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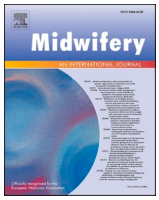

Obstetric and medical factors rather than psychosocial characteristics explain why eligible women do not complete the enhanced recovery after elective caesarean (EREC) pathway: A prospective cohort study

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ABSTRACT

Background: An Australian health-service implemented an 'enhanced recovery after elective caesarean' pathway with next-day discharge.
Problem: Previous anecdotal reports indicated that a large percentage of eligible women were not discharged the next day and therefore were not regarded as having completed the pathway. Psychosocial factors were expected to be the leading reason for prolonged hospitalisation.
Aim: The study objectives were to: enumerate the percentage of women assessed as eligible for EREC who subsequently did not complete the pathway and the reasons; and to describe women's antenatal satisfaction with preparation, preferences, and perceived support. Women who completed the pathway versus those who did not were compared on antenatal biopsychosocial characteristics.
Methods: This exploratory prospective cohort study enrolled consenting eligible women from antenatal clinics and used patient records and questionnaire data. Comparative statistical techniques were used.
Findings: 62 % of women did not complete the pathway, with medical and obstetric factors being the most common reasons (80 %). There was statistically significant evidence of lower antenatal stress levels for those who completed EREC (median=5) relative to those who did not (median=8; $P = 0.035$); although these findings may not be of clinical importance. Antenatally, 51 % of women felt prepared for early discharge, 36 % needed more information, 19 % disliked hospital, 93 % agreed that family togetherness after birth was important. Most agreed that staff (76 %) and family (67 %) supported the pathway.
Conclusion: This study indicated that a large percentage of women assessed as eligible did not complete EREC and that obstetric and medical factors, rather than psychosocial characteristics, largely explained this. This provides reassurance to clinicians and women that discharge home is working as intended and is useful for planning similar models of care. Higher stress levels in the antenatal period were demonstrated for women who did not complete EREC suggesting the need for further research into how to support these women.

Introduction

Enhanced recovery after surgery (ERAS) has been implemented in several surgical settings with the intention to reduce length of hospital stay and to improve patient outcomes. ERAS is defined as an improved care approach for surgery, which includes preoperative care and education, improved surgical, anaesthetic and pain management techniques, and changes to post-operative rehabilitation such as earlier mobilisation, catheter removal, and cessation of fasting (Aluri and Wrench, 2014; Ilyas et al., 2019; Lucas and Gough, 2013; McNaney, 2011). Given these improvements, it is expected that the patient will have a quicker recovery (Aluri and Wrench, 2014; Lucas and Gough, 2013; McNaney, 2011), contributing to the increased trend of reduced hospital stays (McNaney, 2011).

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More recently, ERAS protocols have been implemented in obstetric care, specifically after caesarean sections (Aluri and Wrench, 2014; Bowden et al., 2019; Cusack et al., 2018; Lucas and Gough, 2013; Peahl et al., 2019). Research on enhanced recovery in obstetric settings indicate a reduction in lengths of stay (Corso et al., 2017; Fay et al., 2019; Suharwardy and Carvalho, 2020) with no significant impact on readmission rates (Cusack et al., 2018; Fay et al., 2019) and evidence of improved outcomes specifically in relation to opioid use (Mullman et al., 2020) and pain levels (Pan et al., 2020). Importantly, two reviews have shown that enhanced recovery protocols on balance improved patient outcomes, satisfaction, reduced hospital stays and costs, with no indication of patient harm (Suharwardy and Carvalho, 2020; Sultan et al., 2020). In 2016, a maternity service in South Australia implemented a practice development initiative called 'Enhanced Recovery after Elective Caesarean (EREC)' (Cusack et al., 2018), the first of its kind in Australia. EREC involves antenatal preparation and proactive postnatal care such as encouraging mobility, early cessation of fasting, and criteria-led hospital discharge. The pathway protocol includes next-day discharge for women and their babies 24–36 h after an elective caesarean section. Women on the pathway receive additional community support at home from the local hospitals' visiting midwifery service and the option of 'Mothercarers'. Mothercarers assist women in the postnatal period with emotional and practical home support such as performing household duties. In 2016 there were 622 elective caesarean sections at the maternity service, and 274 were initially identified as being eligible for EREC. Of these, 92 (33.6 %) completed EREC and were discharged the next day (Cusack et al., 2018). A qualitative study with eleven women who completed the EREC pathway in 2016 also indicated that the pathway was acceptable and all women interviewed were satisfied (Cusack et al., 2020). The same study also indicated that certain aspects of care were an essential part of a positive experience. These included antenatal support from social networks and healthcare staff, adequate and timely information and reassurance of additional hospitalisation if required (Cusack et al., 2020).

To implement EREC, a working group consisting of midwives, obstetricians, hospital administrators and researchers was established. Among objectives such as monitoring the safety of the pathway, the Working Group was especially interested in the outcome of a next-day discharge for women. Given this, completion of the EREC pathway was defined as having a next-day discharge. Initial reports from midwives suggested that a substantial sub-set of women eligible for next-day discharge were remaining in hospital beyond this period. The Working Group believed that psychological and social reasons including lack of social support, mental health concerns, and personal preferences would be the biggest contributing factor for having a longer length of stay and therefore not completing the pathway within the specified timeframe. This belief was largely based on anecdotal evidence and the fact that the health service was located in an area with relatively high levels of socioeconomic disadvantage (Australian Bureau of Statistics, 2018). Literature suggests that in non-maternity settings, individual patient demographic, psychological, and social reasons impact on successful uptake of ERAS. A systematic review by Stone et al. (2018) on ERAS implementation and a qualitative study on enhanced recovery with colorectal surgery (Lyon et al., 2014) reported that successful implementation was dependent on individual characteristics of the patient (Stone et al., 2018). In particular, barriers to successful implementation included various comorbidities, age, socioeconomic status, patient expectations and personality (Lyon et al., 2014; Stone et al., 2018). Research on enhanced recovery for colorectal surgery patients indicated that preoperative anxiety and previous medical history predicted prolonged hospital stays (Keller et al., 2017). Operative, demographic and procedural deviations also predicted a prolonged length of stay following enhanced recovery with laparoscopic colorectal surgery (Boulind et al., 2012). The systematic review by Stone et al. (2018) did not include any obstetric studies, indicating a gap in the literature.

In response to this gap and observations from midwives, this exploratory study's main aim was to understand factors that may predict completion of the EREC pathway within the specific timeframe. Specific objectives were to: 1) enumerate the percentage of women assessed as eligible for EREC who subsequently did not complete EREC defined as having a next-day discharge; 2) categorise the reasons for women not completing the pathway and to determine if psychosocial factors were the most common reason as expected by the Working Group; and 3) describe women's antenatal biopsychosocial characteristics and satisfaction with preparation for EREC, preferences for postnatal care, and perception of support for EREC by hospital staff and family; 4) To compare women who completed the pathway versus those who did not on antenatal demographics, physical health, psychological wellbeing and social support; this was conducted instead of an initially planned predictive study.

Methods

Study design and research setting

An exploratory prospective cohort study was implemented at a large tertiary metropolitan health service in South Australia, Australia. At this health service, women's antenatal care is provided at two hospital sites (site 1 and site 2), with birthing and recovery occurring only at site 1. Women were assessed as eligible for the EREC pathway by obstetric staff at the health service. To be eligible for EREC women had to: be scheduled for an elective caesarean section; be multiparous with a singleton foetus; be living within the community midwifery catchment area (northern metropolitan area); have no major comorbidities including mental health concerns; and have social supports in the community.

For this study, women on the EREC pathway were recruited in the antenatal clinics of the two hospital sites. To participate in the study, women had to be on the EREC pathway and be over the age of 18. Women were consented to the study between 13 and 36 weeks' gestation as this was the period of time women were most likely to be assigned to the pathway. Women were excluded if they did not meet the above criteria, did not speak English or have a translator/translated copy of participant material in their preferred language.

EREC completion was defined as having had an elective caesarean section and being discharged home 24–36 h after birth (next-day discharge). The study design and recruitment process are presented in Fig. 1. The study was approved by the Central Adelaide Local Health Network Human Research Ethics committee and University Human Research Ethics Committee and was conducted in accordance with the National Health and Medical Research Council National Statement (NHMRC) on Ethical Conduct in Human Research 2007 (updated 2018) (NHMRC, 2007). This paper was written in accordance with the STROBE statement for cohort studies (von Elm et al., 2007).

Participant recruitment

The baseline antenatal recruitment period was between June and December 2019. The main researcher (CD) systematically recruited women to the study at different days and times during this 7-month recruitment period, to maximise the opportunity for a representative study sample of participants. The researchers aimed to recruit all available and consenting women during this timeframe, hence a sample size calculation was not conducted. The waiting rooms of both antenatal clinics displayed flyers alerting women to the study. Potentially eligible women were identified to the researcher by midwives from the antenatal clinics and CD scheduled attendance for recruitment at the antenatal clinics accordingly. The researcher approached potentially eligible women in the waiting room and if they were amenable, verbally introduced the study to them. Potential participants were provided a study invitation letter, information sheet, and consent form. Women were required to give informed consent to complete a questionnaire (detailed below) and to allow access to their patient records for the purposes of

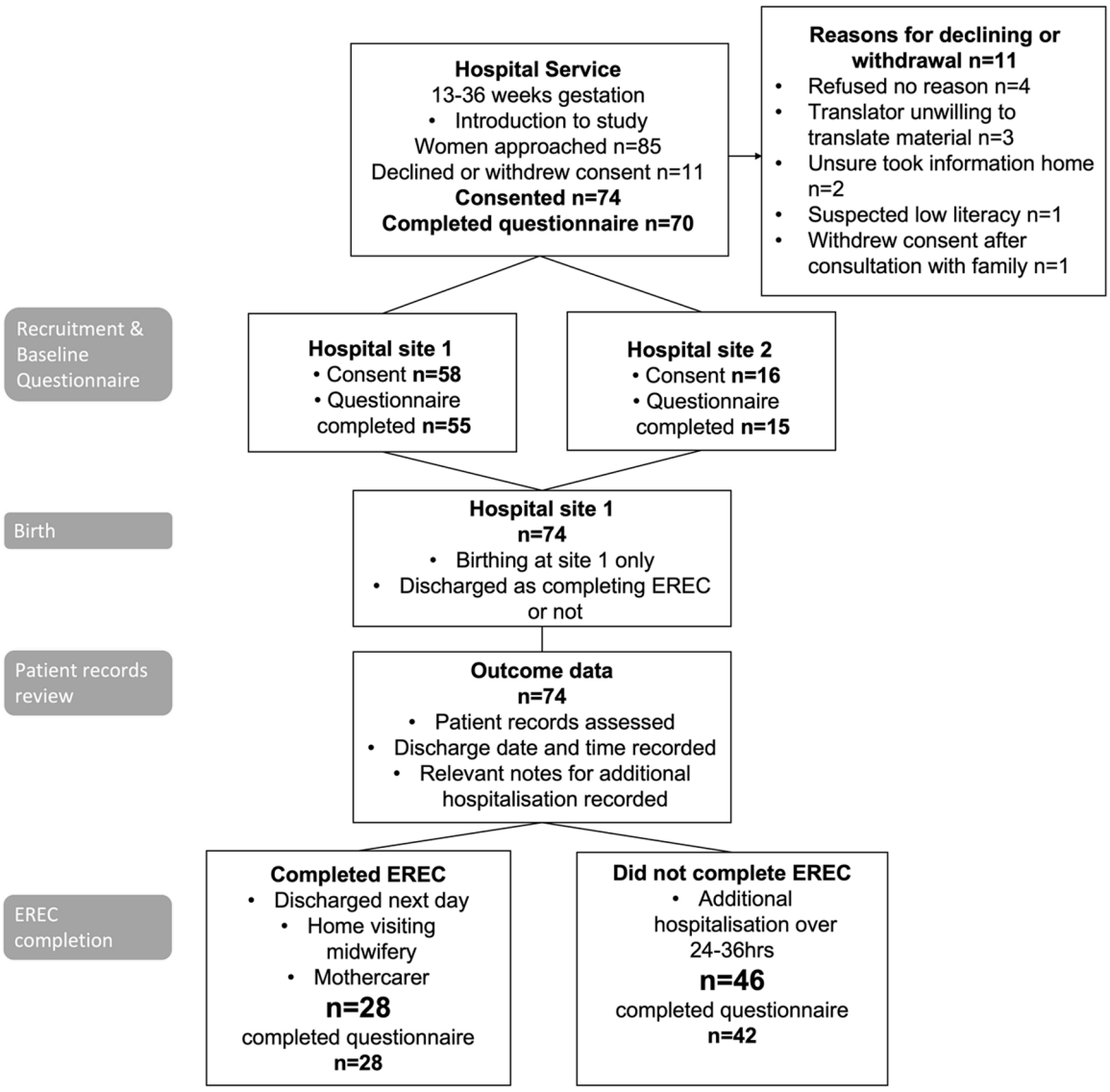

Fig. 1. Study flow diagram.

this study. Women from non-English speaking backgrounds, including those who required a translator, were also approached for recruitment. Study materials were translated into Nepali and Persian, the two most common language groups other than English at the maternity service, and translators were also asked to assist where necessary. The researcher was not involved in the day-to-day running of the program and was not involved with women's health care.

Piloting of the antenatal questionnaire

The EREC Working Group and a Midwifery Advisory Group which consisted of several senior midwives reviewed the questionnaire prior to piloting to ensure face validity and readability. Two participants were recruited in an initial pilot phase which resulted in no need for changes to the process or questionnaire, and given this, a decision was made to include them in the main study.

Antenatal questionnaire

The antenatal questionnaire included questions about demographic details, physical health, psychological wellbeing, social support, and opinions about the EREC pathway. The questionnaire takes no longer than 20 min to complete.

Demographics

Demographic data included: maternal date of birth, postcode, country of birth, date of arrival to Australia (if born overseas), language spoken at home and highest level of education completed. The categories for highest level of education completed were developed using questions based on the Australian Bureau of Statistics classification standards (Australian Bureau of Statistics, 2001).

Physical health

Data collected on women's relevant medical history included: weeks gestation at the time of completing the questionnaire and the date of scheduled caesarean section (if known), parity, and their previous mode of birth. Women's current physical health status was determined using the EuroQol Five Dimensions (EQ-5D-5L) questionnaire, a commonly reported measure of overall health (EuroQol Research Foundation, 2019; Herdman et al., 2011; McCaffrey et al., 2016). From a systematic review of 99 studies, the EQ-5D-5L has excellent psychometric properties including validity and reliability (Feng et al., 2021). The EQ-5D-5L has two parts, the first is a measure of five health states (mobility; self-care; usual activities; pain/discomfort; and anxiety/depression)

relating to quality of Life (QoL) and the second is a visual analogue scale (VAS) to indicate perceived current level of health from 0 (worst health imaginable) to 100 (best health imaginable). The five health states are scored on a five-level response scale ranging from −0.281 to 1, which are compared with UK norms (Devlin et al., 2018; EuroQol Research Foundation, 2019; McCaffrey et al., 2016). The EQ-5D-5L was available in both Nepali and Persian (EuroQol Research Foundation, 2019).

Psychological wellbeing

Depression, anxiety, and stress were measured using the 21-item Depression, Anxiety, and Stress Scale (DASS-21) (Lovibond and Lovibond, 1995). Responses were scored on a five-point Likert scale where higher scores indicate higher levels of distress. Responses are multiplied by two with a possible range of 0–41 for each sub-scale (Lovibond and Lovibond, 1995). The DASS-21 is typically interpreted by using cut-off scores for levels of severity which include normal, mild, moderate, severe, and extremely severe (Lovibond and Lovibond, 1995). The DASS-21 has good validity and fair reliability (Henry and Crawford, 2005). The DASS-21 was available in both Nepali and Persian (Sahebi et al., 2005; Tonsing, 2014).

Social support

Social support was measured using the eight-item modified Medical Outcomes Study Social Support Survey (mMOS-SS) (Moser et al., 2012). The mMOS-SS consists of two sections that are scored separately. Section one is a single question asking for the rough number of close friends and family available for social support. Section two consists of eight-items on a five-point Likert scale asking about available support in specific domains, e.g., for help with daily chores if you were sick. The total average scores of section two are transformed to a 0–100 scale, with higher scores indicating greater support (Moser et al., 2012). The mMOS-SS has good internal validity and excellent reliability (Moser et al., 2012).

Women were also asked additional questions designed for this study about their practical support at home. Specifically, they were asked to indicate using a five-point Likert scale (e.g., all of the time, some of the time) how often an adult would be available for support at home after hospital discharge and how often they would likely have support with childcare (if applicable) in the first few days after discharge.

EREC specific questions

Women's antenatal satisfaction with preparation for EREC, preferences for postnatal care and perception of support for EREC by healthcare providers and family were assessed with purpose–designed questions by the researchers of this study. They were asked to indicate on a five-point Likert scale there: preparedness for early discharge; need for more information on EREC; preference for hospital versus home recovery; dislike of hospital; preference to be together as a family after birth and if both their family and hospital staff seemed to support EREC.

Data collection

Questionnaires could be returned directly after completion during the antenatal visit, or via a prepaid return envelope addressed to the researcher. One woman filled in the translated questionnaire in Nepali. DASS-21 scores were calculated on the day of return and women whose scores were in the moderate to extremely severe range (see supplementary table S1 for data by severity ratings) were contacted by a midwife to follow-up on their mental health and to offer additional support.

To determine completion of EREC, women's electronic patient records were accessed to derive: admission date, mode of birth (vaginal, emergency caesarean, elective caesarean), discharge date and time. Where applicable, relevant notes outlining reasons for non-completion of the EREC pathway were abstracted. Two researchers (LC and BK) with clinical midwifery backgrounds independently coded the notes in the first instance and then met to discuss the codes (with no disagreements). Reasons were coded into the following categories: medical, obstetric, neonatal, psychosocial, and unknown. Medical reasons were defined as either a pre-existing condition or a condition which could have occurred regardless of pregnancy or birth (e.g., high blood pressure, diabetes, respiratory issues). Obstetric reasons were defined as specifically relating to pregnancy, birth, or recovery (e.g., preeclampsia, emergency caesarean section, vaginal birth, postpartum haemorrhage). Psychosocial reasons were defined as a mental health concern (e.g., depression) or social situation such as inadequate social support and relationship or housing issues. Unknown reasons were defined as those where no relevant notes indicating a reason for a prolonged stay were recorded.

Data analysis

As this was a pragmatic exploratory study, no formal sample size calculation was conducted. Sample was dictated by researcher capacity and processes were put in place to maximise sample size and to recruit a representative sample of participants.

Data analysis was conducted using R, version 4.0.3. Where participants' responses to the questionnaire were unclear (e.g., marking two inconsistent answers), they were coded as missing. After team discussion to ensure no loss of meaning, some categorical responses to questions were collapsed for reporting due to insufficient data in some categories. Responses to the question relating to the number of available supports at home were collapsed into four categories with 'one adult' and 'more than one adult' collapsed into a single category 'one or more adult'. Similarly, responses to the question relating to available supports for childcare of 'most', 'some' or 'little' of the time were collapsed into one category 'adult part of the time'. Country of birth was categorised into Australia and 'other' with the 'other' category encompassing 15 different countries.

The Mann Whitney U test was used for comparisons of characteristics for women who completed EREC versus those who did not as quantitative data were typically found to have skewed distributions with the homogeneity of variance assumption commonly violated. By convention, confidence intervals for the differences in medians were not reported for the Mann Whitney U test. P-values are not adjusted for multiple comparisons as this was an exploratory study.

Results

Study uptake

A total of 85 women were approached during the recruitment period. Of these, 11 women declined to participate or withdrew consent, leaving 74 women consenting to participate (described in Fig. 1). Of the 74 women who consented, 70 completed the questionnaire resulting in a completion rate of 82 %.

Estimates from hospital records indicated that approximately 112 women should have been eligible during the recruitment period. Obtaining complete data on 70 women thus equates to enrolling approximately 62.5 % of the potentially eligible population over the recruitment period.

Participants

Women who consented to the study and completed the antenatal questionnaire had a mean age of 31, which is comparable to the available data on the age of women birthing in Northern Adelaide in 2019 (Australian Bureau of Statistics, 2019), were more commonly born in Australia and spoke English at home (Table 1). Most women (93 %) had a previous caesarean section. Median scores on depression, anxiety, and stress were within the normal range in terms of severity cut-off. Median gestation at time of completing the antenatal questionnaire was 31 weeks. Women generally reported high levels of social support and all

Table 1
Antenatal descriptive statistics for women at the time of questionnaire completion.

Age^: mean(SD)	31(4)		
	frequency(%)		*frequency(%)*
		Previous caesarean (emergency or elective)	
Country of birth		yes	65(93)
Australia	46(66)	no	2(3)
Other	23(33)	missing	3(4)
Missing	1(1)	**Available home support first few days**	
Language spoken at home			
English	59(84)	One or more adult all day	43(61)
Persian	3(4)	Adult after work	8(11)
Punjabi	2(3)	Adult most of the day	6(9)
Nepali	1(1)	None of the time	0
Arabic	1(1)	missing	13(19)
Vietnamese	1(1)	**Available childcare support first few days**	
Kiswahili	1(1)		
Missing	2(3)	Adult all the time	36(51)
Highest level education completed		Adult part of the time	20(29)
		None of the time	1(1)
Post-graduate	5(7)	missing	13(19)
Graduate diploma/certificate	1(1)		
University Bachelors	9(13)		*Median, IQR*
Diploma	4(6)	**Weeks Gestation**	31, [23,34]
Certificate	23(33)	**Depression***	2, [0,6]
High school	23(33)	**Anxiety***	4, [2,6]
Primary school	0	**Stress***	6, [4,14]
Missing	5(7)	**Health State (QoL)****	0.77, [0.68,0.84]
Parity at antenatal visit		**Overall health (VAS)****	75, [70, 90]
1 live birth	39(56)	**Social support****	91, [75,100]
2+ live births	27(39)	**Number people to provide social support**	6, [4,10]
Missing	4(6)		

^ Symmetric distribution indicating mean and SD are appropriate descriptors.
* Higher score means worse depression, anxiety, and stress (0–42 each sub-scale).
** Higher score means better social support (0–100), Quality of Life (QoL) (−0.281–1) and overall health Visual Analogy Scale (VAS) (0–100). Note: one response was missing for all continuous variables other than age, two missing for social support, three for the number of people to provide social support and 4 missing for weeks gestation.

participants expected to have an adult at home for most of the day after birth, with a majority (61 %) expecting this adult to assist all day. Similarly, post-discharge, all but one participant expected to have support with childcare, with 51 % expecting someone all of the time and 29 % at least part of the time. Women also had moderate QoL and overall health.

Findings

Of the 74 women assigned to EREC in the study, 46 did not complete the pathway. Thus, 62 % of women did not complete the EREC pathway (i.e., were not discharged the next day) (see Fig. 1). Documented reasons for not completing the EREC pathway are described in Table 2, where length of stay beyond 24–36 h was largely due to obstetric and medical reasons.

Given the dominance of medical and obstetric reasons, it was clear that a predictive model for completion of the EREC pathway would be uninformative and redundant, given this a predictive analysis was not completed. The demographics and antenatal biopsychosocial profiles for women who completed or did not complete the pathway were subsequently compared, with results in Tables 3 and 4, respectively.

Table 2
Documented reasons for not completing EREC pathway ($n = 46$).

	frequency (%)
Obstetric (e.g., preeclampsia, emergency caesarean section, vaginal birth, postpartum haemorrhage)	*29(63)*
Medical (e.g., high blood pressure, diabetes, respiratory issues)	*8(17)*
Neonatal (e.g., neonatal intensive care unit admission)	*2(4)*
Psychosocial (e.g., depression)	*2(4)*
Obstetric and Psychosocial	*1(2)*
Unknown	*4(9)*
Total	46(100)

As observed in Table 3, women who did not complete EREC were slightly more likely to speak English at home and less likely to have support of an adult all the time in the first few days, with both childcare and general home support.

There was no significant evidence of differences between the two groups on median levels of anxiety, depression, QoL, overall health or social support (Table 4). However, women who completed the pathway had significantly lower median antenatal stress levels relative to those who did not (5–8 = −3) ($U = 402$, $P = 0.035$).

Our final objective was to describe women's antenatal satisfaction with preparation, preferences for care and perceived support for EREC from others. From Table 5 we can see that only 51 % agreed or strongly agreed that they felt prepared for early discharge and 36 % reported they needed more information. Sixty-eight percent indicated that they either strongly disagreed or disagreed with the statement that they disliked hospitals, although women's preferences for recovering in hospital versus home varied widely. Ninety-three percent of women either agreed or strongly agreed that being together as a family after birth was important. Furthermore, most women agreed or strongly agreed that hospital staff (76 %) and family (67 %) were supportive of EREC.

Discussion

Concerns that a large percentage of women initially assessed as eligible were subsequently not completing EREC were confirmed in this study, as 62 % of study participants did not go home the next day. Psychological and social reasons were initially purported to be the main reason for not completing the pathway. However, this study indicated that the main reasons related to physical concerns, that is, obstetric

Table 3
Antenatal descriptive statistics of women who completed the questionnaire delineated by EREC completion ($n = 70$).

	Completed EREC *(n = 28)*	Did not complete EREC *(n = 42)*
Age^: mean(SD)	*31(5)*	*32(4)*
	frequency(%)	*frequency(%)*
Country of birth		
Australia	19(68)	27(64)
Other	8(29)	15(36)
missing	1(4)	0
Language spoken at home		
English	22(79)	37(88)
Other	5(18)	4(10)
missing	1(4)	1(2)
Education highest level completed		
Postgraduate	3(11)	2(5)
Graduate diploma/certificate	1(4)	0
University bachelors	4(14)	5(12)
Diploma	2(7)	2(5)
Certificate	8(29)	15(36)
Highschool	8(29)	15(36)
missing	2(7)	3(7)
Parity at antenatal period		
1 live birth	18(64)	21(50)
2+ live births	9(32)	18(43)
missing	1(4)	3(7)
Home support available first few days		
One or more adult all day	19(68)	24(57)
Adult most of the day	4(14)	2(5)
Adult after work	0	8(19)
missing	5(18)	8(19)
Help with other children available first few days		
Adult all the time	18(64)	18(43)
Adult part of the time	6(21)	14(33)
None of the time	0	1(2)
missing	4(14)	9(21)

^ Symmetric distribution indicating mean and SD are appropriate descriptors.

reasons (63 %; such as preeclampsia, postpartum haemorrhage), or medical reasons (17 %; such as high blood pressure and diabetes). Hence, a predictive analysis was redundant given the identified medical and obstetric factors as reasons for additional hospitalisation. These findings are consistent with previous literature which found that pathology and intraoperative complications (e.g. operating times and blood transfusions) were the strongest predictors of prolonged hospitalisation after ERAS (Keller et al., 2017, 2014). Women and staff should be reassured by this finding, as it indicates that women are not being discharged home if they are not medically well. This finding, alongside other data regarding hospital readmission rates (Cusack et al., 2018; Klaer et al., 2018) suggest that the EREC pathway is not associated with negative clinical sequelae.

Furthermore, psychosocial reasons may not have greatly influenced EREC completion due to the pathway's eligibility criteria of requiring adequate social support and women not having major comorbidities, including major psychiatric concerns. Baseline data supports this, as women in the cohort had high levels of social support (see Table 1) (Moser et al., 2012; Sherbourne and Stewart, 1991) and on average DASS-21 scores were in the normal range when compared using severity cut-offs for depression (90 %), anxiety (65 %), and stress (80 %; see supplementary Table S1 for data by severity ratings)(Lovibond and Lovibond, 1995). When compared to Australian norms, this cohort had similar or the same median depression and stress levels but with slightly higher median anxiety scores. Although, importantly, it should be noted that normative data on the DASS-21 is not pregnancy specific (Crawford et al., 2011). Furthermore, all women who scored moderate to extremely severe on the DASS-21 were referred to midwives for additional follow up and this may have acted as an antenatal intervention and influenced their outcomes on EREC. That is, they may have received additional support which reduced their likelihood of not completing EREC due to psychosocial reasons. Women in the study cohort were also more likely to speak English as their first language when compared to representative local data (Australian Bureau of Statistics, 2017).

There was no significant evidence of a difference between groups on anxiety, depression, QoL, and social support (Table 4), which is understandable given that medical and obstetric reasons were the main factors for not completing EREC. In contrast, women who did not complete EREC had higher median antenatal stress scores indicating worse stress on average. Although, the median stress scores of both groups were still in the normal range. Furthermore, the p-value was not adjusted for multiple comparisons and the observed difference may not be of clinical importance. Nevertheless, more research is needed to better understand the experiences of stress among women assigned to EREC in the antenatal period as this could assist in tailoring the support services for women on the pathway.

Women's antenatal reports about their preparation for EREC indicated that there was some room for improvement in information provision and preparation for discharge. We note that this may have been affected by women's gestation at the time of completing the questionnaire, that is, women who completed the questionnaire later in their pregnancy may have felt more prepared (the interquartile range for questionnaire completion was from 23 to 34 weeks gestation). This is generally supported by our previous qualitative study which indicated that post-discharge, women reported generally feeling informed and prepared to go home when the time came, although new information post-discharge was sometimes difficult to retain (Cusack et al., 2020). Women's preferences for care may in some instances influence the likelihood of early discharge. Women's preference to recover at hospital varied among study participants, although most women indicated that they did not dislike hospital. Most women agreed that being together as a family after birth was important and previous evidence showed that recovering with family was seen as a particularly positive outcome of EREC (Cusack et al., 2020). Perception of support for EREC by

Table 4
Comparison of antenatal, psychological wellbeing, QoL, overall health and social support delineated by EREC completion ($n = 69$).

	Completed EREC *(n = 28)* Median, IQR	Did not complete EREC *(n = 42)* Median, IQR	P-value
Depression*	2, [0,2.5]	2, [0,6]	0.31
Anxiety*	4, [2,6]	6, [2,12]	0.09
Stress*	**5, [2,10]**	**8, [4,16]**	**0.035**
Health states QoL**	0.80, [0.74,0.86]	0.75, [0.67,0.72]	0.31
Overall health (VAS)**	80, [50,90]	75, [10,86]	0.052
Social support**	93.8, [80.5,100]	87.5, [71.9,100]	0.16
Number people to provide social support***	6, [5,10]	6, [4,10]	0.50

* Higher score means worse depression, anxiety, and stress (0–42 each subscale).
** Higher score means better social support (0–100), QoL (−0.281–1) and overall health (0–100).
*** Based on 67 responses (3 missing).

Table 5
Frequency(%) of antenatal agreement on satisfaction with preparation, preferences for care and perceived support for EREC ($n = 70$).

	Strongly disagree	disagree	Not sure	agree	Strongly agree
Satisfaction with preparation					
Prepared for early discharge	5(7)	7(10)	22(31)	21(30)	15(21)
Need more information about EREC	10(14)	23(31)	12(17)	23(33)	2(3)
Preferences for care					
Prefer to recover at hospital	7(10)	17(24)	17(24)	16(23)	13(19)
Dislike hospital*	8(12)	39(56)	9(13)	8(12)	5(7)
Together as a family is important	0	2(1)	4(6)	26(37)	39(56)
Perceived support for EREC by significant others					
Hospital staff supportive of EREC**	0	2(3)	14(21)	33(49)	18(27)
Family supportive of EREC***	1(1)	7(10)	14(21)	22(32)	24(35)

* based on 69 responses (1 missing).
** based on 67 responses (3 missing).
*** Based on 68 responses (2 missing).

significant others (hospital staff and family) is also known to be an important indicator of confidence with enhanced recovery (Cusack et al., 2020), so it was reassuring to see that women in the current study generally felt that both staff and family were supportive of EREC and early discharge. This is a positive indication, as staff buy-in supports the successful implementation of enhanced recovery (Cusack et al., 2020; Lyon et al., 2014; Stone et al., 2018), and support from family facilitates preparation and recovery at home (Cusack et al., 2020).

Strengths and limitations

This is the first Australian study to report on enhanced recovery after an elective caesarean and our systematic recruitment approach resulted in us acquiring approximately 62.5 % of the estimated eligible population assigned to EREC. While the overall sample was modest and the population size is only an estimate, we believe the findings will be useful to others planning similar services. Similarly, while the response rate was high, there is a possibility that women who declined ($n = 10$), withdrew ($n = 1$), or did not attend appointments and were therefore not approached, were at greater risk of not completing the pathway due to psychosocial factors which we were unable to document. In addition, the recruitment period from 13 to 36 weeks' is also as limitation. While the interquartile range for the questionnaire completion was from 23 to 34 weeks gestation; the timing of the antenatal questionnaire may not have been relevant to women's postnatal psychosocial context. Additionally, EREC completion was defined according to length of hospital stay as documented in electronic notes and these notes had minimal details about the precise time at which the woman left the pathway. It is possible, then, that women may have been taken off the pathway before hospital admission for birth and that these may have been for psychosocial reasons; this level of detail would not be captured in electronic patient notes. Future studies could investigate the precise time in the woman's journey that they were opted out of the pathway and the reasons why. Another useful area of future research would be the identification of specific medical or obstetric factors identifiable in the antenatal period which could later influence completion of EREC. This knowledge could lead to interventions to better support these women or a broadening of the exclusion criteria for the pathway which would assist in the implementation of enhanced recovery at the maternity service.

Implications/conclusions

This prospective cohort study indicated that a large percentage of women assessed as eligible for EREC were not discharged the next day and subsequently did not complete the EREC pathway. Obstetric and medical factors, rather than psychosocial characteristics, largely explained why eligible women did not complete the EREC pathway. These findings further demonstrate that the pathway is discharging women home as intended, as length of stay is extended if medically indicated. This paper adds further information to the growing implementation literature for enhanced recovery, in this instance within the context of an elective caesarean section.

Ethics approval and consent to participate

This study is approved by the Central Adelaide Local Health Network, Human Research Ethics Committee HREC/15/TQEH/286 and was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research 2007 (updated 2018). All participants provided informed consent to participate in this study.

Consent for publication

Not applicable.

Availability of data and material

Ethics approval is not granted for publishing the study data. Reasonable requests for study data can be sent to the corresponding author.

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CRediT authorship contribution statement

Christianna Digenis: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Amy Salter:** Conceptualization, Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing. **Lynette Cusack:** Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. **Deborah Turnbull:** Conceptualization, Formal analysis, Investigation, Methodology, Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

None to declare.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2024.103931.

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