Journal of Cancer Education (2019) 34:839–846
https://doi.org/10.1007/s13187-018-1433-6

Cancer Pain Management Among Oncology Nurses: Knowledge, Attitude, Related Factors, and Clinical Recommendations: a Systematic Review

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Published online: 12 October 2018

Abstract

The current study evaluated the oncology nurse's knowledge, attitude, related factors of cancer-related pain management (CPM), and clinical recommendations for improving knowledge and attitude. In this systematic review, international databases (PubMed, EMBASE, Web of science (WOS), Science Direct, and Scopus) were searched for relevant studies published in English language from March 30, 2000 to March 30, 2018. The quality of the studies was evaluated using the Hoy instrument. Out of 888 initial studies, 12 studies performed on 3574 participants were included in the final stage of the review. Based on the results, most studies indicated that nurses had a poor ($n = 4$) or moderate ($n = 4$) knowledge of CPM. The lowest and the highest knowledge levels were 28.5% and 75%, respectively. According to most studies, nurses had a fair (average) ($n = 4$) or negative ($n = 3$) attitude toward CPM. The important factors related to the nurses' knowledge of CPM included previous pain-related education programs ($n = 7$) and having work experience with cancer patients ($n = 4$). The most important barrier was the deficit in staff's knowledge of pain ($n = 2$). The important clinical recommendations for improving nurses' levels of knowledge included the implementation of educational programs ($n = 9$), training programs ($n = 3$) on CPM and including CPM topics in nursing curricula ($n = 5$). This systematic review showed that most nurses had poor knowledge of CPM and a fair attitude toward CPM, indicating the importance of considering the barriers to knowledge, strengthening the positive relevant factors, and using clinical recommendations based on clinical guidelines such as including CPM topics in nursing curricula and implementing educational programs on CPM to improve the knowledge, attitude, and skills of oncology nurses. The results of the present study could be used by policymakers to provide care for cancer patients and manage their pain.

Keywords Cancer pain management · Nurses · Knowledge · Attitude · Systematic review

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Introduction

Pain, as a fifth vital sign in cancer patients, is one of the most important, costly, and terrifying symptoms of cancer and the most common factor negatively affecting quality of life in cancer patients [1–3]. The prevalence of pain among cancer patients is between 39 and 66.4% and increases in the last stages of the disease, especially when the lifespan of a patient in the late stages of cancer is increased by the development of new maintenance treatments. Cancer pain remains a serious challenge for cancer patients [4, 5]. Cancer pain management (CPM) is one of the most important care dimensions in patients with various types and at various stages of the disease [6]. Since nurses, as members of the healthcare team, are the main contributors to managing cancer pain, their knowledge, attitudes, and skills are critical [7]. Considering the amount of

communication oncology inpatient nurses have with patients and the fact that nurses make up the largest group of health personnel on the care team, cancer ward nurses are major contributors to the examination and relief of pain of cancer patients through both drug and non-drug treatments as well as patient and family education programs. Oncology inpatient nurses also play a key role in providing care for cancer patients suffering from pain [8, 9]. Individual studies have shown that nurses' levels of knowledge about CPM are lower than the levels of other members of the care team [10–12]. Determining the exact level of knowledge of nurses and their attitudes toward CPM and resolving epidemiologic gaps will help policymakers set priorities for increasing nurses' knowledge levels. To the best of the researcher's knowledge, there has been no systematic review to date of the CPM knowledge levels of nurses working in cancer wards. The current study evaluated the oncology nurse's knowledge, attitude, related factors, and recommendations for improvement of cancer-related pain management.

Methods

Eligibility Criteria

The methods adopted for this systematic review have been developed in accordance with the Cochrane Handbook for Systematic Reviews and reported using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) tool [13]. Observational studies carried out on inpatient nurses in oncology wards were included. Outcome was collected as reported in the studies. Minimum required sample size was 20 patients in every study. The target population was oncology inpatient ward nurses. The knowledge, attitude, related factors, and improvement recommendations were evaluated in the current study.

Search Strategy

The International databases (PubMed, EMBASE, Web of science (WOS), Science direct, and Scopus) were searched for relevant studies in English language from March 30, 2000 to March 30, 2018. The MEDLINE search strategy was adopted to search in other databases. The specific search strategies were created by a Health Sciences Librarian with expertise in systematic review according to the PRESS standard [14]. In addition, PROSPERO was used to search for ongoing or recently completed systematic reviews. Boolean operators (AND, OR, and NOT), Medical Subject Headings (MeSH), truncation "*", and related text words were used for search in title and abstract using the following keywords: "knowledge" OR "attitude" OR "related factors" OR "oncology nurses" OR "CPM" OR "Cancer pain management". We conducted the search in 10 April 2018.

Selection of Studies and Data Extraction

According to the study protocol and the eligibility criteria, two researchers independently screened the titles and abstracts, removed duplicated studies, screened studies full-texts, and extracted the required information. Consensus method (is a group decision-making process in which group members develop and agree to support a decision in the best interest of the whole) was used for solving controversies between two researchers to selecting the final included studies. About missing necessary information, we contacted with authors of studies. Extracted data items included general information, i.e., first author, year, country, sample size, response rate (RR) (is the number of nurses who answered the survey divided by the number of nurses in the sample), final included sample, target population, age, gender, sampling method, method of data collection, and risk of bias and outcome measures, i.e., objectives, instrumentation, knowledge, attitude, related factors, barriers, and improvement recommendations.

Quality Assessment

To assess the methodological quality and risk of bias, each included observational study was evaluated by using the Hoy et al. tool [15]. This 10-item tool evaluated the quality of studies in two dimensions including external validity (items 1–4 assess target population, sampling frame, sampling method, and nonresponse bias minimal) and internal validity (items 5–9 assess data collection method, case definition, study instrument, mode of data collection, and item 10 assesses bias related to the analysis). Risk of bias was evaluated by two researchers independently; disagreements were resolved via consensus method. Studies were tabulated in chronological order.

Results

Overall Results

Study Selection

A total of 888 articles from initial searches were retrieved in various databases. Out of 7038 non-duplicated studies in the title and summary screening process, 653 studies were excluded due to inappropriate titles and abstracts. Out of 50 studies, 12 had eligibility criteria. Out of 38 excluded studies, 21 studies were conducted on other populations (except nurses), three studies were review, three studies were letter to editor, four studies had no full text, three studies were non-English, and four studies did not meet the minimum quality requirements for inclusion in the study (Fig. 1). In one study, we contacted

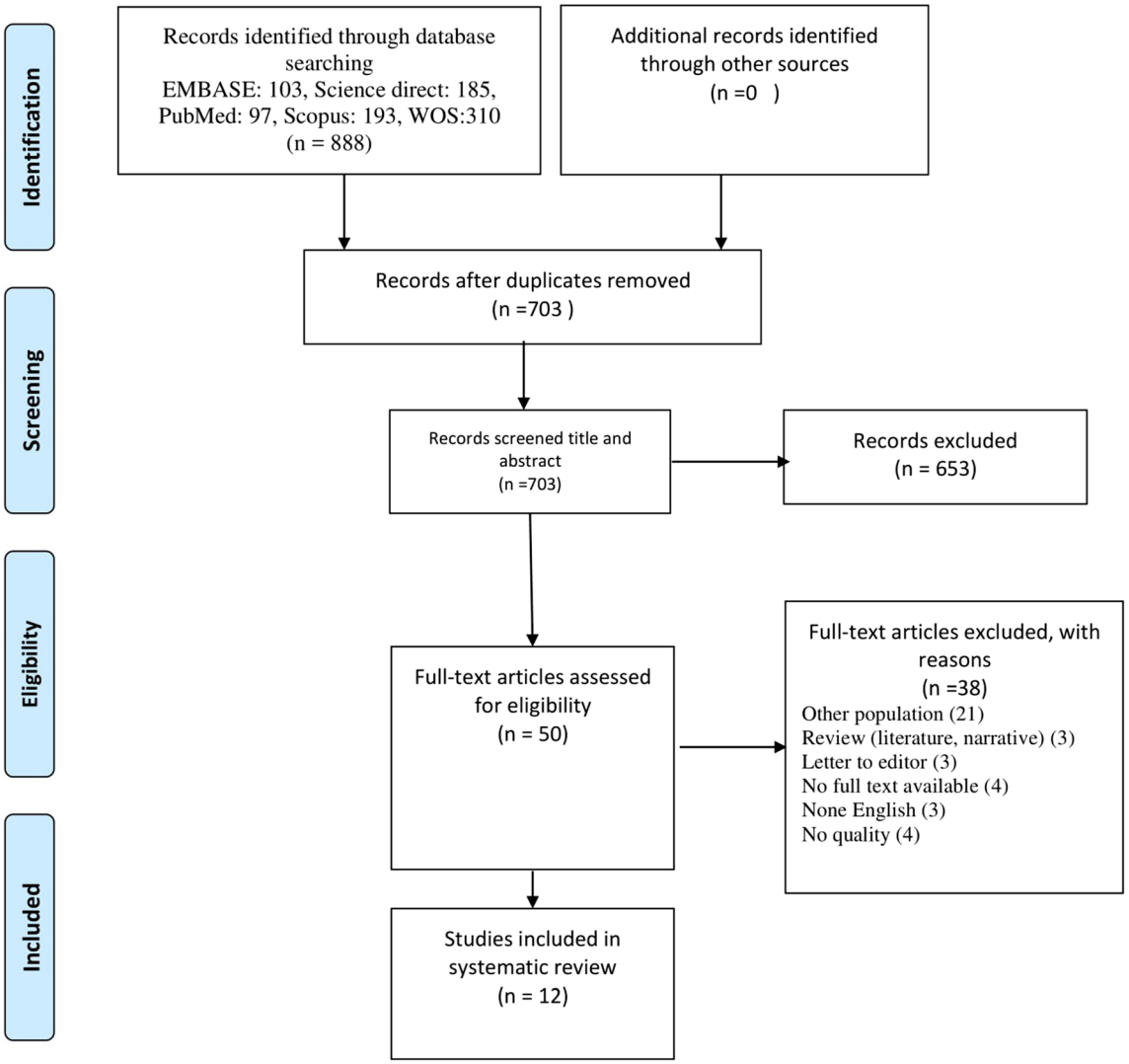

Fig. 1 PRISMA flow diagram

the first author for providing the information about knowledge and barriers of CPM among nurses.

Study Characteristics

These studies were conducted on 3574 nurses. The age range of the participants was between 21 and 65 years (mean: 29.2 year). All the 12 included studies provided cross-sectional data. Twelve studies were obtained from 14 countries. Of the 12 studies, two studies were from Jordan [8, 16]. One from Saudi Arabia [17], one from Italy [18], Brazil [19], Korea [20], Taiwan [21], Iran [22], Norway [23], USA [24], and Turkey [25], one study was conducted in each. The sampling methods used were census ($n = 6$) [8, 16, 19, 22, 23, 26] and convenience ($n = 6$) [17, 18, 20, 21, 24, 25]. More studies had a low risk of bias. The method which was used to data collection was self-report (self-report data collection is a type of survey, questionnaire, or poll in which respondents read the question and select a response by themselves without researcher interference). (Table 1).

Main Results

Instruments

The most commonly used instrument was KASRP standard instrument ($n = 8$) [8, 16–18, 21–23, 25]. Other standard used instruments were included Salanterä [26], WHO Q [19], and Weissman [24]. Instrument items consisted of 14 to 127. In 12 studies, the validity of instruments used in nine studies was reported to be 0.70–0.80 using Cronbach's alpha. The validity of the intended instrument was not investigated in three studies.

Table 1 Knowledge, attitude, related factors, barriers, and recommendations for practice among nurses towards cancer pain management

First author (year)	Studies characteristics 1. Country 2. Sample Size/RR[a]/ final included 3. Age 4. Gender (male/female) 5.Sampling method 6. Risk of bias	Instrumentation 1. Name 2. Type 3. Number of Items 4. Reliability (Cronbach's alpha)	Knowledge 1. Overall knowledge 2. Level of knowledge	Attitude 1. Overall attitude 2. Level of attitude	1. Related factors 2. Barriers
Alnajar, M (2017) [8]	1. Jordan 2. 152/ 88.8/135 3. 28.1 ± 4.9 4. 74/61 5. Census 6. Low	1. KASRP 2. Standard 3. 39 4. 70	1. 51.5 2. Moderate	1. 51.5 2. Fair	1. Previous pain-related education programs 2. NR
Alqahtani, M (2015) [17]	1. Saudi Arabia 2. 400/80/320 3. 34.2 ± 8.6 4. 284/36 5. Convenience 6. Low	1. KASRP 2. Standard 3. 39 4. 70	1. 45.1 2. Poor	1. 45.1 2. Negetive	1. Previous pain-related education programs 2. NR
Bernardi M (2007) [18]	1. Italy 2. 380/75.5/287 3. 21.4 ± 5.5 4. 55/226 5. Convenience 6. Low	1. KASRP 2. Standard 3. 39 4. 70	1. 55 2. Moderate	1. 55 2. Fair	1. Previous pain-related education programs 2. NR
Darawad M (2017) [16]	1. Jordan 2. 139/91.4/135 3. 28.01 ± 4.9 4. 74/61 5. Census 6. Low	1. KASRP 2. Standard 3. 39 4. 70	1. 51.5 2. Moderate	1. 51.5 2. Fair	1. Having experience in a pain team and previous pain-related education programs. 2. Staffs' knowledge deficit regarding pain, insufficient psychological support interventions, and lack of pain assessment.
Enskär, K (2007) [26]	1. UK, Sweden and South Africa 2. 106/100/106 3. 25–45 4. 4/102 5. Census 6. Low	1. Salanterä instrument 2. Standard 3. 127 4. NR	1. 3.71 2. Good	1. 4.21 2. Positive	1. Having work experience with cancer patients and age 2. NR
Ferreira FS (2016) [19]	1. Brazil 2. 29/75.9/22 3. 24.6 ± 2.1 4. 1/21 5. Census 6. Low	1. WHO Q 2. Standard 3. 24 items 4. 0.71	1. 31.8 2. Poor	NR	1. Having work experience 2. NR
Jho, H. J (2014) [20]	1. Korea 2. 284/100/284 3. 29 ± 1.1 4. 0/283 5. Convenience 6. Low	1. Researcher made 2. Researcher made 3. 14 items for knowledge 4. NR	1. 65.9 2. Good	NR	1. Being older and previous pain-related education programs 2. Time constraints and staffs' knowledge deficit regarding pain, insufficient communication with patients and patient's reluctance to report pain.
Lai, Y. H (2003) [21]	1. Taiwan 2. 1900/94.5/1797 3. 25 ± 4 4. 0/1797 5. Convenience	1. KASRP 2. Standard 3. 46 items 4. 0.70 and 0.82	1. 50.5 2. Moderate	NR	1. Previous pain-related education programs, having work experience with cancer patients and level of education.

Table 1 (continued)

First author (year)	Studies characteristics 1. Country 2. Sample Size/RR[a]/ final included 3. Age 4. Gender (male/female) 5.Sampling method 6. Risk of bias	Instrumentation 1. Name 2. Type 3. Number of Items 4. Reliability (Cronbach's alpha)	Knowledge 1. Overall knowledge 2. Level of knowledge	Attitude 1. Overall attitude 2. Level of attitude	1. Related factors 2. Barriers
	6. Moderate				2. NR
Shahriary, S (2015) [22]	1. Iran 2. 62/93.5/58 3. 33.5 ± 2.1 4. 0/58 5. Census 6. Low	1. KASRP 2. Standard 3. 39 items 4. 0.70	1. 28.5 2. Poor	1. 28.5 2. Negetive	1. NR 2. NR
Utne, I. (2018) [23]	1. Norway 2. 1704/18.3/312 3. 25–65 4. 5/307 5. Census 6. Low	1. KASRP 2. Standard 3. 41 items 4. 0.70	1. 75 2. Good	1. 75 2. Positive	1. Previous pain-related education programs, having work experience with cancer patients and workplace. 2. NR
Xue, Y (2007) [24]	1. USA 2. 50/100/50[b] 3. 36.1 ± 9.7[c] 34.9 ± 9.6[d] 4. 1.2/23, 2.0/23 5. Convenience 6. Low	1. Weissman tool 2. Standard 3. 36 items 4. NR	A. Medical oncology: 1. 60 2. Good B. Gynecologic-al oncology 1. 50 2. Moderate	A. Medical oncology: 1. 59–78 2. Positive B. Gynecological oncology 1. 49–71 2. Fair	1. NR 2. NR
Yildirim YK (2008) [25]	1. Turkey 2. 80/85/68 3. 20–50 4. NR 5. Convenience 6. Moderate	1. KASRP 2. Standard 3. 39 items 4. 0.70	1. 35.42 2. Poor	1. 35.42 2. Negetive	1. Having work experience with cancer patients. 2.NR

KASRP The Knowledge and Attitudes Survey Regarding Pain, *NR* None reported

Nurses Knowledge and Attitude Toward CPM

Twelve studies were included in this systematic review, all of which reported nurses' levels of knowledge about CPM which were investigated through a set of questions. Nurses' knowledge was classified as poor, moderate, or good. Most studies showed that nurses had a poor ($n = 4$) [17, 19, 22, 25] or moderate ($n = 4$) [8, 16, 18, 21] level of knowledge about CPM. The lowest and the highest knowledge levels were 28.5% [22] and 75% [23], respectively. One study reported the level of knowledge as a numerical mean, indicating a high knowledge of CPM [26]. A total of nine studies investigated nurses' attitudes toward CPM. Their results indicated that nurses had a fair (average) ($n = 4$) [8, 16, 18, 24] or negative ($n = 3$) [17, 22, 25] attitude toward CPM. The minimum and maximum overall attitude levels, similar to those of knowledge, were 28.5% [22] and 75% [23], respectively (Table 1).

Related Factors and Barriers of Knowledge of CPM

Factors affecting the improvement of knowledge were mentioned in most studies ($n = 10$). The results of various individual studies revealed that the most important factors related to nurses' knowledge of CPM included previous pain-related education programs ($n = 7$) [8, 16–18, 20, 21, 23] and work experience with cancer patients ($n = 4$) [19, 21, 23, 26] (Table 2).

Two studies identified barriers to nurses' knowledge of CPM, the most important of which was the Staffs' knowledge deficit regarding pain ($n = 2$) [16, 20] (Table 1).

Clinical Recommendations to Improve the Knowledge and Attitude of Nurses About CPM

All previous studies provided some recommendations for improving nurses' knowledge of and attitude toward CPM. The

Table 2 Related factors of knowledge toward CPM among nurses ($N = 10$)

Study (year) Barrier	Alnajar, M (2017) [8, 17]	Alqahtani, M (2015)	Bernardi M (2007) [18]	Darawad M (2017) [16]	Enskär, K (2007) [26]	Ferreira FS(2016) [19]	Jho, H. J (2014) [20]	Lai, Y. H (2003) [21]	Utne, I. (2018) [23]	Yildirim YK (2008) [25]
Previous pain-related education programs	✓	✓	✓	✓			✓	✓	✓	
Having experience in a pain team				✓						
Having work experience with cancer patients.					✓	✓		✓	✓	✓
Age					✓		✓			
Level of education								✓		
Care environment									✓	

most important ones included the implementation of educational programs on CPM ($n = 9$) [8, 16–18, 22–26], including CPM topics in nursing curricula ($n = 5$) [8, 19, 20, 22, 25], and the implementation of training programs on CPM ($n = 3$) [19–21] (Table 3).

Discussion

Knowledge and Attitude of Oncology Nurses Regarding CPM

The aim of the present systematic review was to evaluate the knowledge of and attitudes toward CPM and the effective factors of nurses working in cancer wards based on studies published in English from March 30, 2000 to March 30, 2018. Twelve studies with a total population of 3574 were entered into the final stage of the review. KASRP was used in most studies as the standard instrument. The results indicated that most nurses had a poor or moderate knowledge of CPM. The minimum and maximum rates of nursing knowledge were 28.5% and 75%, respectively. Previous studies on the knowledge levels of other members of the care team, such as doctors, in China, Turkey, and the USA reported sufficient knowledge levels of 39% [27], 66% [28], and 31% [24], respectively, that is different which can be due to differences in the countries in which studies were performed, sample size, and the amount of training received by nurses. Most studies showed that nurses had a fair attitude toward CPM, while physicians [12] had a positive attitude toward it. The results of one study on hospitalized patients showed that, contrary to nurses, patients had a negative attitude toward CPM [29].

The most important factors related to knowledge of CPM included previous pain-related education programs and work experience with cancer patients. As with the factors related to knowledge and attitude in patients [29, 30], the most

Table 3 Practical recommendations to improve nurses' knowledge and attitude about CPM

Study (year) Clinical Recommendations	Alnajar, M (2017)	Alqahtani, M (2015)	Bernardi M (2007)	Darawad M (2017)	Enskär, K (2007)	Ferreira FS (2016)	Jho, H. J (2014)	Lai, Y. H (2003)	Shahriary, S (2015)	Utne, I. (2018)	Xue, Y (2007)	Yildirim YK (2008)
Including CPM topics in nursing curricula.	✓					✓	✓		✓			✓
Implementation of educational programs on CPM.	✓	✓	✓	✓	✓				✓	✓	✓	✓
Use of an interdisciplinary team approach to pain management.	✓										✓	
Using CPM guidelines.	✓											
Adopting pain assessment tools to be used in the oncology units.				✓								
Implementation of training programs on CPM						✓	✓	✓				

important barriers to knowledge of CPM included a deficit in knowledge of pain among staff members and insufficient psychological support interventions. The most important barriers to knowledge for patients were their high concern about CPM and inadequate management [30] (which can be the different levels of knowledge among nurses and patients) and patients' previous experiences with CPM. Other studies also referred to weaknesses in correct pain examination, physicians' willingness to excessively prescribe opioids, and low knowledge and skills related to CPM as the most important knowledge barriers facing other members of the care team [31–33]. Individual studies referred to CPM topics in nursing curricula, educational programs on CPM, and the use of an interdisciplinary team approach to pain management as the most important recommendations for improving the knowledge and attitude of nurses. Individual studies seem to provide recommendations for CPM improvement based on previous studies [33–36].

Low awareness of nurses about cancer pain management decreases efficient nursing care and increases patient harm by unsafe care [32, 37–39].

Although this study has investigated a set of international studies in different countries, the results of the study show that the level of awareness is weak in most countries, regardless of the country in which the study has been performed, which indicates similarity of nurses' weakness in different countries toward awareness of cancer pain management that must be improved using accurate training patterns. Also, according to the results of the present study, the existing barriers about cancer pain management are the same in many countries, which are comprehensively identified and should be resolved. Also, regardless of the country, general suggestions for improving education on increasing awareness of cancer pain management are the same among nurses. In general, it can be argued that the present study can provide a general overview of the state of knowledge about the cancer pain management among nurses by determining the barriers, risk factors, and useful suggestions, comprehensively. In addition, the internationalization of the studies has led a set of experiences of different authors on the level of knowledge, barriers, risk factors, and suggestions to be summarized concurrently, which will help to prevent the repetition of previous unsuccessful experiences in nursing training about cancer pain.

Limitations and Strengths

The limitations of the present study included the small number of studies included in the final stage of review, which may cause issues with generalizing the results. Other limitations were the type of studies (all included studies were descriptive) and the non-random sampling methods used. Also, the information was incomplete in some studies; in such cases, the researcher contacted the authors. Another limitation of the current study was that only articles submitted in English were included. This limitation was exercised with the aim of unifying and harmonizing the readers. Despite the above limitations, this is the first systematic review that comprehensively examines knowledge, attitude, related factors, barriers, and practical recommendations for improving the knowledge levels and attitudes of nurses about CPM. This study was conducted based on the protocol registered at PROSPERO, using a systematic review approach, the search and extraction of information, and a quality review of the included studies. One of the most important advantages of this study is the comprehensive review of recommendations to improve nurses' knowledge and attitudes.

Conclusion

This systematic review showed that most nurses had a low knowledge and a fair attitude toward CPM, indicating the importance of considering barriers to knowledge (staffs' knowledge deficit regarding pain), strengthening positive relevant factors (previous pain-related education programs and work experience with cancer patients), and the use of clinical recommendations based on clinical guidelines such as including CPM topics in nursing curricula and implementing educational programs on CPM to improve the knowledge, attitude, and skills of nurses who are the most important members of the care team and one of the most important people involved with cancer patients. The results of the present study could be used by policymakers to provide care for cancer patients and to manage their pain.

Compliance with Ethical Standards

This manuscript does not contain clinical studies or patient data.

Conflict of Interest The authors declare that they have no conflicts of interest.

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