



## Systematic Review

**The Effect of Exercise on Postpartum Women's Quality of Life****Ni Putu Dian Ayu Anggraeni<sup>1</sup>, Lucky Herawati<sup>2</sup>, Melyana Nurul Widyawati<sup>1</sup> and I Komang Leo Triandana Arizona<sup>3</sup>**<sup>1</sup> Health Polytechnic, Ministry of Health, Mataram, Indonesia<sup>2</sup> Health Polytechnic, Ministry of Health, Yogyakarta, Indonesia<sup>3</sup> Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia**ABSTRACT**

**Introduction:** Postpartum mothers are vulnerable to several problems during the puerperium, such as fatigue, sleep disorders, anxiety, depression, sexual problems, physical functioning and dissatisfaction with partner support that can affect their quality of life. The aim of this systematic review is to explore the effect of exercise on postpartum women's quality of life

**Methods:** Comprehensive searches including experimental studies (including RCTs and non-randomized trials) from several databases, namely Scopus, PubMed, and Science-Direct, were used to search for scientific contributions published between 2009 and 2019. The articles are identified using the relevant keywords. This systematic review is guided by PRISMA. Fourteen of the 636 articles met both the inclusion and exclusion criteria

**Results:** The postpartum exercises found in this study were Yoga, Pelvic Floor Muscle Training (PFMT), Pilates, Postnatal Exercise, Aerobic Exercise and Progressive Muscle Relaxation (PMR). This review cannot provide definitive conclusions about the best form of exercise, the suggested duration or the timing needed to improve the quality of life for postpartum women.

**Conclusion:** Yoga and Pilates are proven to effectively improve maternal well-being because this exercise focuses on increasing the physical, psychological and social support during the postpartum period. Further research is needed to provide evidence and to strengthen the results of this systematic review.

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**INTRODUCTION**

The postpartum period starts after labor and lasts for about six weeks. This period is characterized by physiological, physical, social and emotional changes for the mothers and their families that require the members therein to take on new roles and responsibilities (Ahmadi et al., 2014). Most problems occur in the first days of this period and last for six weeks and up to one year after delivery (Martínez-Galiano et al., 2019). The symptoms include fatigue, sleep disorders, nausea, anxiety, depression, sexual problems, physical function and dissatisfaction with partner support (Bahrami, Karimian, & Bahrami, 2014; Insana, Costello, & Montgomery-Downs, 2011; Medina, Lederhos, & Lillis, 2009; Parker et al., 2015). However, given the impact and risk on postpartum

mothers, it is not surprising that the quality of life of the mother can decrease. The main reason for the decline in the quality of life of postpartum mothers is that women have physical, psychological and social problems during this period (Rezaei et al., 2016).

In the United States, researchers found that 44-95% of postpartum mothers experienced postpartum fatigue (Milligan, Parks, Kitzman, & Lenz, 1997). The phenomenon of postpartum fatigue often starts immediately after giving birth and reaches maximum severity within 36 hours. It can even last for a long time after giving birth (Dennis & Ross, 2005; Lee, 2004). The literature review by Groër et al reported that more than 80% of mothers complained of postpartum fatigue and that about 70% occurred among women who had given birth 1-2 months earlier (Corwin, Brownstead, Barton, Heckard, &

Morin, 2005; Groër et al., 2005). During the postpartum period, most women experience significant disturbances in their sleep patterns due to hormonal changes and the responsibility for the care of the newborn (Farzaneh Ashrafinia et al., 2013; Heh, Huang, Ho, Fu, & Wang, 2008). Postpartum sleep quality is a critical health index and sleep deprivation is the main source of stress or anxiety for postpartum women (Hardianti, Amir, & Balqis, 2013; Hunter, Rychnovsky, & Yount, 2009; Li, Chen, Li, Gau, & Huang, 2011; Yang, Yu, & Chen, 2013). The prevalence of postpartum anxiety ranges from 0.5% to 2.9%, and for panic disorders, it can be up to 6.1% -7.7% for generalized anxiety disorders. In addition, 10-15% of women suffer from postpartum depression (Guille, Newman, Fryml, Lifton, & Epperson, 2013; Wenzel & Stuart, 2011). About 90% of women start sexual activity after 6 weeks of giving birth. Of this total, 83% experienced sexual problems in the first 3 months and 64% experienced problems in the first 6 months after giving birth (Acele & Karaçam, 2012; Nikpour, Javaheri, Yadavar Nikraves, & Jamshidi, 2006). During this time, there were also cases of urinary incontinence where the incidence reached 6-38%, which increased with the number of births. In the primiparas who gave birth normally, this can cause a decrease in pelvic muscle strength by 22-35% between pregnancy and the postpartum period (Dinc, Kizilkaya Beji, & Yalcin, 2009; Morkved & Bo, 1999). These problems have a significant effect and they can have a negative impact on their physical, emotional, and social health, breastfeeding, relationships with the family, community, baby care, and homework (Bahrami et al., 2014; Parker et al., 2015). Postpartum physical and psychological problems can interfere with the ability of the new mothers to care for their babies and this can adversely affect their quality of life (Lovell, Huntsman, & Hedley-Ward, 2015; Werner et al., 2016).

Quality of life (QoL) is a multidimensional concept that affects individual performance in the physical, psychological, social and spiritual aspects of life. Assessing quality of life in the postpartum period will allow a woman to conduct a self-evaluation of her own postpartum situation and this will help the health care providers with the further promotion of the health of women and their infants (Al Thobaity, Plummer, & Williams, 2017). According to the literature, maternal quality of life is declining due to many problems in relation to women's self-care and infant care (Parker et al., 2015).

To improve the maternal quality of life in the postpartum period, non-pharmacological methods, such as health education, exercise and relaxation therapy during pregnancy and the postpartum period can be used (Dritsa, Da Costa, Dupuis, Lowensteyn, & Khalifé, 2008). One intervention that is often recommended as a part of postpartum maternal care is exercise (Davies, Wolfe, Mottola, & MacKinnon, 2003). Exercise refers to any bodily movements that cause an increase in energy consumption, including

planned and structured systematic movements based on frequency, intensity and duration to maintain or improve health-related outcomes (Wolin, Schwartz, Matthews, Courneya, & Schmitz, 2012).

Therefore, the aim of this systematic review is to explore the effects of exercise on postpartum women's quality of life and to provide references for future research.

## MATERIALS AND METHODS

This systematic review used a guide based on the Preferred Reporting Item for Systematic Review and Meta-Analysis (PRISMA) (Liberati et al., 2009; Moher, Tetzlaff, Altman, Liberati, & Group, 2009).

The journal articles were published in English from January 2009 to February 2019. The search strategy used the PICO framework to identify the keywords. All of the studies were experimental studies (including RCT and non-randomized experimental trial) that studied the effectiveness of postpartum exercises on the quality of life of postpartum mothers. The studies reviewed included normal postpartum mothers aged > 18 years, not limited by the number of births. All types of exercise interventions given to postpartum mothers were included. Exercise refers to any bodily movement that causes an increase in energy consumption, including planned and structured systematic movements, based on frequency, intensity and duration to maintain or improve health-related outcomes. The control group received treatment as usual/regular postpartum care, waiting list controls or no treatment. Quality of life and/or the problems that occur in postpartum mothers include anxiety, postpartum depression, urine incontinence, sleep disorders and other problems related to the quality of life of postpartum mothers.

The studies were identified by searching electronic databases and scanning the reference lists of any relevant articles. Three databases were systematically searched including Scopus, Science Direct and PubMed. The search terms in the database using a combination of keywords: (1) postpartum OR (2) postnatal AND (3) exercises AND (4) quality of life.

The protocol standard for selecting the research studies is as suggested in the PRISMA method for systematic reviews followed by screening to remove duplicates. Two reviewers (NPDA and IKLTA) then chose the titles, abstracts and keywords, and then deleted irrelevant articles. The selection of the research studies was recorded by two reviewers and then these were compared with one another to adjust the feasibility to the criteria set. The full text of the article was obtained if the title and abstract meet the inclusion criteria or if the feasibility study was clearly completed following a joint discussion between the reviewers.

The following data was extracted: author, year, journal, country, the setting of the study and the main result. Two authors (NPDA and IKLTA) were involved in the data extraction, and after organizing the results in a table, the findings were discussed and reviewed again. One review author extracted the following data from the included studies and the other author checked the extracted data. Any disagreement was resolved by a discussion between the authors.

The information that was extracted from each included study was on (1) the study identity (including the author's name, year of publication and origin of the study); (2) the study arrangements (including participant characteristics, interventions, the presence of control groups as a comparison, intervention time, modality, frequency, setting and implementation); (3) outcomes, measurements and tools and (4) major findings relevant to the review.

Two reviewers independently evaluated the quality and risk of bias of each study in accordance with the Cochrane Risk of Bias Tool. For research using the RCT design, the assessment used RoB 2.0 which consists of 5 domains, namely (1) randomization process, (2) deviations from the intended interventions, (3) missing outcome data, (4) the measurement of the outcome and (5) the selection of the reported results (Higgins, Savovic, Page, & Sterne, 2018). The non-randomized studies were assessed using the ROBINS-I (J. A. Sterne et al., 2016). The ROBINS-I tool covers seven domains through which bias might be introduced into non-randomized studies or interventions (NRSI). The first two domains discussed the problem before the interventions began to be compared, the third domain discussed the classification of the intervention itself and the other four domains addressed the problem after the intervention began (J. Sterne, Higgins, Elbers, Reeves, & The Development Group for ROBINS-I, 2016). The reviewers crosschecked their final assessments and resolved any disagreements through discussion.

The studies were grouped according to the intervention used and the study population. Where possible, the studies were thereafter grouped according to the time of follow-up and the type of control group. All studies were individually rated for evidence level using the National Health and Medical Research Council (NHMRC) Hierarchy of Evidence guidelines (IV-I, with I being the strongest level of evidence).

Meta-analysis was not possible as the studies were too heterogeneous in design and methodology, namely in relation to the types of intervention, the type of control group, the outcome measures used and the time of follow-up.

## RESULTS

### Study selection

A total of 14 articles were identified to be included in this systematic review. Searching through the Scopus,

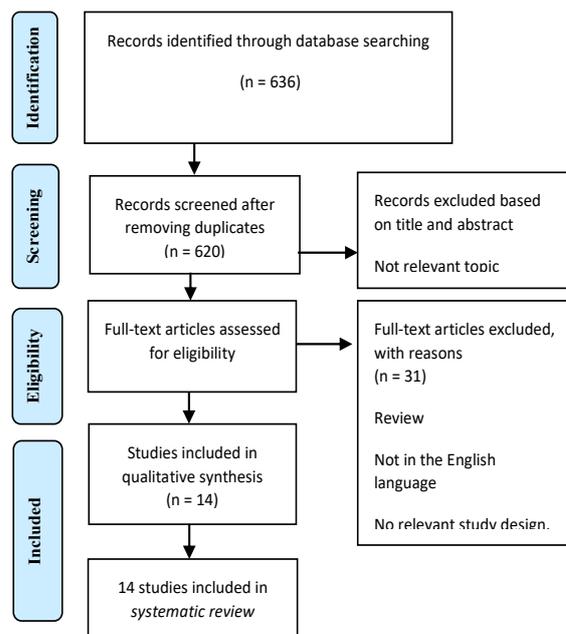


Figure 1. Flow Diagram

Science Direct and PubMed databases, 636 articles were found. After duplication screening, there were 620 articles left. Of these, 575 articles were eliminated because of being on an irrelevant topic. The full text article stage identified and eliminated as many as 31 articles on the grounds that it was a review article, the publication was not in English, the research design was not experimental and the outcome was irrelevant (see the flow diagram in Figure 1).

### Study characteristics

For the summary of the characteristics of the studies, see Appendix A. In total, 14 studies were finally selected for review. These consisted of 12 randomized controlled trials, 1 single-center prospective cohort study and 1 single group pre-post experimental study design.

The included studies involved 945 participants. The sample size of the included studies ranged from 18 - 140 participants, involving female participants (pregnant women and postpartum mothers) from 8 different countries. The studies were conducted in Turkey (n=3), USA (n=2), Ireland (n=1), Sweden (n=1), South Korea (n=1), Iran (n=4), India (n=1) and Taiwan (n=1). The average age of the participants ranged from 18 - 45 years.

Table 1 represents the characteristics and content of the intervention of the 14 low-risk studies related to postpartum exercises. One study evaluated Progressive Muscle Relaxation (Gökşin & Ayaz-Alkaya, 2018), 2 studies evaluated Yoga (Buttner, Brock, O'Hara, & Stuart, 2015), 6 studies evaluated pelvic floor muscle training (Dinc et al., 2009; Gagnon, Boucher, & Robert, 2016; Golmakani, Zare, Khadem, Shareh, & Shakeri, 2015; Gutke, Sjødahl, & Öberg, 2010; Kim, Kim, & Oh, 2012; Pourkhiz, Mohammad-Alizadeh-Charandabi, Mirghafourvand, Haj-Ebrahimi, & Ghaderi, 2017; Sut & Kaplan, 2016), 2 studies

evaluated the Pilates exercise (F Ashrafinia et al., 2015; Farzaneh Ashrafinia et al., 2013), 1 study evaluated postnatal exercises (Mahishale, Ulorica, & Patil, 2014) and 1 study evaluated aerobic gymnastic exercise (Yang & Chen, 2018).

Each study examined the problems in the puerperium associated with the quality of life of postpartum mothers. The timing of the results ranged from 1 week to 3 months after birth. There were 3 studies starting from 20 - 34 weeks of pregnancy through to 6 - 8 weeks postpartum. The follow-up period in several studies was determined relative to the time since starting or completing the treatment. To measure the postpartum quality of life, the studies used the Maternal Postpartum Quality of Life Questionnaire (MAPP-QoL) and the Patient Health Questionnaire (PHQ-9, Short-Form Health Survey (SF-36) and health-related quality of life (EQ-5D). Depression, stress and anxiety were measured using the Hamilton Depression Rating Scale (HDRS), the Inventory of Depression and Anxiety Symptoms (IDAS), the Stress Perception Scale and the Edinburgh Postnatal Depression Scale. Sleep quality was measured using the Pittsburgh Sleep Index (PSQI). Postpartum Sleep Quality was measured using the Postpartum Fatigue Scale and the Multidimensional Fatigue Inventory Questionnaire (MFI-20). Pain was measured using the Oswestry Disability Index. Muscle symptom, function satisfaction and urinary incontinence were measured using the Bristol Female Lower Urinary Tract Symptoms Questionnaire. Sexual function was measured using perineometer vaginal function, self-efficacy sexual and the Brink scale.

### **Risk of bias**

The risk of bias in the judgments of each paper was summarized in Appendix B. The 12 Randomized Control Trials were assessed using RoB-2 (see Appendix Table B1). Five studies (41,67%) had a low risk of bias and 7 studies (58,33%) had a risk of bias with some concerns. Inadequate randomization methods were the main source of bias. Two non-randomized studies consisting of interventions were assessed using ROBINS-I (see Appendix Table B2). One article has a risk of serious bias and one article had a moderate risk of bias.

### **Result of individual studies**

There were various types of exercise intervention found, including pelvic floor muscle training (n=7), progressive muscle relaxation (PMR) (n=1), yoga (n=2), postnatal exercise (n=1), pilates exercises (n=2) and aerobic gym exercises (n=1). Each intervention was grouped and described separately related to its effect on the quality of life of postpartum mothers (Table 1).

## **DISCUSSION**

### **Summary of the evidence**

This systematic review investigated the effectiveness of postpartum exercises on the quality of life of

postpartum women. Fourteen studies were included and analyzed. The trials included were very heterogeneous, differing in the outcome measures, the type of intervention, the type of control group and the duration of the follow-up. Five studies reported that PFMT can improve the quality of life of postpartum women in pelvic floor muscle strength and as an intervention for urinary incontinence treatment (Dinc et al., 2009; Gagnon et al., 2016; Golmakani et al., 2015; Kim et al., 2012; Sut & Kaplan, 2016). Two of the five studies were carried out from pregnancy through to postpartum (Dinc et al., 2009; Sut & Kaplan, 2016). One study related to the PFMT exercise reported that kegel exercises carried out during the postpartum period can improve self-efficacy (Pourkhiz et al., 2017). Six studies reported that PFMT, PMR, postnatal exercises, pilates, and yoga have been shown to significantly improve the quality of life for postpartum women (F Ashrafinia et al., 2015; Gagnon et al., 2016; Gökşin & Ayaz-Alkaya, 2018; Mahishale et al., 2014; Sut & Kaplan, 2016; Timlin & Simpson, 2017). Four studies including aerobic exercise, pilates and yoga can improve the well-being of psychology in postpartum women (F Ashrafinia et al., 2015; Buttner et al., 2015; Timlin & Simpson, 2017; Yang & Chen, 2018). Other studies reporting on pilates and aerobics also reduced the fatigue and can improve the sleep quality of postpartum women (Farzaneh Ashrafinia et al., 2013; Yang & Chen, 2018).

Although the results of the various studies varied as a whole, this review provided evidence that exercise is a viable, acceptable and effective intervention to improve the quality of life for women during pregnancy and through to the postpartum period. There are several important findings regarding efficacy, or a lack thereof, for several types of interventions, which will now be discussed in detail. Pelvic floor muscle training is beneficial for women with or without incontinence in the postpartum period. PFMT that is carried out for 8 weeks can increase sexual self-efficacy, contribute to a significant increase in pelvic function and result in an increased quality of life for pregnant women and postpartum women (Dinc et al., 2009; Kim et al., 2012; Sut & Kaplan, 2016). Some studies reported that exercises to strengthen pelvic floor muscles can increase a woman's ability to achieve optimal orgasm, the duration and intensity of her orgasms, the number of orgasms, and the vaginal sensations felt during intercourse (Bø, Talseth, & Vinsnes, 2000). Therefore, the increase in female sexual self-efficacy after doing the pelvic floor strengthening exercises was proven in this study. This is different from Gutke, Sjö Dahl dan Öberg's (2010) research, where the majority of the respondents after being given specific muscle stabilization exercises still experienced pain and some back-related disability for up to 9 months after giving birth. Some women may need more than training as a part of their care (Gutke et al., 2010).

Pelvic floor exercises applied during pregnancy to the postpartum period increased the pelvic floor

muscle strength and prevented the worsening urinary symptoms, decreased the urinary system factors and improved the quality of life in both pregnancy and postpartum (Sut & Kaplan, 2016). In Gagnon's study (2016), the study design used a prospective cohort study in which the design limited the ability to accurately measure the impact on pelvic floor function as a result of the intervention. Without evidence from the control group, it is possible that the improvement in the pelvic floor function and the strength of the MOS is more due to time than due to the PFMT program (Gagnon et al., 2016).

Five other studies were reported to have physical and psychological benefits related to improving the quality of life for postpartum mothers; they involved PMR, Yoga and Pilates (F Ashrafinia et al., 2015; Farzaneh Ashrafinia et al., 2013; Buttner et al., 2015; Gökşin & Ayaz-Alkaya, 2018; Timlin & Simpson, 2017). The PMR effect on the postpartum quality of life of women in both the intervention group and the control group was investigated, revealing an increase in the mean MAPP-QoL score after PMR which was found to be statistically significant. PMR has physiological and psychological benefits related to improving the quality of life for postpartum women. This technique promotes the systematic relaxation of the body's main muscle groups with the aim of physical and mental relaxation, reducing the response to stress, reducing the contraction of the skeletal muscles and reducing the sensation of pain (McGuigan & LEHRER, 2007). PMR applied in the postpartum period will have a positive impact on improving the quality of life for women by increasing their overall ability to overcome any problems that may be encountered during this period. PMRs are thus recommended to be taught to women who are being treated in midwifery clinics and as outpatients. This can be continued during home visits to expand on the use of PMR (Gökşin & Ayaz-Alkaya, 2018).

The two studies related to Yoga reported that women in the yoga group, by 78%, had at a much lower rate of depression and anxiety and better scores for well-being and health-related quality of life (HRQOL) compared to the control group (WLC) (Buttner et al., 2015). Other studies have found that Dru yoga programs significantly reduce stress, negative coping and dysfunctional focus. They are a form of coping that focus on emotions and positive influences (Timlin & Simpson, 2017). In accordance with the previous research, there is a growing interest in the role of yoga as a type of CAM therapy for emotional and physical health (Cramer, Lauche, Langhorst, & Dobos, 2013; Kuan-Yin, Yu-Ting, King-Jen, Lin, & Tsauo, 2011), especially during the perinatal and postpartum periods (Bershadsky, Trumpfheller, Beck, Pipaloff, & Yim, 2014).

Quality of life improvement was also reported when the Pilates exercises were carried out by primiparous postpartum women for 8 weeks. It significantly improved their subjective sleep quality, sleep latency and daytime dysfunction. However, there were no differences in sleep duration, sleep

efficiency and sleep disorders between the groups (Farzaneh Ashrafinia et al., 2013). In another study conducted by Ashrafinia et al (2015), it was shown that the Pilates exercises performed at home were proven to reduce general fatigue, physical and mental and increase activity and motivation, physical fatigue, reduced activity, reduced motivation and mental fatigue. Physical exercise can significantly reduce the fatigue of postpartum women for all subscales. Reducing fatigue and the risk of depression is an effective step toward improving maternal and infant health. Therefore, more attention is needed to be given as an effective intervention, especially concerning physical exercise, to reduce fatigue (F Ashrafinia et al., 2015). In accordance with the research findings conducted by Eyigor et al. (2010), Pilates exercises are a healthy and effective method for improving functional capacity, flexibility, fatigue, depression and the quality of life for breast cancer patients (Eyigor, Karapolat, Yesil, Uslu, & Durmaz, 2010).

One study reported that the postpartum women who received postnatal training immediately after giving birth had been shown to be shown to have better physical well-being and an improved quality of life (Mahishale et al., 2014). The results of the exploratory studies conducted by Carolyn et al also showed that by exercising, postpartum women can avoid decreasing their usual level of activity and increase their physical and psychological benefits felt by postpartum women (Sampselle, Seng, Yeo, Killion, & Oakley, 1999). Another type of exercise reported in this systematic review was aerobic exercise. Aerobic exercise performed three times a week (15 minutes per session) for three months had a positive and significant effect on the stress perception, fatigue and sleep quality of the postpartum women. In addition, changes in sleep inefficiency associated with physical symptoms after 12 weeks of gymnastics training decreased significantly after aerobic exercise (Yang & Chen, 2018). In general, physical exercise has been well documented to be important and beneficial to overall women's health during the postpartum period (Adeniyi, Ogwumike, & Bamikefa, 2013; Daley, Jolly, & MacArthur, 2009).

### Limitations

There are several potential limitations associated with this systematic review. (1) The heterogeneity of the research design makes it difficult to collect the data and to draw quantitative conclusions. (2) What we consider to be the main outcome (quality of life) is not always the same as in the original research. (3) The research instruments used were subjective assessment tools, and there is still a lack of objective measurement variables such as biomarkers (hormonal). (4) The results of the study only explored the short-term effects of exercise on the quality of life of women during the postpartum period and they ignored the long-term effects and (5) some studies were limited to primipara / nulliparous women and those who experienced vaginal delivery.

Special training programs for postpartum women may be more conducive to increasing their acceptance and adherence to sports. In addition, it is recommended that health care providers should encourage postpartum women to carry out postpartum exercise in the early weeks of labor to improve their quality of life as early as possible. Therefore, future research is expected to explore alternative or additional variables such as QoL biomarkers to quantitatively predict or evaluate the quality of life of postpartum women. Future research should focus on implementing follow-ups and emphasizing the importance of exercise in order to have a long-term impact on women's quality of life during the postpartum period. In addition, further research is needed by using large-scale replication studies and this should be carried out for all postpartum women including primiparas and multiparas.

## CONCLUSION

This systematic review explains that the postpartum exercises found in this review (Yoga, Pelvic floor muscle training (PFMT), Pilates, Postnatal Exercise, Aerobic Exercise and Progressive Muscle Relaxation (PMR)) have a positive impact on the quality of life of postpartum mothers. This is in the prevention and treatment of problems during the puerperium, including pelvic floor muscle strength, depression, stress, anxiety, sleep quality, fatigue, pain, urinary incontinence and sexual function. However, this review cannot provide definite conclusions about the best form of exercise, including its duration or timing to improve the quality of life for postpartum women. Out of the exercises, Yoga and Pilates were found to be effective at improving maternal well-being during the postpartum period. Both of these exercises focus on improving psychological well-being, helping to speed up the recovery of physical strength after giving birth, and providing social support to the mothers. In particular, the Yoga and Pilates exercises must be considered by the midwives and obstetricians to improve physical and mental health during the postpartum period. Further research is needed to provide evidence and to strengthen the results of this systematic review.

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