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Systematic Review

Evaluating the Characteristics of Questionnaires Evaluating Knowledge, Attitude, and Practice Regarding Polycystic Ovarian Syndrome Among Women of Reproductive Age: A Systematic Review

Roya Gholami[1], Marjan Akhavan Amjadi[1], Sareh Dashti*[2]

[1]*Department of Midwifery, TeMS.C., Islamic Azad University, Tehran, Iran*
[2]*Department of Nursing and Midwifery, MMS.C., Islamic Azad University, Mashhad, Iran*

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Corresponding Author: Department of Nursing and Midwifery, MMS.C., Islamic Azad University, Mashhad, Iran.
Email:
sareh_dashti@iau.ac.ir

ABSTRACT

Context: Although polycystic ovarian syndrome (PCOS) is common, little is known regarding the knowledge, attitude, and practice (KAP) of women regarding PCOS, possibly due to the scarcity of KAP assessment tools.

Objectives: This systematic review aimed to identify the questionnaires used to evaluate KAP regarding PCOS among PCOS women during reproductive age.

Methods: In this systematic review, published articles in PubMed, Web of Science, Magiran, and SID databases were searched until 24 Jul 2025. Inclusion criteria included original research articles in Persian or English that investigated KAP using questionnaires among PCOS women of reproductive age. Exclusion criteria were unavailable full texts, seminar abstracts, commentaries, letters, and opinions. The search keywords were PCOS, questionnaire, knowledge, attitudes, and practice. Joanna Briggs Institute (JBI) quality assessment tool was used for quality assessment of the included articles.

Results: Of the initial 4606 articles, five articles were eligible for review. Validity and reliability were reported in 60% and 40% of the articles, respectively. All the articles evaluated knowledge. Attitude and practice were evaluated in three and two articles, respectively. The knowledge domain mostly included questions on the definition, diagnosis, and complications of PCOS. The attitude domain included questions on feelings after diagnosis, the effectiveness of PCOS treatments, and lifestyle modification.

Conclusions: The available KAP questionnaires failed to cover the main domains and subdomains of KAP. Holistic KAP questionnaires regarding PCOS should be developed and standardized to improve PCOS management and health education.

Keywords: Polycystic Ovarian Syndrome, Knowledge, Attitude, Practice

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1. Context

Polycystic ovarian syndrome (PCOS) is a prevalent endocrine and metabolic disorder that affects 8 to 13% of women of reproductive age globally (1- 3). However, up to 70% of affected women remain undiagnosed worldwide (3). Polycystic ovarian syndrome is also linked to cardiometabolic conditions such as obesity, diabetes, psychological disorders (2), and increased risk of cancer as well as anovulation infertility (3). Polycystic ovarian syndrome diagnosis is typically made using the modified Rotterdam criteria, which requires the presence of any two of the following: (1) Hyperandrogenism (clinical or biochemical), (2) oligo- or anovulation, and (3) polycystic ovarian morphology in ultrasound assessment, after ruling out other relevant conditions (4).

As part of its efforts to improve women's health and reproductive well-being globally, the World Health Organization (WHO) collaborates with governmental and non-governmental partners to raise public awareness about PCOS (3). Assessing knowledge, attitude, and practice (KAP) regarding PCOS among women with the condition is crucial, as it helps identify gaps in awareness, promotes adherence to lifestyle modifications, and supports early intervention tomitigate long-term complications like infertility and cardiometabolic risks (5). The common method for evaluating KAP in health research is through subjective questionnaires (6- 9). These tools are inexpensive and can be easily used in different populations through direct, phone, or online interviews (10).

KAP questionnaires are good tools to assess or develop behavioral theories (10). There are limited KAP studies and no systematic reviews have been conducted on the related questionnaires among women with PCOS (11- 13). Although in some studies, the development of questionnaires has drawn on insights from surveys conducted by the WHO, these questionnaires differ significantly in terms of the number of items and the structure of questions and responses. Furthermore, due to the subjective nature of attitudes and practices, it might be difficult to combine or compare the findings of these questionnaires. Consequently, there is a need for a standardized questionnaire to provide comparable information that could be used in health decision making.

2. Objectives

The objective of this study was to systematically review the characteristics of the currently available questionnaires evaluating the KAP regarding PCOS among women of reproductive age with PCOS diagnosis.

3. Methods

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses was followed to perform this systematic review (14). The review process was documented in a protocol (PROSPERO ID: CRD420251042362).

Literature search was conducted in PubMed and Web of Science international databases and SID and Magiran Persian databases and Google Scholar as gray literature until 24 Jul 2025.

3.1. Search Strategy

In order to access all Persian and English articles, keywords were selected using Patient/Population, Concept, and Context (PCC) terms. Therefore, the keywords were PCOS (patient), questionnaire (concept), knowledge, attitudes, and practice (context). The vocabulary and medical synonyms of the keywords were combined using Boolean operators. Keywords in each PCC term were combined using OR and the terms were combined using AND to cover the highest possible number of search results in the field. The search was primarily conducted in PubMed with relative Medical Subject Heading (MeSH) terms. The search strategy was then updated based on the primary findings of the search and relevant keywords were added to the search.

PubMed: ("polycystic ovary syndrome"[MeSH Terms] OR "polycystic ovary syndrome"[All Fields] OR "PCOS"[All Fields]) AND ("questionnaire"[All Fields] OR "survey"[All Fields]) AND ("knowledge"[All Fields] OR "attitude"[All Fields] OR "practice"[All Fields]) [Limits: English, Persian; from inception to 24 July 2025]." The final search strategy was implemented in other databases using required modifications (Supplementary File). The Persian translation of the keywords was used to search Persian databases using similar methodology. The search covered articles from database inception to 24 July 2025.

3.2. Inclusion Criteria and Study Selection

The inclusion criteria in this study were original research articles that were published in Persian or English languages, studies that investigated KAP using questionnaires, and studies that were published in peer- reviewed journals. The exclusion criteria were unavailable full text, seminar abstracts, abstracts, commentaries, letters, and opinions.

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3.3. Article Screening

After searching the databases, the identified articles were exported to Endnote software version 9. Duplicated publications were then removed. In the first step, the title and abstract of the articles were evaluated for eligibility based on the inclusion and exclusion criteria. In the second step, the screening of the remaining articles' full texts was performed based on the inclusion and exclusion criteria. Two authors performed the screening separately, and in case of disagreement between the authors, the disagreement was resolved based on group discussion with the third author. The inter-rater agreement between the reviewers was assessed using Cohen's Kappa at the end of the first and second screening phases. The Kappa values for the first (title abstract) and second (full text) screening phases were 0.56 (95% CI: 0.49 - 0.68) and 0.44 (95% CI: 0.03 - 0.86), respectively.

3.4. Quality Assessment

The quality of the finally included articles was evaluated by the authors using the Joanna Briggs Institute (JBI) quality assessment tools based on the risk of bias (15). Joanna Briggs Institute provides different tools for different study designs. In this systematic review, the JBI tool for cross-sectional and quasiexperimental studies was used to assess the quality of the included cross-sectional and quasi-experimental studies, respectively. Decision on the inclusion of each study was made based on the JBI tool instructions and consensus between the authors.

3.5. Data Acquisition

The included studies were evaluated by the authors and data including first author name, publication year, country, study type, sample size, questionnaire characteristics, and findings were extracted and summarized in tables and figures. Then the findings of the studies were reviewed and discussed in the following sections of the manuscript.

4. Results

Primarily, 4606 articles were identified based on the search strategy. Of the 4606 articles identified, 108 duplicates were removed. Four thousand nine hundred and ninety-eight titles/abstracts were screened, excluding 4933 for irrelevance. Sixty-five full-texts were assessed, with exclusions for unavailable full texts (n = 1), non-original research or not reporting data (n = 3), no KAP involvement (n = 1), and no data on outcome (n = 2), resulting in five included studies. This section summarizes the selection process, characteristics, and methodological quality of the included studies. Out of these articles, five articles evaluated KAP regarding PCOS among women in reproductive age who had PCOS using structured questionnaires (16- 20). Overall, the five included articles were published between 2014 and 2023 and included one analytical cross-sectional study, two descriptive cross-sectional studies, and two quasi-experimental studies. Based on the quality assessment using the JBI critical appraisal tool (21, 22). The PRISMA flow diagram of the study is presented in Figure 1.

Of the two quasi-experimental studies, neither reported on participant retention, while one study did not report selection and allocation bias (16). Of the three cross-sectional studies, all fulfilled the JBI requirements, except two articles that failed to mention the confounders and the strategies to manage them (18, 20). All the included articles were identified to have moderate to high quality rating and were included in the review (Table 1 and 2). Summary of the study characteristics and main findings is presented in Table3. In most of the articles, the questionnaire was applied using pre- and post-test method.

Table 1: Quasi experimental studies

	Bekhatroh Rashed et al. (2023)	Selvaraj et al. (2023)
Bias related to temporal precedence	Yes	Yes
Bias related to selection and allocation	Not applicable	Yes
Bias related to confounding factors	Yes	Yes
Bias related to administration of intervention/exposure	Yes	Yes
Bias related to assessment, detection and measurement of the outcome	Yes	Yes
Bias related to participant retention	No	No
Statistical conclusion validity	Yes	Yes

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Table 2: Cross sectional studies

	Naz et al. (2022)	Safdar et al. (2023)	Type of study
Were the criteria for inclusion in the sample clearly defined?	Yes	Yes	Yes
Were the study subjects and the setting described in detail?	Yes	Yes	Yes
Was the exposure measured in a valid and reliable way?	Yes	Yes	Yes
Were objective, standard criteria used for measurement of the condition?	Yes	Yes	Yes
Were confounding factors identified?	Yes	No	No
Were strategies to deal with confounding factors stated?	Yes	No	No
Were the outcomes measured in a valid and reliable way?	Yes	Yes	Yes
Was appropriate statistical analysis used?	Yes	Yes	Yes
Type of study	Analytical cross-sectional study	Descriptive cross-sectional study	Descriptive cross-sectional study

The KAP questionnaires in all the five reviewed articles included the knowledge domain. The characteristics of questionnaires are shown in Table 4. The KAP questionnaires in three articles included questions about attitudes toward PCOS. However, one article did not report on the construct of the attitude's domain of the questionnaire. Practice was included in the questionnaires in two articles. All the three domains of knowledge, attitude, and practice were evaluated simultaneously in one study; nevertheless, the article did not report questionnaire findings in terms of practice. Data on the validity of the questionnaires was reported in three articles (60%), while the reliability was reported in two articles (40%). The number of items and form of questions and responses were highly variable between the articles. Validity assessments included content validity via expert opinion in one study (17), pilot study in another (18), and Cronbach's alpha for reliability in one study (16), where the α value was not specified. None of the articles reported construct validity assessment

Table 3: Characteristics of Studies Included in Review

Number	Author, Country (y)	Questionnaire	Age (y)	Sample	Sample Size	Title	Full Text
1	Teede et al., Australia (2014), (20)	Attitudes	Any age	Both lay people (PCOS) and health professionals	162:57 women with PCOS and 105 primary care physicians	Perceptions and attitudes of women and primary health care physicians on features of PCOS and renaming the syndrome	Yes
2	Naz et al., Pakistan (2022), (17)	Knowledge and attitude	18-23	Women with PCOS	1.278	Knowledge and attitude of young female population toward early diagnosis of PCOS	Yes
3	Selvaraj et al., India (2020), (19)	Knowledge and attitude	15-17	School going girls with high and moderate PCOS risk	40	Implementation of an awareness program and lifestyle intervention on PCOS among adolescent schoolgirls in India	Yes
4	Bekhatroh Rashed et al., Egypt (2023), (16)	Knowledge and Practices	20-35	Women with PCOS	100	Impact of multimedia education on women's knowledge and practices regardinVg PCOS	Yes
5	Safdar et al., India (2023), (18)	Knowledge, attitude, and behavior (practice)	18-45	Women with PCOS	300	Cross-sectional study to assess the knowledge, attitude, and behavior of women suffering from PCOS and their effect on the skin	Yes

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4.1. Knowledge Domain

All the included articles had questions on the knowledge domain. Table 4 illustrates the key questions in the field of knowledge, which are predominantly related to individuals' understanding of definition, causes, signs and symptoms, diagnostic evaluation, and complications. The knowledge questions were administered in the form of close-ended questions (CQ).

4.2. Attitude Domain

In three of the articles, questions concerning attitudes were used. However, one out of three articles did not address questions in this domain. Table 4 outlines the characteristics of the questions related to the attitude's domain. Most questions in this domain pertained to the individual's feelings after diagnosis, attitude toward the effectiveness of PCOS treatments, and changing lifestyle. The questions were presented in the form of CQ.

4.3. Practice Domain

Practice was evaluated in two articles, but only one of the articles reported practice results. Table 4 summarizes the key questions related to the practice domain. Questions in this domain focused on lifestyle aspects, such as dietary habits, physical activity, leisure activities, and sleep patterns.

5. Discussion

This systematic review identified five studies evaluating KAP questionnaires on PCOS among women of reproductive age with the condition. Key findings included a focus on knowledge domains across all studies, with limited coverage of attitudes (three studies) and practices (two studies). Questionnaires varied in items, validity (reported in 60%), and reliability (reported in 40%), highlighting the absence of a standardized tool.

5.1. Overall, Knowledge, Attitude, and Practice Questionnaire Characteristics

The majority of the reviewed studies were conducted in developing countries [only one study was conducted in Australia (20)]. Both the studies that were conducted in India (18, 19) designed their own self-administered structured questionnaires.

The validity of questionnaires was reported in the majority (60%) of the reviewed studies (16- 18), while only 40% mentioned the reliability of their questionnaires (16, 19). Validity was reported in three studies, where the Cronbach's alpha was used in one study (16), while another study used a pilot study (18), and expert opinion was used to assess validity in one study (17). None of the studies reported the statistical test to assess reliability.

Although the number of questions varied widely, most of the questionnaires included 25 items. A most studies focused on only one or two areas, it appears that a comprehensive questionnaire should assess KAP across different domains, such as awareness of reproductive system anatomy, causes, signs and symptoms, diagnostic evaluation, complications, prevention, mental effects of PCOS, sleep habits, diet, and physical activity. In all studies, knowledge questions were asked first, which seems reasonable to measure knowledge before assessing attitudes and practices related to PCOS. The most common format for the questions was a combination of multiple-choice and Yes/No questions, with all questions presented in a closed-ended format.

The findings of this systematic review indicated a lack of a standardized questionnaire to assess KAP regarding PCOS among affected women. This gap may stem from cultural and regional differences in PCOS perceptions, limited interdisciplinary collaboration, and a historical focus on clinical rather than behavioral aspects in PCOS research. Similar to PCOS, initial variability in assessing diabetes knowledge assessment tools led to the development of validated instruments like the Diabetes Knowledge Questionnaire (DKQ) that facilitated comparative studies and improved patient education programs (23). Similarly, adopting a comparable approach in PCOS could address cultural and methodological barriers, promoting interdisciplinary collaboration and enhancing global health initiatives for endocrine disorders.

5.2. Knowledge Domain

Based on the findings of this systematic review, the greatest similarity between the questionnaires was found in the knowledge domain. In an appropriate questionnaire, the thorough knowledge assessment about PCOS should encompass a variety of topics, including basic understanding of PCOS, causes and risk factors of PCOS, PCOS symptoms and presentation, long- term health risks of PCOS, treatment and management of PCOS, fertility and reproductive health, lifestyle and self-care, and support and resources (Supplementary file). It is preferable to answer the knowledge questions using both short formats (yes/no or true/false) and multiple-choice questions, depending on the nature of the question. This systematic review revealed that only a

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limited number of studies have inquired about knowledge on mental health. Additionally, no study included questions about diet, exercise, lifestyle, or support systems.

Table 4: The Items of Knowledge, Attitude, and Practice Questions About Population, Concept, and Context

Author	Number of items	type	knowledge	attitude	behavior
Teede et al. (20)	19 items for knowledge	CQ (Multiple choice questions	Which of the following do you believe are the four key clinical features of PCOS? (The multiple choices were not mentioned in the article)	-	-
Selvaraj et al. (19)	25 items for knowledge	CQ (Multiple choice questions and Five-point Likert scale)	Questions about the anatomy of the reproductive system, definition, causes, signs and symptoms, diagnostic evaluation, complication and prevention of PCOS (the exact questions were not mentioned in the article)	The questions in this field were not mentioned, only five-point Likert scale (minimum score '0' and maximum score '4') was mentioned	-
Naz et al. (17)	18 items for knowledge, 7 items for attitude	CQ (Yes/ No questions)	1- Metabolic syndrome is a group of symptoms that increases my risk for endometrial cancer; 2 -It is common in women from 15 to 44 years of age; 3- Laboratory tests can diagnose PCOS; 4- Abnormal menstruation is the primary indication of PCOS.; 5- It may lead to infertility; 6- It is chronic and does not have treatment.; 7- Patients with PCOS may have an increased risk of breast cancer, increased sugar levels, and cardiac disease.; 8- Patients with PCOS may develop facial hair; 9- Patients with PCOS may develop excessive hair growth on face, chest, and belly; 10- Patients with PCOS may develop acne and worsens acne; 11- Patients with PCOS may develop weight gain and obesity; 12- Patients with PCOS may develop obstructive sleep apnea;13- Patients with PCOS may suffer from thinning of hair on the head; 14- PCOS patients have an increased risk of depression and anxiety; 15- Patients with PCOS may develop darkened, thickened skin around the neck, armpits, or breasts; 16- Patients with PCOS may develop high blood pressure and high cholesterol; 17- PCOS can be treated by weight reduction; 18- PCOS can be treated with medication	1- I take it seriously and will go to the doctor for further consultation; 2- I would use hormone-regulating herbs to treat when I will come to know; 3- I will not take it seriously; 4- Diagnosis would negatively impact my self- confidence; 5- I am scared to think that PCOS needs lifetime treatment; 6- I would feel depressed; 7- I will ignore it and would not take treatment	-
Safdar et al. (18)	6 items for knowledge, 3 items for attitude	CQ (Yes/ No and Multiple-choice questions)	1-Did you hear about PCOS? Yes, No; 2- What is PCOS? Absence of periods, Presence of longer periods, I don't know; 3- What are the reason for PCOS? Genetics, Weight gain, Hormonal imbalance, All the above, I don't know; 4- What are the symptoms of PCOS? Acne, Hair loss, Rashes, All the above, I don't know; 5- How do you diagnose PCOS? Based on symptoms, Hormone test, Ultrasonography, All the above, I don't know; 6- What are the treatment options available? Medication, Ovarian cystectomy, Weight management, I don't know	1-Do you think weight reduction helps in PCOS in: Healthy lifestyle, Monitor insulin level, Weight reduction, All the above, I don't know; 2- Do you helps in achieving: Improve ovulation, Improve physiological, condition, All the above, I don't know; 3- What do you think can control and maintain hormone balance in PCOS: Diet, Exercise, Medication, All the above, I don't know	Regardless of mentioning practice in the title, there was no report on the question or conclusion.
Bekhatroh Rashed et al. (16)	Unknown	CQ (The type of the choices was not mentioned in the article)	The questionnaire contained questions about definition, causes, signs and symptoms risk factors, complications, treatment and source of knowledge	-	1- Evaluating the women's eating behaviors, including food types consumed, frequency of meals and meal components; 2- Evaluating the women's physical activity, including the frequency and type of exercise; 3- Evaluating how often and how much women watched television and use computers during their free time; 4- Evaluating sleep habits, including napping and daily sleep hours

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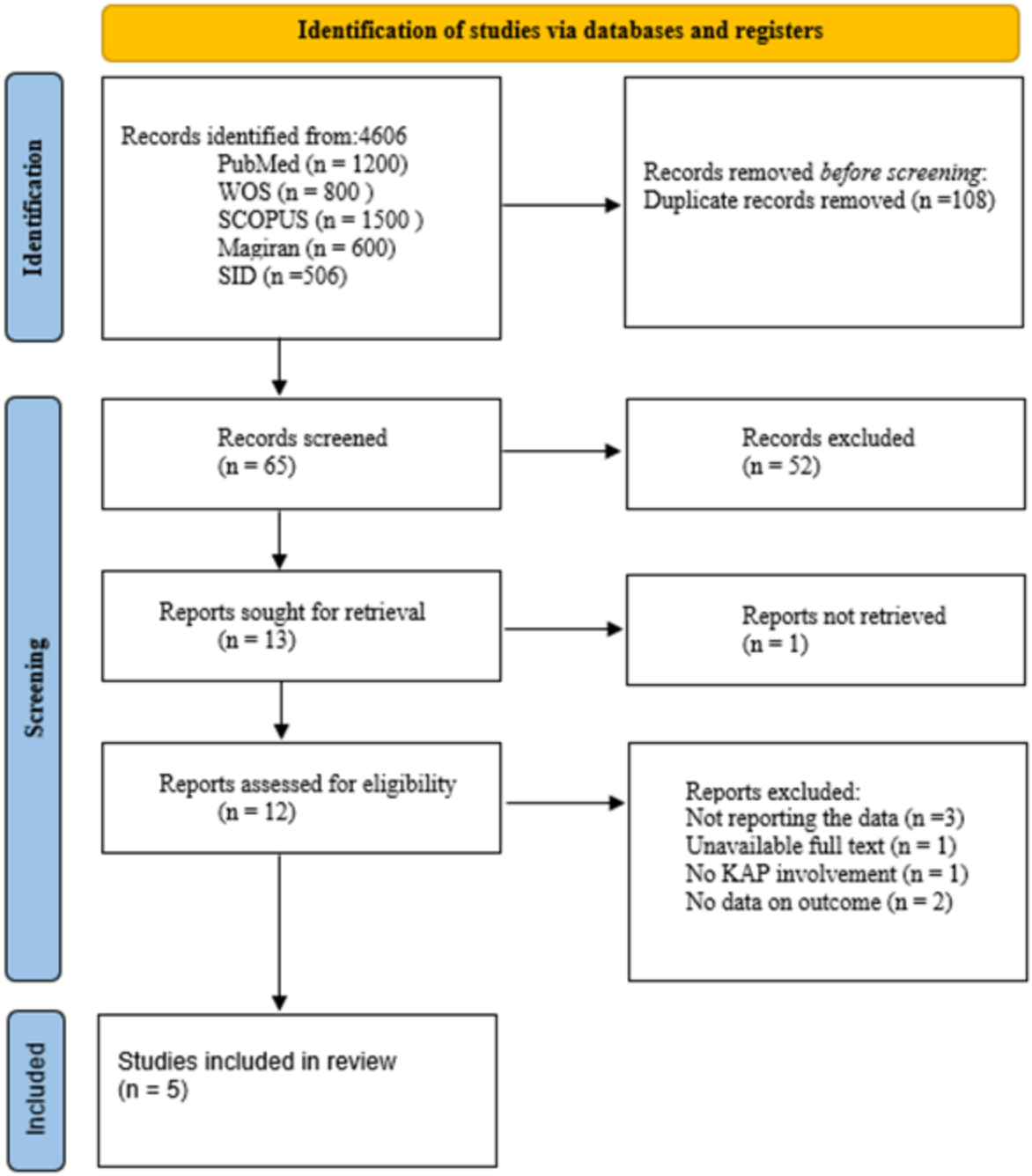


Figure 1: PRISMA flow diagram of the study

5.3. Attitudes Domain

The attitudes of women with PCOS were evaluated in three articles in this systematic review. Although attitudes towards lifestyle changes could influence PCOS-related practices, this topic has been less emphasized in designing KAP questionnaires, possibly due to the finding that a positive attitude does not necessarily translate into healthy behaviors (24). Furthermore, due to its reflective construct, attitude questions might vary based on regional and cultural characteristics of the target population. Therefore, this systematic review combined the common aspects covered in different studies conducted on different populations to provide the summary of the necessary aspects that should be covered in the attitudes section of KAP questionnaires regarding PCOS. Based on the findings of this systematic review, an ideal attitude questionnaire should include items addressing the importance of factors such as daily life impact, concerns, emotional and psychological challenges,

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self- management, confidence, and satisfaction (Supplementary File). It is preferable that the questionnaire uses a Likert scale for answering the attitude items.

5.4. Practice Domain

In this systematic review, two articles evaluated the practices of women with PCOS, but only one provided the specific questions in the text. This study assessed behaviors related to eating habits, physical activity, screen time (watching television and using computers), and sleep patterns. Based on the findings of this systematic review, an acceptable practice questionnaire regarding PCOS should include items that focus on lifestyle management approaches, particularly controlled eating habits and regular cardio exercise to manage weight using multiple-choice questions and to a lesser extent Yes/No and Likert scale (Supplementary File).

This systematic review can serve as a guide for researchers to select the best questions for each item and to create a suitable questionnaire for this population. The insights from this comprehensive KAP questionnaire assessment could be beneficial for healthcare policy makers and educators in developing targeted health initiatives, designing awareness campaigns, and bridging knowledge gaps about PCOS hrough designing a comprehensive and standard KAP Questionnaire (25, 26).

It is recommended that further studies utilize appropriate, culturally adapted, and accurate questionnaires. Future research should focus on designing a comprehensive, feasible, reliable, and valid questionnaire across all the three domains, especially in the attitude and practice domains, based on the subdomains suggested in this review. The questionnaire is recommended to include 35 to 40 questions (27- 29).

5.5. Limitations

One limitation of this systematic review was the lack of access to some full-text articles despite efforts to contact the authors. Therefore, these studies were excluded from the review. Additionally, in some cases, incomplete information was available regarding the construct, validity, and scoring of the questionnaires. Attempts to contact the authors for the full questionnaires were unsuccessful, so the questions had to be extracted from the tables in the articles. Another limitation was that only studies in English and Persian languages were evaluated in this systematic review.

5.6. Conclusions

Despite the significance of assessing KAP regarding PCOS in affected women, no standard questionnaire currently exists on this subject. Therefore, it is crucial to develop a standardized questionnaire to assess KAP in women with PCOS.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Statements

AI Use Disclosure: The authors declare that no generative AI tools were used in the creation of this article.

Authors' Contribution: Study concept and manuscript screening: S. D.; Designing search strategy, manuscript screening, and data synthesis: R. G. and M. A.; Drafting of the manuscript: M. A.; Critical revision of the manuscript for important intellectual content: S. D. and R. G; All authors read and approved the final manuscript.

Conflict of Interests Statement: The authors report there are no competing interests to declare.

Data Availability: As this study is a systematic review, no new data were generated. The data used, such as tables summarizing study characteristics and the items of KAP questions about PCO, are available within the manuscript.

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