5$) and period pain ($n=3$) were the next most commonly selected (Table S6).

3.2.1 | Symptom impact scores

Participants rated the degree of impact experienced due to their "most impactful" symptom (Table 5). The overall average impact score was 87.5/100, with the highest rated symptoms being infertility (99.8/100), irregular menstrual cycles (95.3/100), other symptoms (94.0/100), and constipation (92.1/100).

3.2.2 | Satisfaction with different scale types

The mean scores for each of the satisfaction questions for each scale type that was used to rate the impact of the "most impactful symptoms" were overall high and very similar (Table S7). Refer to Figure S2 for the complete satisfaction questions and scoring system. Scale 1

TABLE 4 Symptoms experienced and most impactful symptoms Survey 2, *n* = 983.

Symptom	Most impactful symptom, *n* (%) (*n* = 983)[a]	Number experienced, *n* (%)[a]	Number selected as most impactful symptom/number experienced (%)
Pelvic pain	198 (20%)	868 (88%)	198/868 (23%)
Abdominal pain	146 (15%)	918 (93%)	146/918 (16%)
Cramps	70 (7%)	850 (86%)	70/850 (8%)
Ovary pain	67 (7%)	718 (73%)	67/718 (9%)
Back pain	64 (7%)	838 (85%)	64/838 (8%)
Period pain	63 (6%)	742 (75%)	63/742 (8%)
Fatigue	50 (5%)	883 (90%)	50/883 (6%)
Leg/hip/groin pain	48 (5%)	704 (72%)	48/704 (7%)
Bloating	34 (3%)	901 (92%)	34/901 (4%)
Heavy menstrual periods	28 (3%)	485 (49%)	28/485 (6%)
Infertility	27 (3%)	177 (18%)	27/177 (15%)
Painful sex	27 (3%)	620 (63%)	27/620 (4%)
Pain emptying bowels	21 (2%)	587 (60%)	21/587 (4%)
Mood disturbances	18 (2%)	745 (76%)	18/745 (2%)
Migraine	17 (2%)	402 (41%)	17/402 (4%)
Nausea	15 (2%)	644 (66%)	15/644 (2%)
Bowel dysfunction	14 (1%)	519 (53%)	14/519 (3%)
Uterus pain	11 (1%)	563 (57%)	11/563 (2%)
Irregular bleeding/ spotting	10 (1%)	443 (45%)	10/443 (2%)
Rectal pain	9 (1%)	549 (56%)	9/549 (2%)
Constipation	8 (1%)	663 (67%)	8/663 (1%)
Diarrhea	7 (1%)	535 (54%)	7/535 (1%)
Irregular menstrual cycles	7 (1%)	430 (44%)	7/430 (2%)
Headache	4 (0%)	664 (68%)	4/664 (1%)
Blood clots during a period	3 (0%)	512 (52%)	3/512 (1%)
Other	17 (2%)	109 (11%)	17/109 (16%)

[a] Participants may have selected more than one symptom therefore percentage totals are not equal to 100.

(5-point Likert with descriptors) was the most favored with an average score of 22.1/25, followed by Scale 2 (5-point Likert with anchors) (21.6/25), and Scale 3 (11-point Likert with anchors) (21.4/25).

3.2.3 | Recall period

In total, 726 (76%) participants reported that their answer would stay the same if asked to identify their "most impactful symptom" over a recall period of 1 month. Of the remaining participants, 38 (4%) indicated that they were unsure if their answer would have changed, and 188 (20%) indicated that their answer would have been different. Participants who originally selected pelvic pain (17%), abdominal pain (8%), and fatigue (8%) were most likely to change their answers based on the shorter recall period (Table S8). The most common reasons for the change were fluctuations in symptoms (70%) and the influence of an intervention (21%) (Table S9).

4 | DISCUSSION

Consistent with existing literature, participants in this study reported a variety of symptoms, including, but not limited to, pain in the abdominal and pelvic regions, symptoms associated with the menstrual cycle, bloating, fatigue, and back pain. This study found

TABLE 5 Impact scores for the most impactful symptoms, $n = 983$.

Most impactful symptoms	Mean score (/100)	*n* (%)[a]
Infertility	99.8	27 (3%)
Irregular menstrual cycles	95.3	7 (1%)
Constipation	92.1	8 (1%)
Nausea	91.6	15 (2%)
Mood disturbances	91.1	18 (2%)
Irregular menstrual bleeding/spotting	90.6	10 (1%)
Bloating	90.3	34 (3%)
Cramps	89.9	70 (7%)
Blood clots during a period	88.6	3 (0%)
Period pain	88.5	62 (6%)
Migraine	87.8	17 (2%)
Abdominal pain	87.7	146 (15%)
Ovary pain	86.9	67 (7%)
Back pain	86.7	64 (7%)
Painful sex	86.1	27 (3%)
Heavy menstrual periods	86.0	28 (3%)
Leg/hip/groin pain	86.0	47 (5%)
Diarrhea	85.8	7 (1%)
Fatigue	85.7	50 (5%)
Pelvic pain	84.9	197 (20%)
Pain emptying bowels	84.7	21 (2%)
Bowel dysfunction	83.3	14 (1%)
Uterus pain	82.5	10 (1%)
Rectal pain	82.4	9 (1%)
Headache	67.0	4 (0%)
Other	94.0	16 (2%)

[a] Total does not equal 983 due to missing data from five participants.

that there is also considerable heterogeneity in the impact of these symptoms among individuals and which symptoms cause the most impact. Measuring the "most impactful symptom" was recently selected as the most appropriate construct or term for prioritizing endometriosis symptoms, as it recognizes the seriousness of symptoms and allows for a deeper appreciation of the consequences on daily living.[6] This study is the first to explore the concept of "most impactful symptom" among people with endometriosis.

The degree of symptom impact was high. The mean impact scores for all symptoms apart from "headache" surpassed 80/100. This finding was not surprising, as it is well documented that significant impairments in daily functioning are common for people living with endometriosis and that symptoms negatively affect quality of life.[17,18] Such impacts on daily living include loss of productivity and absenteeism from work,[19] financial strain,[20] compromised intimate relationships,[21] and mental health challenges.[22] The symptoms of endometriosis have the potential to create substantial impact and interference with the lives of people living with the condition.

Pain symptoms were common, with 99.6% of participants experiencing at least one pain-related symptom. These results are in line with previous findings that pain is a predominant symptom of endometriosis.[18,23,24] However, there was noticeable variability in the location and timing of pain (especially in regard to the menstrual cycle) and also in the subjective descriptions reported by participants. Interestingly, "pain" without any additional descriptor, was the most frequently listed symptom when participants were asked to provide a free-text list of their symptoms (49%, Survey 1). Additionally, just under half (47%) of participants reporting "pain" also nominated this as their most impactful symptom in Survey 1. Due to the nature of this study, we were unable to probe individuals to better understand the location or nature of this "pain."

"Pelvic pain" and "abdominal pain" were two of the most commonly reported symptoms across both surveys. However, participants also frequently reported pain localized to specific organs within these regions, such as "uterus pain" and "ovary pain." This finding suggests that people living with endometriosis employ diverse terminology to express what may be a similar symptom experience. A significant proportion of participants across both surveys (94%) experienced at least one COPC. This high prevalence suggests these multiple pathologies contribute to the overall symptom experience, and the complex interplay of different health conditions may be complicating how symptoms are perceived and described. Additionally, without follow-up questioning, it remains unclear how participants distinguished between symptoms and may have been potentially influenced by a lack of anatomical knowledge, as in general, women have poor knowledge of specific female reproductive anatomy.[25]

This study and survey design involved direct input from people with a history of lived experience of endometriosis, ensuring comprehensive, patient-centered representation of the symptom experience. Despite the data being categorized by the research team and people with experience with endometriosis, participants were provided with the flexibility of free-text responses to maintain the patient-focused approach of the study. The large sample size and inclusion of participants from diverse locations through international recruitment, enhancing the external validity of the findings, are also major strengths.

While the sample size was large, it may not be fully representative of the diversity of the endometriosis population globally, and therefore caution is required when generalizing findings. Selection bias of participants may have been introduced due to the online methodology, potentially excluding individuals who do not engage with digital media, particularly those from rural and remote areas.[26] The inclusion criteria, restricting only those with English fluency, resulted in a lack of input from people who speak other languages.

The findings of this study have implications for the development of a new patient-reported outcome measure to assess the "most impactful symptom" in individuals with endometriosis. The diversity of the symptoms experienced creates challenges in making a condensed list of symptoms that is practical and useful in a clinical trial setting. Use of a short, fixed-item list would not permit every single individual to select their “most impactful symptoms.” A possible solution may be to allow people to provide their own symptom/s using a free-text field. However, this may risk the inclusion of symptoms that are not considered to be attributable to endometriosis or are not likely or intended to be affected by interventions to manage pain and symptoms in a clinical trial, such as “infertility.”

The consideration of an appropriate recall period to measure the “most impactful symptom” of endometriosis was a major consideration of this study. A fifth of participants indicated that their symptoms would differ if the recall period were shortened to 1 month, with most citing the reason being fluctuations in symptoms between months, especially due to menstrual cycles. This is an important finding and suggests that a recall of at least 3 months is needed to accurately capture the wide impact of endometriosis symptoms.

5 | CONCLUSION

This study demonstrates the significant impact and heterogeneity of symptoms experienced by individuals with endometriosis. It introduces the concept of assessing for the “most impactful symptom” in this population, with participants reporting high impact scores for the majority of these symptoms. The “most impactful symptom” varies between participants, and no single symptom is the most common. The results from this study have informed the initial development of an outcome measurement instrument to assess the ‘most impactful symptom’ of endometriosis by highlighting the symptoms that typically impact people the most. The variability in responses, however, emphasizes the potential need for a personalized approach to capture these diverse symptom experiences.

AUTHOR CONTRIBUTIONS

Alice M. Mitchell, Sarah Lensen, K. Jane Chalmers, and Steven J. Kamper conceived the idea for this study. Alice M. Mitchell coordinated participant recruitment and data collection. Helena Frawley, Martin Healey, Claudia Cheng, and K. Jane Chalmers assisted with categorizing symptom data between Survey rounds. Data analyses were performed by Alice M. Mitchell. The first draft of the manuscript was written by Alice M. Mitchell. K. Jane Chalmers, Sarah Lensen, and Steven J. Kamper commented on previous versions. All authors contributed to critical review of the manuscript and read and approved the final version.

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CONFLICT OF INTEREST STATEMENT

All authors report no conflicts of interest.

ETHICS STATEMENT

Approval for this study was granted by the University of Melbourne Human Research Ethics Committee on February 1, 2023 (Reference Number 2023-25369-39051-6).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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