BMC Nursing

RESEARCH

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Factors influencing self-management in patients with epilepsy: a systematic review and meta-analysis

Wenhao Tian[1,2†], Xiaoxiao Yin[1,2†], Wanya Pan[1,2], Chang Liu[1,2], Yuan Zhao[1,2], Leiwen Tang[1,2*] and Xiuqin Feng[1,2*]

Abstract

Background Self-management is significant for the quality of life, physical and mental health, and prognosis of patients with epilepsy. There is evidence that various factors significantly affect the level of self-management in people with epilepsy, however, the reported factors affecting self-management vary greatly. Therefore, it is particularly important to further unify and clarify the factors affecting self-management in people with epilepsy.

Aims This study aimed to identify the influencing factors of epilepsy self-management, and provide help for researchers to develop more accurate intervention strategies and interventions.

Design A systematic review and meta-analysis.

Data sources From online databases, including PubMed, Web of Science, CINAHL, Embase, Cochrane Library, China National Knowledge Infrastructure, China Science and Technology Journal Database and Wan Fang Data.

Review methods Two independent systematic searches of English and Chinese databases were conducted by two graduate students with evidence-based training. The searches combined MeSH terms and free terms and covered the period from the establishment of the databases to October 31, 2024. References were managed using EndNote 20. Then, two reviewers independently screened literature, assessed study eligibility using the Agency for Healthcare Research and Quality (AHRQ) and extracted data. After conducting a quality assessment of the included literature, meta-analysis was performed by using the obtained data. The degree of heterogeneity was also indicated by using I^2 statistic.

Results In 10 cross-sectional studies were selected from 2720 studies, Education, Gender, Income level, Employment, Marital status, Age, Duration of disease, Self-efficacy may be key factors affecting self-management in patients with epilepsy. Meanwhile, the meta-analysis result of Education(0.53, 95% confidence interval (CI):0.25 ~ 0.58), Gender(0.35, 95%CI:0.18 ~ 0.51), Income level(0.41, 95%CI:0.18 ~ 0.51), Employment(-0.49, 95%CI: -0.63 ~ 0.36), Marital status(-0.28,

[†]Wenhao Tian and Xiaoxiao Yin contributed to the work equally and should be regard as joint first authorship. Other authors are ranked according to their contributions.

*Correspondence:
Leiwen Tang
tanglw@zju.edu.cn
Xiuqin Feng
fengxiuqin@zju.edu.cn

Full list of author information is available at the end of the article

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95%CI: -0.43 ~ 0.13), Age(0.12, 95%CI:0.01 ~ 0.23), Duration of disease(0.47, 95%CI:0.11 ~ 0.83), Self-efficacy(0.28, 95%CI:0.21 ~ 0.35) were statistically significant ($P<0.05$) and result of Frequency of seizure(0.3, 95%CI:-0.63 ~ 1.22) was not significant($P>0.05$).

Conclusion The status of self-management in patients with epilepsy in some regions is still not optimistic. In this review, self-management in patients with epilepsy is affected by many factors, including education, age, self-efficacy, employment, marital status, duration of disease, gender, income level. These factors may provide more targeted interventions and education to improve the self-management and quality of life of epilepsy patients.

Registration www.crd.york.ac.uk CRD42024619449, registered 10/12/2024.

Keywords Self-management, Epilepsy, Influencing factors, Systematic review, Meta-analysis

Background

Epilepsy is a common and serious chronic disease of nervous system [1]. Epilepsy affects more than 50 million people worldwide and accounts for 0.75% of the global disease burden [2]. The Global Burden of Epilepsy Report indicates that epilepsy accounts for 13 million disability-adjusted life years annually [3]. "Intersectoral Global Action Plan for Epilepsy and other neurological Diseases 2022–2031" issued by the World Health Organization puts the prevention and treatment of epilepsy as the first priority in the prevention and treatment of neurological chronic diseases [4].

Epilepsy has the long duration, unpredictability and repeated seizures, which can cause motor function limitation, somatosensory disorders, mental and psychological abnormalities, and even lead to brain function impairment, affecting patients' intellectual and physical development, and seriously affecting patients' physical and mental health and quality of life [5, 6]. The particularity of epilepsy self-management lies in the unpredictability of the disease itself and its profound impact on the daily life of patients [7]. In contrast to other chronic diseases such as diabetes or high blood pressure, the suddenness of seizures requires patients to be prepared to deal with possible seizures at all times, increasing the need for emergency response measures [8]. Meanwhile, patients with epilepsy need to take anti-epileptic drugs for a long time, and medication management is essential to control the condition, and irregular medication can lead to an increase in the frequency and severity of seizures [9]. In addition, patients must manage the various factors that can trigger an attack, such as getting enough sleep, avoiding excessive alcohol consumption and healthy diet. World Health Organization states that the key to effective management of patients with epilepsy is self-management [5].

In view of the importance of self-management of epilepsy patients, many scholars in the world have conducted research on it. There is evidence that some factors affect the level of self-management in people with epilepsy. However, these factors affecting self-management reported vary greatly. The current studies are mostly single-centre cross-sectional studies and still lacking of meta-analyses of self-management in patients with epilepsy.

Our aim was to estimate the factors influencing self-management in patients with epilepsy by using systematic review and meta-analytic techniques. To identify the influencing factors of epilepsy self-management, and provide support for researchers to develop more accurate intervention strategies and interventions.

Methods

Design

This systematic review with meta-analysis was conducted under the guidance of the registered PROSPERO protocol and Cochrane Handbook for Systematic Reviews of Interventions, and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist.

Study registration

Our study has been registered at the International Prospective Register of Systematic Reviews (Registration ID: CRD42024619449).

Search strategy

Two independent system searches of English and Chinese databases were carried out by two graduate students (W T. and X Y.) with evidence-based training. Our search strategy (Supplementary material 1) was developed by experts in epilepsy and academic researchers. We searched PubMed(36), Web of Science(1612), CINAHL(190), Embase(661), Cochrane Library(137), China National Knowledge Infrastructure [13], China Science and Technology Journal Database [10] and Wan Fang Data(61) through a combination of Mesh terms and free terms from the establishment of the database to October 31,2024. Articles in English or Chinese were included. References were managed using EndNote 20.

Selection criteria

Inclusion criteria

Study characteristics Studies that met the following criteria were included: (1) studies based on the patients with epilepsy; (2) studies reporting the influencing factors of self-management in patients with epilepsy; (3) studies that measured self-management with scales or questionnaires; (4) studies published in English or Chinese.

Participant characteristics Participants meeting the following criteria were included: (1) meet the diagnostic criteria of epilepsy patients in the International League against Epilepsy; (2) Duration of epilepsy ≥ 6 months; (3) Age ≥ 18; (4) Have the ability to cooperate with the completion of research, have good understanding skills, communication skills, without functional or organic mental illness.

Exclusion criteria

Studies meeting the following criteria were excluded: (1) repeated publication; (2) unable to obtain the full text; (3) reviews (including systematic reviews and meta-analyses), animal studies, comments, conference or case reports; (4) low quality (quality score < 4).

Study selection

All searched studies were imported into Endnote 20 literature management software to remove duplicates. Two independent reviewers (Tian and Yin) screened abstracts and titles of all references to remove irrelevant studies, the remaining studies are the results of the first stage of review. Then downloaded the full texts of potential studies for a second screening. They reviewed the screening results and discussed the differences. Disagreements pertaining to the inclusion of articles were resolved by consensus or involvement of a third author as necessary.

Outcome

Self-management in patients with epilepsy was the primary outcome. In each study, researchers should use the scientific and objective evaluation tools, such as The Epilepsy Self-Management Scale (ESMS), other scales or questionnaires to obtain the data of self-management. And it should also include the influencing factors of self-management, such as Education, Seizures, Age, Self-efficacy, Social support, Employment(status/occupations), Marital status, Duration of disease, Gender, Income level and so on.

Data extraction and management

Study basic characteristics, including first author, year of publication, language, geographical position, study design, measurement tools, sample size, influencing factors were extracted. The information is summarized and presented in a table. And The Epilepsy Self-Management Scale score also need to be extracted, in particular, including the total score and the scores of different groups of different influencing factors. For subsequent meta-analysis, we first extract the mean and standard deviation of variables from those selected studies and converted it to standardized mean difference (SMD). For studies that do not provide mean and standard deviation, we chose correlation coefficient(r) and standardized regression coefficient(β-value) as alternatives and then obtained Fisher's Z converted by using the formula [10].

Quality assessment

We used the 11-item questionnaire recommended by the Agency for Healthcare Research and Quality to evaluate the quality of the eligible articles by the same.

two reviewers independently [11]. For each item, the answer "Yes" received 1 point, and the answers "No" or "Unclear" received 0 points, for a total possible score of 11 points. Generally, the score of an article ≤ 3 was classified as low quality, 4–7 as moderate quality, and ≥ 8 as high quality [12]. If the quality was uncertain, the article was reviewed by a third reviewer.

Statistical analysis

Statistical analysis was performed with Review manager software version 5.3 and Stata software version 17. We conducted a meta-analysis by using the obtained SMD and Fisher's Z in order to evaluate the influence of different influencing factors on self-management outcomes. Meanwhile, the most important is creating forest plots to obtain the Z-value, I^2 statistic, summary Fisher's Z and their P-value. In the end, we need to convert summary Fisher's Z to summary Fisher's r as the part of result. For effect sizes that are less studied or cannot be combined, we only performed descriptive analysis. In our review, I^2 statistic was used to indicate the degree of heterogeneity in percentages [13], when $P \geq 0.1$ and $I^2 \leq 50\%$ meant that there was no significant heterogeneity among the studies, and the fixed effect model is adopted; in contrast, $P < 0.1$ and $I^2 > 50\%$ indicated that there was heterogeneity among the studies [14]. To evaluate the reliability of the meta-analysis results, we conducted a sensitivity analysis by transforming the model. The main sources of heterogeneity was determined by excluding the included studies one by one. Normally, publication bias was investigated using funnel plots and statistically using Egger tests. And publication bias is more convincing when the number of studies is greater than 10. However, there were no factors involved in the 10 studies, thus we only assessed publication bias for influencing factors with a number of studies greater than or equal to 5.

Results

Search results

Through the search of major databases, a total of 2720 records were obtained. After removing the duplicates and screening the titles and abstracts, we excluded 2628 studies. Finally, we included 10 studies which meet the inclusion criteria for our meta-analysis. All 10 studies were cross-sectional study, reported the level of self-management in patients with epilepsy and factors influencing self-management. PRISMA 2020 flow diagram shows the search and selection process of study in Fig. 1.

Descriptions of the included studies

Among the 10 studies, 6 studies were written in English [15–20] and 4 were written in Chinese [21–24] with English abstracts. These studies were conducted in 6 different countries from 2008 to 2024, seven of them were published in the last five years. All studies reported self-management as the outcome, most of them($n=8$) used ESMS to evaluate self-management in patients with epilepsy. ESMS contains 38 items across five dimensions (Medication/ Safety/ Seizure/ Lifestyle/ Information Management) and uses a Likert 5-point rating scale, with scores ranging from 1 to 5, corresponding to "never" to "always". Some items were reverse-scored. The total score ranges from 38 to 190 points. A higher score indicates a better level of self-management. The quality scores of the included studies ranged from 4 to 8 points, 9 studies' score ranged from7 to 8points, which means these studies are moderate or high quality. The detailed characteristics of the 10 eligible studies are summarized in Table 1, the main findings of included studies are in Table 2.

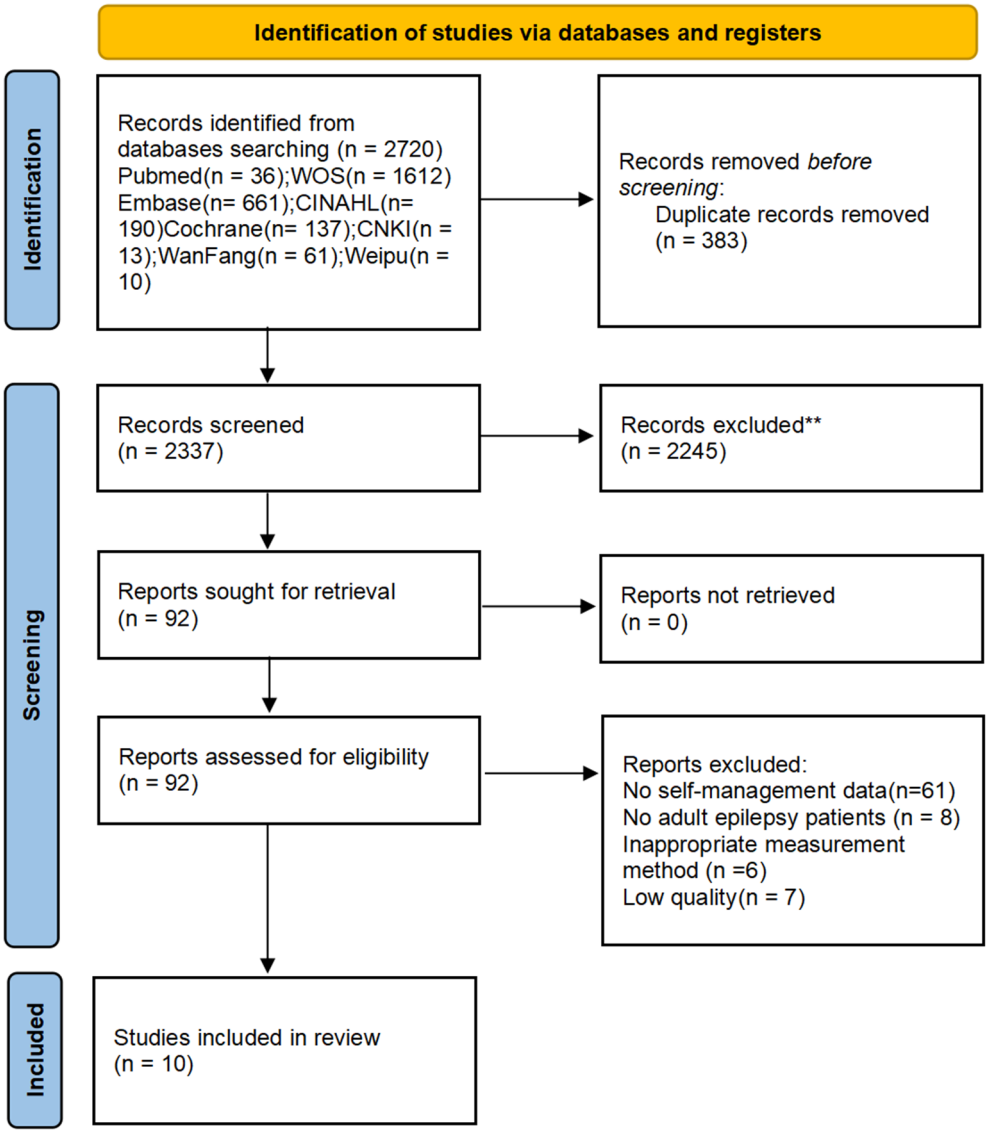

Fig. 1 PRISMA 2020 flow diagram

Table 1 Characteristics of included studies

Author(year)	Country	Language	Sample size	Scale	Influencing factors	Quality score
Thuy Le et al., [15]	Vietnam	English	147	V-ESMS	1	8
Duran et al., [16]	Turkey	English	135	T-ESMS	1,2,3,4	4
Babaei et al., [20]	Iran	English	335	ESMS	4,5,6,7,8	7
Smithson et al., [17]	UK	English	438	ESMS	5,6,7	8
Begley et al., [19]	USA	English	238	ESMS	9,10	7
McAuley et al., [18]	USA	English	50	AESMMI	1,5	8
Jin et al., [22]	China	Chinese	208	C-ESMS	1,2,5	8
Shi et al., [21]	China	Chinese	226	C-ESMS	1,2,3,5,6,9,11,12	8
Bai et al., [24]	China	Chinese	276	CDSMS	3,5,9,13	8
Xiao et al., [23]	China	Chinese	327	C-ESMS	8	8

[a] Influencing factors: (1) Education; (2) Gender; (3) Income level; (4) Frequency of seizures; (5) Age; (6) Employment(status/occupations); (7) Marital status; (8) Duration of disease; (9) Self-efficacy; (10) Social support; 11. Self-concept; 12. Medical coping modes; 13. Disease cognition

Table 2 Main findings of included studies

Study	Main findings
Thuy Le et al., [15]	1) Results showed a moderate overall V-ESMS score (131.32 ± 16.53), 2) Educational level as the significant factor influencing self-management (SM) practices ($p = 0.001$), with higher education correlating with better scores across all subscales except Medication and Safety.
Duran et al., [16]	1) The mean score of the epilepsy SM scale was 133.64 ± 18.40. 2) Education, gender, income level, presence of children, and frequency of seizures were determined as factors affecting epilepsy SM. No relationship was found between spousal support and epilepsy SM.
Babaei et al., [20]	1) The mean score of SM was 114.37 ± 11. 2) Age, place of residence, marital status, seizure type, seizure frequency, and epilepsy duration significantly predicted 53% of the variance of SM.
Smithson et al., [17]	1) Young adults, those in education or employment, those living with others and those who had recent seizures were more likely to have low SM scores.
Begley et al., [19]	1) Self-efficacy and social support were strongly associated with SM.
McAuley et al., [18]	1) Age and education were associated with epilepsy SM
Jin et al., [22]	1) The mean score of self-management ability in neurosurgical perioperative epilepsy patients was 132.58 ± 14.42. 2) Patient 's self-management ability was positively correlated with bachelor's degree or higher, female, and duration of surgery < 3 h, and negatively correlated with 30–50 years of age.
Shi et al., [21]	1) The total ESMS score was (110.64 ± 12.56). 2) Gender, education level, work situation, monthly family income, self-efficacy, self-concept and medical coping modes were the influencing factors of self-management in young patients with epilepsy
Bai et al., [24]	1) Patients with female, high income, high self-efficacy, and Disease cognition had better self-management behaviours.
Xiao et al., [23]	1) The Chinese version of ESMS(C-ESMS) of adult PWE in western China was 122.43 ± 12.5. 2) The longer the duration, the higher the self-management level of patients with epilepsy.

Results of the meta-analysis

10 cross-sectional studies were selected from 2720 studies, which were moderate or high quality (Table 3). The meta-analysis result of Education 0.53, 95% confidence interval (CI):0.25 ~ 0.58), Gender 0.35, 95%CI:0.18 ~ 0.51), Income level (0.41, 95%CI:0.18 ~ 0.51), Employment (-0.49, 95%CI: -0.63 ~ 0.36), Marital status (-0.28, 95%CI: -0.43 ~ 0.13), Age (0.12, 95%CI:0.01 ~ 0.23), Duration of disease (0.47, 95%CI:0.11 ~ 0.83), Self-efficacy (0.28, 95%CI:0.21 ~ 0.35) were statistically significant ($P<0.05$) and result of Frequency of seizure (0.3, 95%CI:-0.63 ~ 1.22) was not significant ($P>0.05$).

Factors affecting self-management in patients with epilepsy

In 10 included studies, 13 influencing factors were mentioned, 9 factors can conduct a meta-analysis, the other four factors (social support, self-concept, medical coping modes, disease cognition) cannot because they were only mentioned in one study. The forest plots of each influencing factor which is formed by comprehensive analysis of the different research results involved in each influencing factor shows that 8 factors (Education, Age, Self-efficacy, Employment, Marital status, Duration of disease, Gender, Income level) were statistically significant ($P<0.05$). In addition, the meta-analysis of frequency of seizure did not show an effect on self-management ($P>0.05$). The results of meta-analysis of factors affecting self-management in epilepsy patients were presented in Table 4 (continuous data) and Table 5 (correlation variable). Forest plots (Figs. 2 and 10) are provided in Supplementary material 1.

Table 3 Quality assessment of included studies

AHRQ	Thuy Le et al., [15]	Duran et al., [16]	Babaei et al., [20]	Smithson et al., [17]	Begley et al., [19]	McAuley et al., [18]	Jin et al., [22]	Shi et al., [21]	Bai et al., [24]	Xiao et al., [23]
1) Define the source of information (survey, record review)	1	1	1	1	1	1	1	1	1	1
2) List inclusion and exclusion criteria for exposed and unexposed subjects (cases and controls) or refer to previous publications	0	0	0	1	0	0	0	0	0	0
3) Indicate time period used for identifying patients	1	0	1	1	1	1	1	1	1	1
4) Indicate whether or not subjects were consecutive if not population-based	1	1	1	1	1	1	1	1	1	1
5) Indicate if evaluators of subjective components of study were masked to other aspects of the status of the participants	1	1	1	1	1	1	1	1	1	1
6) Describe any assessments undertaken for quality assurance purposes (e.g., test/retest of primary outcome measurements)	0	0	0	0	0	1	1	1	1	1
7) Explain any patient exclusions from analysis	1	0	1	1	1	1	1	1	1	1
8) Describe how confounding was assessed and/or controlled.	1	0	1	0	1	0	0	0	0	0
9) If applicable, explain how missing data were handled in the analysis	1	0	0	1	0	1	1	1	1	1
10) Summarize patient response rates and completeness of data collection	1	1	1	1	1	1	1	1	1	1
11) Clarify what follow-up, if any, was expected and the percentage of patients for which incomplete data or follow-up was obtained	0	0	0	0	0	0	0	0	0	0
Total	8	4	7	8	7	8	8	8	8	8

*Yes-1, No/Unclear-0

Table 4 Meta-analysis of influencing factors self-management in patients with epilepsy (continuous variable)

Influencing factors	Groups	Number of studies	Heterogeneity		Model	Meta-analysis results			
			I^2(%)	P		SMD (95%CI)	Z	P	Prediction interval
Education	≥College ≤High school	5	62	0.03	Random	0.53(0.28,0.78)	4.16	<0.01	(-1.58, 2.64)
Gender	Female/Male	4	22	0.28	Fixed	0.35(0.18,0.51)	4.11	<0.01	(-4.30, 5.00)
Income level	≥Middle income/ < middle income	3	43	0.17	Fixed	0.41(0.25,0.58)	4.90	<0.01	(-3.22, 4.02)
Employment	Yes/No	3	0	0.66	Fixed	-0.49(-0.63,-0.36)	7.21	<0.01	(-4.00, 3.02)
Marital status	Married/Single	2	0	0.73	Fixed	-0.28(-0.43,-0.13)	3.62	<0.01	(-4.44, 3.88)

Table 5 Meta-analysis of influencing factors self-management in patients with epilepsy (correlation variable)

Influencing factors	Number of studies	Heterogeneity		Model	Meta-analysis results		
		I^2(%)	*P*		Summary Fisher's Z (95%CI)	*P*	Summary Fisher's *r*
Frequency of seizure	2	98.80	0.001	Random	0.3(-0.63,1.22)	0.529	0.29
Age	6	74.70	0.001	Random	0.12(0.01,0.23)	0.035	0.12
Duration of disease	2	95	<0.001	Random	0.47(0.11,0.83)	0.01	0.44
Self-efficacy	3	0	0.989	Fixed	0.28(0.21,0.35)	<0.001	0.27

Sensitivity analysis

Sensitivity analysis was performed by converting the model (Table 6), the results showed that all factors were robust. For meta-analysis with large heterogeneity, we used the one-by-one exclusion method. In the categories of education and income level, a study [21] is the main source of heterogeneity, which may be related to the fact that Shi's research objects was young patients with epilepsy. After excluding this study, the level of heterogeneity is within a reasonable range (I^2<50%). In terms of age, the study of Duran [16] is the main source of heterogeneity, possibly because its research results are contrary to those of other studies. It is worth noting that the factor of frequency of seizure was only mentioned in two studies, therefore, this method is not applicable.

Publication bias

Limited by the number of studies, thus we only assessed publication bias for influencing factors with a number of studies greater than or equal to 5 (including Education and Age) by using Egger tests. The results of the tests were presented in Figs. 11 and 12 (Supplementary

Table 6 Sensitivity analysis of influencing factors self-management in patients with epilepsy

Influencing factors	Before conversion		After conversion	
	Model	SMD/Summary Fisher's Z(95%CI)	Model	SMD/Summary Fisher's Z(95%CI)
Education	Random	0.53(0.28,0.78)	Fixed	0.56(0.41,0.71)
Gender	Fixed	0.35(0.18,0.51)	Random	0.35(0.18,0.51)
Income level	Fixed	0.41(0.25,0.58)	Random	0.41(0.25,0.58)
Employment	Fixed	-0.49(-0.63,-0.36)	Random	-0.49(-0.63,-0.36)
Marital status	Fixed	-0.28(-0.43,-0.13)	Random	-0.28(-0.43,-0.13)
Frequency of seizure	Random	0.3(-0.63,1.22)	Fixed	0.50(0.41,0.59)
Age	Random	0.12(0.01,0.23)	Fixed	0.13(0.08,0.19)
Duration of disease	Random	0.47(0.11,0.83)	Fixed	0.49(0.41,0.57)
Self-efficacy	Fixed	0.28(0.21,0.35)	Random	0.28(0.21,0.35)

Material 1) and showed that no significant publication bias was detected in the Egger test results for education and age ($P > 0.05$). However, such results cannot conclusively demonstrate the absence of publication bias in our study, because the small number of studies included may affect the reliability of the findings.

Results of the systematic review

In all eight studies that used the ESMS scale, scores ranged from 110 ± 12.56 [21] to 141 ± 15.4 [18], shows great differences among epilepsy patients in different countries and regions. Some studies found that social support [19], self-concept [21], medical coping modes [21], disease cognition [24] also have an impact on self-management.

Discussion

Self-management is important for the quality of life, physical and mental health, and prognosis of patients with epilepsy [9, 25, 26]. The particularity of epilepsy self-management lies in the unpredictability of its seizures, which means patients need to be constantly prepared to deal with sudden epileptic seizures, while other chronic diseases such as diabetes or hypertension usually do not have this kind of suddenness. Through this review, we also found that the self-management level of epilepsy patients in different regions varies greatly, with some concerning outcomes in some developing nations, including China and Vietnam. However, at present, there is still a lack of more targeted intervention programs for such patients, because the results of influencing factors obtained by various original studies are different. A meta-analysis is needed to integrate them scientifically and systematically. In our study, a systematic review and meta-analysis were conducted, combining data from 10 included studies across several continents, including Asia, Europe, and the America. The results showed that gender, education, income level, age, duration of disease, self-efficacy, employment and marital status were important factors of the self-management in patients with epilepsy, and sensitivity analysis showed that the results were stable and reliable.

Through analysis, we found that self-management has a positive trend with education, income level, age, duration of disease and self-efficacy. The results of five studies indicated that patients with a higher educational background may achieve a better self-management level, especially in those individuals with a bachelor's degree or higher education. It may be related to the knowledge of patients [27]. The lower the education level, the worse the individual's cognition of disease and understanding ability of health education which eventually lead to a bad self-management [21]. Of course, effectively managing epilepsy may require significant behaviour changes in patients, and providing information alone does not ensure such changes. Low-income level patients are facing more obstacles and barriers in self-management due to economic issues, which keeping them away from healthcare services and use of other treatment options [16, 21]. And these patients pay less attention to their own heath [21], because the balance between basic survival needs and disease management is rough. The results of age and duration of disease were shown that with the age and duration increasing, self-management in patients with epilepsy indicate better. They may gain more experience [22], not only gain more knowledge about the disease, but increase awareness of their health [23]. From another side, young patients with epilepsy are in the golden period of life, their studies and careers are in the development period or rising period, eager to get a better life, because of frequent seizures and the uncertainty of treatment, their learning, life, work, family, marriage and other diseases have been affected [28]. Meanwhile, their self-management the determining factor is not good enough to improve current situation. In the future, young patients with epilepsy are a target group worthy of attention and intervention, especially those under the age of 30. In addition, between female and male, self-management also have significant differences. Several studies proved female patients possess better self-management, this may be related to that women bear more housework

in daily life and attach importance to and manage their own diseases [29]. Of course, there are other studies [16] that have reached the opposite conclusion, but after conducting a meta-analysis, the original conclusion still holds. Age, gender, education, income level and duration of disease are not factors we could intervene, but factors we can focus on. While the process of intervention and nursing, giving more attention and support to those patients with young, male, less education, low income level and long duration will be necessary and meaningful.

As same as other chronic diseases, self-efficacy may also be an important factor affecting the level of self-management in epilepsy. Those with higher self-efficacy are able to establish a good cognitive evaluation system, are more willing to participate in disease management, deal with their own illnesses correctly [30]. And low level of self-efficacy brings negative psychological and self-confidence setback [31]. This finding is important because it suggests that strategies to improve self-management may be achieved by improving self-efficacy.

To be mentioned, employment and marital status may have a negative effect on self-management. Patients who are employed have worse self-management performance than those are unemployed, the reason may come from the discrimination and rejection at workplace [32]. Another potential reason is work pressures and professional rules compressing the space for self-management [21], on the contrary, unemployed have more time and energy to take care of their health. For employed patients, it is necessary to consider the impact of occupational stress on them, and then minimize its impact on self-management on the process of intervention and nursing. Furthermore, it is not what we expected, marital does not promote self-management in people with epilepsy, on the contrary, single or divorced patients achieve a higher level of self-management. For patients those in a marriage, they may be busier while taking care of the lives of other family members [20]. Moreover, there is a study [29] found married patients are more anxious and depressed leading to a worse quality of life. Because of the social discrimination and psychological stress that seizures cause, patients need more psychosocial support [33]. Patients and their families also need to be able to cope with sudden seizures, including keeping their airways open and avoiding injury. Therefore, patient's relatives should consciously lighten the burden of patients in life and recognize negative emotions timely. Although, nurses and interveners cannot always be involved in this process, it is possible to give some guidance and help to the family members. Understanding the complexities of self-management in patients with epilepsy requires an intervenor or nurse through an effective communication to listen how patients live with epilepsy and help them develop an individualized plan to address their life and epilepsy issues.

Besides, the results of the analysis showed frequency of seizures had no effect on self-management, possibly due to the fact that only two studies were included and the results of the two studies were contradictory. For those influencing factors (social support, self-concept, medical coping modes, disease cognition) cannot be meta-analysed, due to the few numbers of included studies, it is not easy to determine their impact on self-management. Thus, more research is needed to determine the specific effects of these factors.

Limitations

This review still has some potential limitations. Firstly, in this study, only the cross-sectional study was included that causal inferences could not be made. Secondly, some factors have only been explored in a limited number of studies, more research is needed to explore these factors in the future. Thirdly, due to the differences in cultural backgrounds and regions of the included literatures, and the inconsistency in the measurement tools of outcome indicators, there may be heterogeneity among studies, which has a certain impact on the research results. Finally, for those meaningful, valuable, unpublished articles or data, we were unable to obtain.

Conclusions

Overall, through this systematic review and meta-analysis, we found that the status of self-management in patients with epilepsy in some regions is still not optimistic. And self-management in patients with epilepsy may be affected by many factors, including education, age, self-efficacy, employment, marital status, duration of disease, gender, income level. This review can provide more evidence for clinical work, help epilepsy self-management intervention, and provide scientific basis for future scientific research and clinical decision-making. In clinical practice, professionals could identify epilepsy patients with poor self-management at an early stage based on the aforementioned factors. They may provide more targeted interventions and education to improve the self-management and quality of life of epilepsy patients. However, further research is required to definitively establish the impact of certain factors on self-management practices. Based on the factors influencing self-management in patients with epilepsy, more personalized intervention programs and strategies can be developed.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12912-025-03063-3.

Supplementary Material 1

Acknowledgements
Not applicable.

Author contributions
#W. T. and X. Y.: Writing - review & editing, Writing - original draft, Formal analysis, Datacuration, Conceptualization. W. P. and C. L.: Writing - original draft, Software, Methodology, Data curation. Y. Z.: Writing - review & editing, Software, Methodology. *L. T. and X. F.: Writing - review & editing, Supervision, Conceptualization.

Funding
This work was supported by the Medical and Health Science and Technology Plan of Zhejiang Province, China [No. 2024KY1038].

Data availability
All data generated or analyzed during this study are included in this published article [and its supplementary information files].

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Nursing, The Second Affiliated Hospital, Zhejiang University School of Medicine (SAHZU), No. 88 Jiefang Road, Shangcheng District, Hangzhou, Zhejiang Province 310009, China
[2]Zhejiang University School of Medicine, No. 866 Yu Hang Tang Road, Hangzhou, Zhejiang Province 310058, China

Received: 14 January 2025 / Accepted: 7 April 2025
Published online: 22 April 2025

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