



Research article

Factors associated with utilization of physical therapy services during pregnancy and after childbirth

Kuan-Yin Lin ^{a,b,*}, Yi-Ju Tsai ^{a,b}, Jeng-Feng Yang ^{a,c}, Meng-Hsing Wu ^{d,e}^a Department of Physical Therapy, College of Medicine, National Cheng Kung University, Tainan, Taiwan^b Institute of Allied Health Sciences, College of Medicine, National Cheng Kung University, Tainan, Taiwan^c Physical Therapy Center, National Cheng Kung University Hospital, Tainan, Taiwan^d Department of Obstetrics and Gynecology, College of Medicine, National Cheng Kung University, Tainan, Taiwan^e Department of Obstetrics and Gynecology, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan

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ABSTRACT

Objective: To explore demographic and clinical factors associated with utilization of antepartum/postpartum physical therapy.

Methods: This is a secondary analysis of a cross-sectional survey of 298 women who were receiving or had received obstetric care at a medical center in southern Taiwan. Data were collected between May 2021 and May 2022 using an online questionnaire, which included demographic, medical, and obstetric details, the symptom severity questionnaires, management strategies, and experience and perception about physical therapy. Descriptive statistics, independent *t*-test, chi-square analysis and multivariate logistic regression model were used to analyze data.

Results: Among 298 respondents, 190 (63.8%) were pregnant and 108 (36.2%) were postpartum. Thirteen percent of pregnant participants and 27% of postpartum participants had received physical therapy during and/or after childbirth. Multivariate analyses showed that being postpartum, having an associate degree and below, and experiencing depressive symptoms were significantly associated with an increased utilization of physical therapy (postpartum: OR = 3.039, 95% CI = 1.530, 6.035; associate degree and below: OR = 2.521, 95% CI = 1.007, 6.316; depressive symptoms: OR = 3.606, 95% CI = 1.067, 12.185). The odds of utilizing physical therapy decreased with age (OR = 0.935, 95% CI = 0.874, 1.000).

Conclusions: Individual factors, such as age, education level, pregnancy status, and experience of depressive symptoms, have a significant association with utilization of antepartum/postpartum physical therapy and should be considered when developing obstetric care pathways to optimize clinical and healthcare utilization outcomes.

1. Introduction

Globally, the fertility rate is approximately 2.4 births per woman [1], and in Taiwan the fertility rate is 1.13 children per woman [2]. Worldwide, it is estimated that 303,000 women died from pregnancy-related causes [3]. The estimated pregnancy-associated

* Corresponding author. Department of Physical Therapy, College of Medicine, National Cheng Kung University, Tainan, Taiwan.
E-mail address: 10802003@gs.ncku.edu.tw (K.-Y. Lin).

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mortality ratio in Taiwan is 36 (deaths per 100,000 live births) [4]. During pregnancy and postpartum period, women may experience many physiological changes, which may cause physical and psychological conditions that require medical treatments [5,6]. The utilization of prenatal and intrapartum care services has substantially increased [7,8], and obstetricians and gynaecologists are often the primary health care providers to pregnant and postpartum women in Taiwan [2]. As many of the maternal morbidity and mortality can be prevented by quality healthcare during pregnancy and childbirth, a multidisciplinary team approach has been encouraged to address mother's specific physical and psychological needs and to provide a comprehensive maternal care giving [3,9].

Physical therapy, as part of the multidisciplinary team for maternity care [10,11], has been shown to be beneficial in pregnancy and postpartum [12–16]. Studies have shown that physical therapy including aerobic exercise, resistance training, coaching, osteopathic manipulation, core stability exercise, and pelvic floor muscle training can improve low back pain [13], functional status [13], depressive symptoms [12], cardiorespiratory fitness [14], diastasis recti [15], and quality of life [15], and prevent urinary incontinence [14] in pregnant and postpartum women. Despite the well-established evidence, not many women have attended or been referred to physical therapy for their specialized needs during pregnancy and/or after childbirth [17,18]. Previous studies reported that 42% of 375 pregnant women attended physical therapy [18], and only 14% of 106 had been referred to physical therapy for antenatal exercises during pregnancy [17].

Four previous studies have identified the factors affecting utilization or non-utilization of maternal healthcare services and these studies were conducted in China [19], Ethiopia [20,21], and India [22]. Factors associated with the use of maternal health services included travel distance to the hospital and women's perception, choice, autonomy, and characteristics (e.g. history of pregnancy complications, education, place of residence, ethnicity, parity, household wealth, planned pregnancy) [19,20,22]. While factors associated with medical healthcare and physical therapy utilization may be similar (e.g. source of referral, pain and disability) [23], it remains unknown whether disparities exist in terms of factors associated with physical therapy utilization *versus* overall medical utilization in pregnant and postpartum women due to the lack of direct access to physical therapy in some countries or locations (i.e. Taiwan) [24] and socio-cultural differences among countries [21]. While evidence supports physical therapy as a safe and effective treatment option for women at various life stage [25], to date, no studies have compared the characteristics of women who utilized and did not utilize physical therapy during pregnancy and/or after childbirth in Taiwan.

The goals of the Healthy New Generation Project of The Ministry of Health and Welfare in Taiwan include combing multidisciplinary professionals and inter-departmental resources to initiate programs on pregnancy management and initiating holistic health follow-ups and caring programs to continue safeguarding women's and children's health [28]. Hence, it is important to gain insight into the characteristics of women who receive antepartum and postpartum physical therapy and the factors that influence the utilization of physical therapy in women during and after pregnancy. Therefore, the aims of this study were to compare characteristics of women who received and not received physical therapy during pregnancy and after childbirth and to explore demographic and clinical factors associated with utilization of antepartum/postpartum physical therapy.

2. Materials and methods

This study presents a secondary analysis of a cross-sectional study, which explored women's experiences and perspectives of physical therapy during pregnancy and after childbirth. Ethics approval was obtained from the Institutional Review Board of National Cheng Kung University Hospital (IRB No. –/A-ER-108-221). The study was conducted from May 2021 to May 2022. This secondary analysis included a prospective cohort of antepartum and postpartum women who were receiving or had received services at the Department of Obstetrics and Gynaecology of National Cheng Kung University Hospital in the past two years. Women were eligible for inclusion if they were aged over 20 years, understood Chinese/Mandarin, and agreed to complete the questionnaire.

Eligible women were identified by treating doctors/nurses and invited to participate in the study. The invited women received a flyer that included information about the study and a link to an anonymous online questionnaire. The questionnaire was developed using Google forms and included demographic, medical, and obstetric details, self-reported experience of pregnancy/postpartum-related symptoms, the symptom severity questionnaires, management strategies, and experience and perception about physical therapy. The symptom severity was evaluated via a range of measures, including the six-point engorgement scale developed by Hill and Humenick [29], the International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF) [30], the Pelvic Floor Distress Inventory (PFDI) [31], the self-administered Oswestry Disability Index (ODI) version 2.1 [32,33] and the Numerical Rating Scale [34]. The utilization of physical therapy was established using an affirmative response to question "Have you received physical therapy for this or these pregnancy/postpartum-related symptom(s)?"

2.1. Statistical analysis

All statistical analyses were performed using Statistical Package for Social Sciences, version 20.0 for Windows. The questionnaire data were reported descriptively as frequencies, percentage, median and interquartile range (IQR) as appropriate. Data were categorized into groups (i.e. participants who received or not received physical therapy during pregnancy and/or after childbirth). The independent *t*-test and chi-square analysis were used to test the differences between two groups. Multivariate logistic regression model was used to adjust for variables identified by univariate analysis (*p*-value <0.25) as associated with utilization of antepartum/postpartum physical therapy. All analyses were tested with a significance level of *p* < 0.05. As this study was a secondary analysis of a cross-sectional study (primary study), we used all participant data from the primary study; hence, no a priori sample size estimation was performed. A post hoc power analysis was conducted using G-Power software 3.1.9.2.

3. Results

3.1. Participants

A total of 298 participants were included in the analysis. Participants who received physical therapy during pregnancy and/or after childbirth (n = 53) had a median age of 32 years (IQR = 7). Fifty six percent of participants in this cohort were at the postpartum period. Most of participants in this cohort had a job in non-medical field (88.7%), received a bachelor's degree and above (77.4%) and knew about Physical Therapy (81.1%). Participants who did not receive physical therapy during pregnancy and/or after childbirth (n = 245) had a median age of 34 years (IQR = 7). Most of participants in this cohort were pregnant (67.8%) at the time of data collection, had a non-medical occupation (76.3%), received a bachelor's degree and above (89.4%) and knew about Physical Therapy (75.1%). The most commonly reported pregnancy/postpartum-related symptoms by participants in both cohorts were fatigue, nausea, and morning sickness. The symptom severity scores are shown in [Table 1](#).

Table 1
Characteristics of participants who had or had not received antepartum/postpartum physical therapy.

Variables	Received PT (n = 53)	Not received PT (n = 245)	p-value
Age, median (IQR)	32 (7)	34 (7)	0.020 ^b
Marital status, n (%)			1.000 ^c
Married/living with a partner	53 (100)	243 (99.2)	
Single	0 (0)	2 (0.8)	
Identity, n (%)			0.003 ^c
Pregnant	24 (45.3)	166 (67.8)	
Postpartum	29 (54.7)	79 (32.2)	
Occupation, n (%)			0.047 ^c
Medical/health service	6 (11.3)	58 (23.7)	
Non-medical/health service	47 (88.7)	187 (76.3)	
Highest level of education, n (%)			0.017 ^c
Associate degree and below	12 (22.6)	26 (10.6)	
Bachelor and above	41 (77.4)	219 (89.4)	
Pregnancy/postpartum-related symptoms, n (%)^a			
Fatigue	43 (82.7)	184 (75.1)	0.350 ^c
Fever >38.5 °C	3 (5.8)	10 (4.1)	0.708 ^c
Heartburn	13 (25.0)	49 (20.0)	0.461 ^c
Nausea	28 (53.8%)	141 (57.6)	0.529 ^c
Morning sickness	29 (55.8)	126 (51.4)	0.664 ^c
Bladder dysfunction	8 (15.4)	39 (15.9)	0.881 ^c
Bowel dysfunction	5 (9.6)	10 (4.1)	0.106 ^c
Breast engorgement	24 (46.2)	89 (36.3)	0.223 ^c
Blocked milk ducts	2 (2.9)	7 (3.8)	0.664 ^c
Mastitis	1 (1.9)	7 (2.9)	1.000 ^c
Breast pain	11 (21.2)	50 (20.4)	0.955 ^c
Joint laxity	1 (1.9)	11 (4.5)	0.700 ^c
Low back pain	25 (48.1)	87 (35.5)	0.112 ^c
Pelvic pain	12 (23.1)	68 (27.8)	0.446 ^c
Diastasis Abdominis	1 (1.9)	2 (0.8)	0.446 ^c
Anemia	7 (13.5)	28 (11.4)	0.715 ^c
Insomnia	19 (36.5)	96 (39.2)	0.651 ^c
Anxiety	15 (28.8)	49 (20.0)	0.182 ^c
Depression	10 (19.2)	16 (6.5)	0.004 ^c
Carpal tunnel syndrome	6 (11.5)	27 (11.0)	0.950 ^c
Hemorrhoid	10 (19.2)	50 (20.4)	0.800 ^c
Hand foot swelling	14 (26.9)	55 (22.4)	0.535 ^c
Headache	15 (28.8)	62 (25.3)	0.651 ^c
Other symptoms	1 (1.9)	11 (4.5)	0.700 ^c
IPAQ total score, median (IQR)	0.0 (327)	0 (268)	0.998 ^b
ICIQ total score, median (IQR)	4 (8)	4 (7)	0.835 ^b
PFDI total (0–300), median (IQR)	33.33 (52.9)	35.42 (44.8)	0.901 ^b
ODI score %, median (IQR)	16 (28.8)	4.4 (20)	0.007 ^b
Six-point engorgement scale, median (IQR)	2 (2)	2 (2)	0.293 ^b
Knew about Physical Therapy, n (%)	43 (81.1)	184 (75.1)	0.350 ^c

PT, Physical therapy; ICIQ, International Consultation on Incontinence Questionnaire; IPAQ, International Physical Activity Questionnaire Short Form; ODI, Oswestry Disability Index; PFDI, Pelvic Floor Distress Inventory Questionnaire-20.

^a Participants could select multiple responses.

^b Mann-Whitney U.

^c Chi-squared test.

Table 2

Univariate and multivariate logistic regression analysis of factors associated with utilization of physical therapy services during pregnancy and after childbirth.

Variables	Crude OR (95% CI)	p-value	aOR (95% CI)	p-value
Identity				
Postpartum	2.54 (1.39, 4.64)	0.002	3.04 (1.53, 6.04)	0.002
Pregnant	1	–	1	–
Age	0.93 (0.87, 0.99)	0.020	0.94 (0.87, 1.00)	0.049
Occupation				
Medical/health service	0.41 (0.17, 1.01)	0.05	0.36 (0.13, 1.01)	0.053
Non-medical/health service	1	–	1	–
Education				
Associate degree and below	2.47 (1.15, 5.28)	0.020	2.52 (1.01, 6.32)	0.048
Bachelor and above	1	–	1	–
IPAQ Total score	1.00 (1.00, 1.00)	0.033	1.00 (1.00, 1.00)	0.068
Fatigue				
Yes	1.43 (0.68, 3.01)	0.352		
No	1	–		
Fever 38.5				
Yes	1.41 (0.37, 5.31)	0.612		
No	1	–		
Heartburn				
Yes	1.30 (0.65, 2.62)	0.462		
No	1	–		
Nausea				
Yes	0.83 (0.46, 1.50)	0.530		
No	1	–		
Morning sickness				
Yes	1.14 (0.63, 2.07)	0.664		
No	1	–		
Bladder dysfunction				
Yes	0.94 (0.41, 2.15)	0.881		
No	1	–		
Bowel dysfunction				
Yes	2.45 (0.80, 7.48)	0.116	2.68 (0.68, 10.61)	0.160
No	1	–	1	–
Breast engorgement				
Yes	1.45 (0.80, 2.64)	0.225	1.34 (0.63, 2.87)	0.444
No	1	–	1	–
Blocked milk ducts				
Yes	1.33 (0.27, 6.61)	0.725		
No	1	–		
Mastitis				
Yes	0.65 (0.08, 5.43)	0.694		
No	1	–		
Breast pain				
Yes	1.02 (0.49, 2.13)	0.955		
No	1	–		
Joint laxity				
Yes	0.41 (0.05, 3.24)	0.397		
No	1	–		
Low back pain				
Yes	1.62 (0.89, 2.95)	0.114	1.21 (0.59, 2.45)	0.603
No	1	–	1	–
Pelvic pain				
Yes	0.76 (0.38, 1.54)	0.447		
No	1	–		
Diastasis Abdominis				
Yes	2.34 (0.21, 26.25)	0.492		
No	1	–		
Anemia				
Yes	1.18 (0.49, 2.86)	0.716		
No	1	–		
Insomnia				
Yes	0.87 (0.47, 1.61)	0.651		
No	1	–		
Anxiety				
Yes	1.58 (0.80, 3.10)	0.185	0.65 (0.24, 1.75)	0.395
No	1	–	1	–
Depression				
Yes	3.33 (1.42, 7.82)	0.006	3.61 (1.07, 12.19)	0.039

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Table 2 (continued)

Variables	Crude OR (95% CI)	p-value	aOR (95% CI)	p-value
No	1	–	1	–
Carpal tunnel syndrome				
Yes	1.03 (0.40, 2.64)	0.950		
No	1	–		
Hemorrhoid				
Yes	0.91 (0.43, 1.93)	0.800		
No	1	–		
Hand foets welling				
Yes	1.24 (0.63, 2.45)	0.535		
No	1	–		
Headache				
Yes	1.17 (0.60, 2.26)	0.652		
No	1	–		
Other symptoms				
Yes	0.41 (0.05, 3.24)	0.397		
No	1	–		
Six point engorgement scale	1.15 (0.91, 1.46)	0.246	1.15 (0.86, 1.53)	0.353
ICIQ Total score	1.01 (0.94, 1.08)	0.773		
PFDI total	1.00 (0.99, 1.01)	0.748		
ODI percentage	1.02 (1.00, 1.03)	0.012	1.01 (1.00, 1.03)	0.176
Do you know PT?				
Yes	1.43 (0.68, 3.01)	0.352		
No	1	–		

ICIQ, International Consultation on Incontinence Questionnaire; IPAQ-SF, International Physical Activity Questionnaire Short Form; NRS, Numerical Rating Scale; ODI, Oswestry Disability Index; PFDI-20, Pelvic Floor Distress Inventory Questionnaire-20.

3.2. Comparison between participants who had and had not received physical therapy during pregnancy and after childbirth

The comparison of characteristics between participants who had and had not received antepartum/postpartum physical therapy is presented in Table 1. Participants utilizing physical therapy were younger ($p = 0.02$), being at postpartum period ($p = 0.003$), had non-medical occupations ($p = 0.047$), and had lower levels of education ($p = 0.017$) as compared to participants who did not utilize antepartum/postpartum physical therapy. More participants who had received physical therapy reported having experience of depressive symptoms during pregnancy and/or after childbirth compared to those who did not receive physical therapy ($p = 0.004$). Participants who had received physical therapy reported significantly higher ODI scores than those who did not receive physical therapy ($p = 0.007$).

3.3. Association between participants' characteristics and the utilization of physical therapy services during pregnancy and after childbirth

The associations of participants' characteristics, self-reported experience of pregnancy/postpartum-related symptoms, and symptom severity with the utilization of physical therapy services during pregnancy and after childbirth are presented in Table 2. In the multivariate analyses, being at postpartum period (OR = 3.039, 95% CI = 1.530, 6.035), having an associate degree and below (OR = 2.521, 95% CI = 1.007, 6.316), and experiencing depressive symptoms (OR = 3.606, 95% CI = 1.067, 12.185) were significant factors associated with higher odds of utilizing physical therapy when compared with those being pregnant, having a bachelor degree and above, and not having depressive symptoms. On the other hand, younger women were more likely to utilize physical therapy (OR = 0.935, 95% CI = 0.874, 1.000).

4. Discussion

This study examined differences in characteristics between women who utilized physical therapy during pregnancy and childbirth compared with those who did not, and the factors associated with the utilization of physical therapy in this population. Our findings indicated that participants who utilized antepartum/postpartum physical therapy were younger and postpartum, and had non-medical/health service occupation and experience of depressive symptoms and more disability due to back pain than participants who did not utilize physical therapy during pregnancy and after childbirth. Being postpartum, having an associate degree and below, and experiencing depressive symptoms were more likely to utilize physical therapy during pregnancy and childbirth. Age was negatively associated with the use of physical therapy services. The results of this study suggest factors to target to improve physical therapy utilization and to enable physical therapists to develop effective strategies for promoting antepartum/postpartum physical therapy.

Our findings showed that participant characteristics, such as age, identity and education, were associated with the use of antepartum/postpartum physical therapy, which is in line with the previous studies [35,36,37]. However, in contrast to the studies which found that older patients with higher socioeconomic levels [27] and women with higher education levels [26] were more likely to use physical therapy, we found that younger participants with lower levels of education were more likely to use physical therapy. Being younger and having a low education level had also been shown to be significantly associated with poor maternal health care services

utilization [38]. A study conducted in Bangladesh reported that mothers aged 20 and above with higher level of education were more likely to seek high level health care [39], while another study in Ireland reported that individuals with higher levels of education had fewer visits to general practitioner than those with a lower level of education [40]. Conflicting results on the associations between levels of education and use of healthcare services may be due to differences in sample size and the study setting [41]. People with different education levels may view the benefits of health services differently [42] as the knowledge and management of health problems may affect people's choices of healthcare. Our finding may reflect the fact that younger women with low levels of education may have less health literacy and would more likely to cite recommendations from medical professionals (e.g. obstetricians/gynaecologists) [43]. As higher education level is significantly related to higher health literacy [44], and health literacy is inversely associated with healthcare utilization [45], future studies could investigate the optimal intervention to improve health literacy and its relationships with levels of education and physical therapy utilization [46].

In terms of pregnancy and postpartum status, we found that more postpartum women had received physical therapy than pregnant women. This finding is in contrast to the previous studies which reported fewer women seeking or utilizing postnatal care than antenatal care [37,47]. It is possible that some pregnant women believe that musculoskeletal discomfort (i.e. low back pain) during pregnancy is a natural consequence of pregnancy and does not need any intervention [48]. Previous studies reported that every woman had 1.75 reported morbidities after each childbirth, and more than half of those who had morbidity would seek treatment for their problems [49,50]. As adequate antenatal care significantly reduces the probability of postpartum maternal hospitalization [51], future studies could explore the relationships between utilization of antepartum/postpartum physical therapy and the clinical outcomes in order to provide high quality care to this population.

Similar to other studies, women with experience of depressive symptoms were more likely to utilize physical therapy [52–54]. This finding is supported by the previous studies which showed that depressive symptoms were the major predictor of frequent attendance of healthcare service [53,54]. Wahl et al. revealed that patients attending physical therapy on a regular basis had more depressive symptoms than those who did not attend regularly [52]. The authors suggested that more distressed patients had less internal locus of control, hence sought more physical therapy [52]. As physical therapy including physical activity and aerobic training has beneficial effects on the mental health of women after childbirth [55], it could be incorporated in the postnatal care guidelines to reduce the symptoms of postpartum depression, improve the quality of life, and reduce the level of fatigue in postnatal women.

As a strength, this study is the first to investigate factors associated with the use of antepartum/postpartum physical therapy. Given the ongoing covid-19 pandemic, the online surveys provided real-time responses and reduced health risks for both study participants and research staff [56]. Nevertheless, this study has several limitations. Due to the lack of a priori sample size estimation, the sample size may be inadequate and the possibility of a type II error cannot be ruled out. The post hoc power analysis was performed based on an adjusted odds ratio for the factor age (0.94), being postpartum (3.04), having associate degree and below (2.52) and experience of depressive symptoms (3.61), and a total sample size of 298. The 21.4% of variance was explained by the model; therefore, “ R^2 other X” equals to 0.214. The analysis revealed a power of 0.1024977 for age, 0.9999999 for being postpartum, 0.9999649 for having an associate degree and below and 1.0000000 for experience of depressive symptoms. The participants were recruited from a single medical centre, hence the findings may not be generalized to all antepartum/postpartum populations. Several factors (e.g., women's perception, choice, autonomy, history of pregnancy-related complications, obstetric conditions, place of residence, ethnicity, etc. [19, 20,22]) were not included in the analysis due to the lack of data, which might have impact on the utilization of physical therapy. Some of the pregnancy-related complications (e.g. postpartum haemorrhage, preeclampsia) [57,58] and obstetric conditions (e.g. intra-uterine growth restriction, recurrent miscarriage, multiple pregnancy or incompetent cervix) may be contraindications to physical therapy (i.e. exercise) [59]. Moreover, the lack of specific details of physical therapy (i.e. type and frequency) and the combination of both pregnant and postpartum groups may limit the interpretation of our results. The cross-sectional study design and survey nature may pose recall bias and does not allow causal relationships to be determined.

Among the pregnant and postpartum women, being younger, having received less education, being at postpartum period and having experience of depressive symptoms are associated with a greater probability of utilizing physical therapy during pregnancy and after childbirth. The findings of this study may provide a fundamental information to policymakers who can take the factors explored in this study into consideration when aiming to improve the maternity care pathways to optimize clinical outcomes. The results could also be used to target specific population, such as pregnant and older women, to promote the benefits of physical therapy when physical therapists become more actively participate in obstetric care. Further research is warranted to determine the effect of utilization of physical therapy on pregnancy/postpartum-related symptoms.

Author contribution statement

Kuan-Yin Lin: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Yi-Ju Tsai; Jeng-Feng Yang; Meng-Hsing Wu: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no competing interests.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.heliyon.2023.e13247>.

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