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Review

Knowledge, attitudes, and practices of physiotherapists with regard to epilepsy and patients with epilepsy: A systematic scoping review

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ABSTRACT

Background: In today's healthcare systems, physiotherapists are one of the most important providers of care services to patients with disabilities including those with epilepsy. The aims of this systematic scoping review were to identify, summarize, and present narrative synthesis of qualitative evidence on knowledge, attitudes, and practices of physiotherapists toward epilepsy and patients with epilepsy.
Methods: Primary studies were searched in Medline/PubMed, Embase, Science Direct, SpringerLink, CInAHL/EBSCO, Cochrane library, and Scopus as late as July 02, 2021. Appraisal of the methodological quality was conducted for the studies included in this systematic scoping review. Due to the heterogenous nature of the collected data, results of this study are presented as narrative synthesis.
Results: A total of 11 were finally included in the qualitative synthesis. The selected studies were published in the period between 2016 and 2020. The studies included in this review had acceptable methodological quality in many of the 11 domains of the quality assessment tool. Contents of the included studies were grouped into the 11 themes and 8 subthemes. The major themes were related education/access to information, interaction with patients, witnessing seizures, barriers and promoters of adequate knowledge and attitudes, and interventions to improve knowledge and attitudes.
Conclusion: Currently, high-quality interventional studies are needed to improve knowledge, attitudes, and practices of physiotherapists with regard to epilepsy and patients with epilepsy. Future studies are still needed to investigate if improving knowledge, attitudes, and practices of physiotherapists with regard to epilepsy and patients with epilepsy can improve health-related outcomes of the patients.

1. Introduction

Epilepsy is one of the most common chronic neurological disorders of the brain that is characterized with unprovoked seizures [1,2]. Globally, prevalence and incidence of epilepsy vary among different age groups and settings studied. In a recent population survey, Angwafor et al estimated the age-normalized prevalence rate of active epilepsy at 33.9/1,000 (95% CI: 31.0–37.1/1,000) and the 1-year age-normalized incidence of epilepsy at 171/100,000 (95% CI: 114.0–254.6) among the general population in North-West Cameroon [3]. In Germany, Jacob et al estimated an incidence rate of epilepsy at 157/100,000 among elderly [4]. Today, there are more than 65 million people with epilepsy around the world [5,6]. Epilepsy affects people of all ages, socioeconomic classes, educational levels, cultural, and faith groups [7].

Epidemiological studies have reported high prevalence of physical disabilities and comorbidities among people with epilepsy [8,9]. Many of these physical disabilities and comorbidities require rehabilitation. In general, rehabilitation programs aim to attain functional and psychological independence within environmental, anatomic, and physiological restrictions as well as improving the quality of life of the patients and their families/caregivers. In modern healthcare delivery, rehabilitation is a multidisciplinary approach [10]. Physiotherapy is an important part of rehabilitation programs. Previous studies have shown that individualized physiotherapy sessions might help in long-term rehabilitation and regaining functional abilities of patients with epilepsy who also have motor and cognitive deficits [10–12].

In today's healthcare systems, physiotherapists are one of the most important providers of care services to patients with disabil-

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ities. In multidisciplinary team approaches to healthcare, physiotherapists are the "movement experts" who aim to help patients achieve their potential for physical independence and optimal fitness level [13]. As physiotherapy is increasingly introduced into different healthcare institutions and services, physiotherapists are increasingly encountering patients with epilepsy [14]. Therefore, adequate knowledge of epilepsy, positive attitudes toward patients with epilepsy, and adequate practices with regard to epilepsy and patients with epilepsy are required from all healthcare professionals including physiotherapists [15].

Knowledge, attitudes, and practices of healthcare professionals are often surveyed to gauge what healthcare professionals know about certain diseases and patients, how they view those patients and diseases, and how they deal with those patients [16–26]. Assessment of knowledge, attitudes, and practices of healthcare professionals toward epilepsy and patients with epilepsy might help in identifying misconceptions that contribute to suboptimal healthcare delivery and patient outcomes [17,27]. Additionally, these assessments might help identify gaps in the knowledge, skills, and abilities of healthcare professionals to provide optimal services to patients [28]. Moreover, these assessments might inform decision makers on how to design appropriate interventions to address these misconceptions, lack of knowledge, skills, and abilities, and correct negative attitudes toward patients [27,29].

As the number of primary research studies is ever expanding, evidence-based decision making in healthcare is also continuously expanding. There are many approaches to evidence synthesis [30–32]. Systematic reviews with meta-analyses of blind randomized control trials provide the strongest evidence and are ranked at the apex of the evidence-based medicine pyramid [33,34]. However, systematic scoping reviews of observational studies summarize evidence that can be helpful to decision makers and can be used in answering questions in healthcare [35,36].

In a previous systematic review, Jones et al thematically analyzed the contents of 54 studies that reported on knowledge and attitudes of teachers toward epilepsy [37]. In another systematic review, Kaddumukasa et al reviewed studies reporting on misconceptions about epilepsy and the interventions used to reduce epilepsy stigma in sub-Saharan Africa [38]. Corrigan et al conducted a systematic review of studies reporting on psychosocial interventions used among young and pediatric patients with epilepsy [39]. Baker et al conducted a systematic review to identify factors associated with epilepsy stigma in adult patients with epilepsy [40]. Dannenberg conducted a systematic scoping review to narrate on the self-management interventions for patients with epilepsy who also have intellectual disabilities [41]. Wojewodka et al conducted a systematic scoping review to narrate on the best care for older patients with epilepsy [42].

Because physiotherapists are increasingly included in multidisciplinary healthcare delivery teams, physiotherapists were included in studies that assessed knowledge, attitudes, and practices of healthcare providers toward epilepsy and patients with epilepsy [15,43,44]. Systematic scoping reviews are increasingly used in exploring broad review questions. Systematic scoping reviews are often conducted to explore the extent of the available evidence, help describe/synthesize/summarize evidence, and highlight gaps [35]. A systematic scoping review would be an ideal design to explore what the literature has reported on knowledge, attitudes, and practices physiotherapists with regard to epilepsy. However, a systematic scoping review of the literature reporting on knowledge, attitudes, and practices of physiotherapists with regard to epilepsy was not conducted before. Therefore, the aims of this systematic scoping review were to identify, summarize, and present narrative synthesis of qualitative evidence on knowledge, attitudes, and practices of physiotherapists toward epilepsy and patients with epilepsy.

2. Methods

2.1. Design of the study

This was a systematic scoping review that was conducted in adherence to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement for scoping reviews (PRISMA-ScR) [45]. Adherence to the PRISMA-ScR checklist is shown in Supplementary Table S1. The protocol of this systematic scoping review was informed by previous systematic scoping reviews [46–48].

2.2. Search of the literature

To identify primary studies reporting on knowledge, attitudes, and practices of physiotherapists with regard to epilepsy and patients with epilepsy, a systematic search of the literature was conducted. The following databases were used: Medline/PubMed, Embase, Science Direct, SpringerLink, CInAHL/EBSCO, Cochrane library, and Scopus. Keywords and MeSH terms related to physiotherapists, knowledge, attitudes, and practices were searched. The search syntaxes were created using different combinations of these keywords and MeSH terms using the Boolean operators like "OR" and "AND" [46,47]. The search syntaxes were reviewed by a senior librarian and was customized to each database. The literature search was as late as July 02, 2021. References of primary, secondary, and tertiary sources were manually searched to identify potential studies that could also be added to the results obtained from the database searches [49]. The search engine Google Scholar and OpenGrey were searched to identify potential studies that might not be indexed in the databases searched.

2.3. Selection of eligible studies

Results of the database searches were imported as electronic files in two formats: Research Information Systems (RIS) files and Comma-separated values (CSV) files. The RIS files were imported into EndNote (Clarivate Analytics, Philadelphia) and CSV files were imported into Excel (Microsoft Excel, Microsoft Inc.). Duplicate results were removed and the remaining results were screened for eligibility using their titles and abstracts. To ensure reproducibility, the screening process was repeated and another researcher reviewed and compared the outcomes. Discrepancies were discussed and resolved by consensus. Eligible studies were uploaded as Portable Document Format (PDF) files into Endnote using the "file attachment" option for the full-text review.

2.4. Inclusion and exclusion criteria

Studies were included in this systematic scoping review when they were original articles, published in English language, reported on knowledge, attitudes, and practices of physiotherapists with regard to epilepsy and patients with epilepsy. The population, intervention, and outcomes (PIO) in this systematic scoping review were physiotherapists, knowledge, attitudes, and practices with regard to epilepsy. Studies in which physiotherapists were included among a group of healthcare providers were also included. The search was not restricted to studies originated from a specific country, publication year, or publication status. Review articles, editorials, notes, poster presentations, conference papers, letters to the editor, and commentaries were excluded. Studies that were reported in languages other than English were also excluded.

2.5. Data collection

The full-text of each selected study was reviewed by the researchers. A data collection form was created for this study using Excel (Microsoft Excel, Microsoft Inc.). The data collection form is shown in Supplementary Table S2. Data relevant to name of author(s), year of publication, settings and/or country, aims, design of the study, study participants, methods of data collection, analysis, main findings, and sources of funding were collected. Discrepancies were discussed and resolved by consensus. The data collected were analyzed thematically [46,47]. Due to the heterogenous nature of the collected data, results of this study are presented as narrative synthesis.

2.6. Methodological quality appraisal

Appraisal of the methodological quality was conducted for the studies included in this systematic scoping review. The methodological quality was assessed based on those used to assess observational cohort, prevalence, and cross-sectional studies [50–52]. Each study was assessed based on the following criteria: 1) research questions/objectives clearly stated, 2) study population/sampling frame clearly specified/defined/appropriate, 3) sampling approach used was appropriate, 4) sample size was justified/adequate, 5) study subjects/setting described, 6) the study tool was pilot testing/reviewed prior to the use, 7) the study tool was valid and reliable, 8) data analysis was conducted with sufficient coverage, 9) the condition was measured in a standard, reliable way for all participants, 10) appropriate statistical analysis was used, 11) the response rate was adequate, and 12) confounding factors were identified. Discrepancies among the researchers were resolved by discussion and consensus.

3. Results

3.1. The included studies

A total of 9,318 hits were identified from the databases and additional 10 hits were identified from other sources. Duplicates were removed and 7,812 records were complied. Upon initial screening, 7,694 records were excluded. Of the 118 records reviewed, 11 were finally included in the qualitative synthesis. The selection process is shown in Fig. 1. A detailed summary of the records included is shown in Supplementary Table S3.

3.2. Characteristics of the physiotherapists

Of the studies, 5 included healthcare providers, 5 included healthcare students, and 1 included both healthcare providers and healthcare students. The selected studies in which the numbers of physiotherapists were reported included 347 practicing physiotherapists and 203 physiotherapy students. One study (9.1%) did not report the number of physiotherapists included and another study (9.1%) did not report the number of physiotherapy students. Percentages of practicing physiotherapists or physiotherapy students included in the studies are shown in Fig. 2. Female physiotherapists, physiotherapy students, and healthcare professionals were well represented in the study participants. The ratios of female participants ranged from 28% to 92.4% (Supplementary Table S3). The practicing physiotherapists had various educational levels ranging from basic degrees to Doctor of Philosophy (PhD) degrees who ranged in their professional ranks from physiotherapists, senior physiotherapists, principal physiotherapists, chief physiotherapists, assistant directors, and director of physiotherapy services. In addition to the physiotherapist/physiotherapy students, the studies also included occupational therapists, speech therapists, health educators, nutritionists, physicians, dentists, pharmacists, nurses, midwifes, physical educators, psychologists, health assistants, traditional healers, patients with epilepsy, laboratory scientists, medical orderlies, and public servants (Supplementary Table S3).

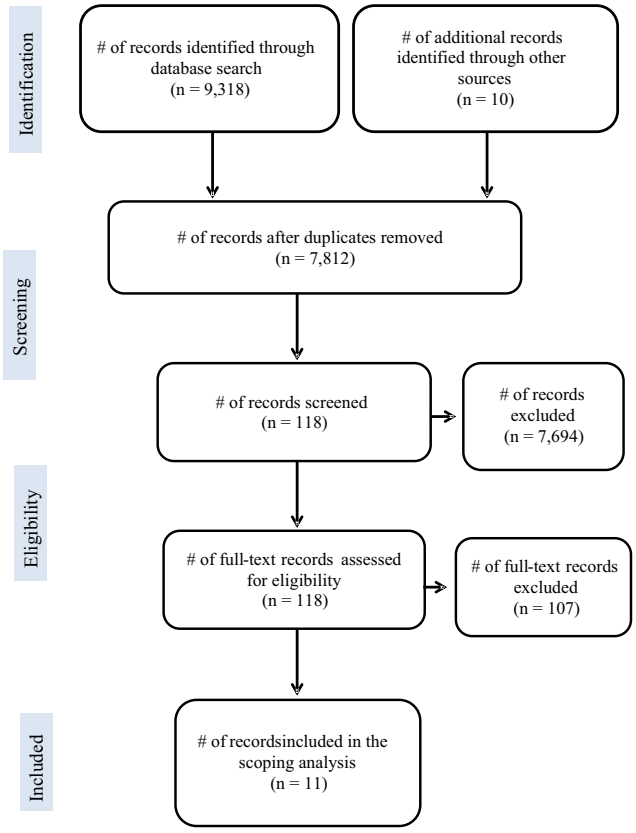

Fig. 1. A PRISMA flow diagram of the selection process.

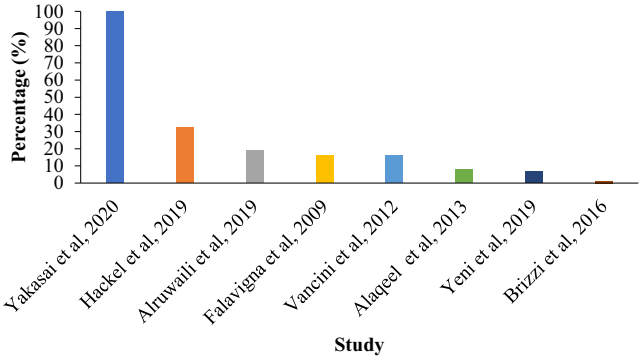

Fig. 2. Percentage of practicing physiotherapies or physiotherapy students included in the studies.

3.3. Year of publication

The selected studies were published in the period between 2016 and 2020. Of the studies, more than half (54.5%) of the selected studies were published in the last 5 years (2016 and beyond). The publication trend is shown in Fig. 3.

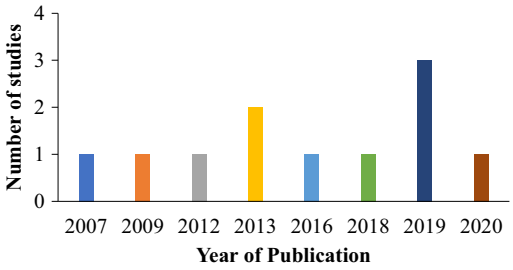

Fig. 3. Number of articles published per year.

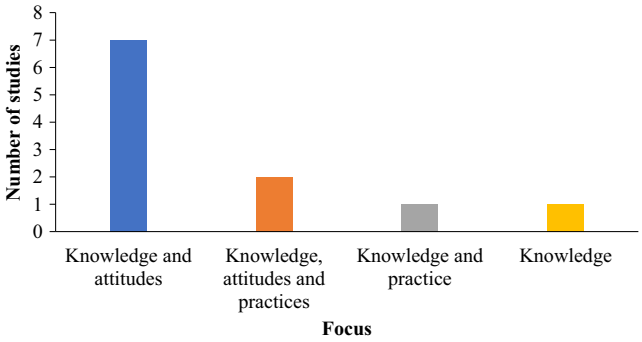

Fig. 5. Focus of the studies included in the review.

3.4. Country of origin

The studies included in this review were conducted in 10 different countries including Brazil, Saudi Arabia, Nigeria, Argentina, Bhutan, Germany, Portugal, South Africa, Turkey, and United States. Of the studies, 1 (9.1%) was a multicenter study that included participants from 5 different countries. The majority of the studies were conducted in Brazil, Saudi Arabia, and Nigeria. The number of studies conducted in each country is shown in Fig. 4.

Practicing physiotherapists were recruited from general hospitals, teaching hospitals, private hospitals, military hospitals, medical centers, community practice, sports centers, and nongovernmental organizations.

3.5. Study design, recruitment of the participants, and focus of the studies

The participants in the studies included were recruited using convenience sampling. The studies were conducted in cross-sectional design. One study (9.1%) used a pre- and post-intervention design (Supplementary Table S3). All studies included in this review used a questionnaire. Of the studies, 2 (18.2%) reported that the questionnaire was developed by expert panels that included neuro-pediatricians, neuropediatric physiotherapists, exercise physiologists, and clinical pharmacists. The rest of the studies (81.8%) adopted a questionnaire that was developed in previous studies (Supplementary Table S3).

Of the studies, 7 (63.6%) reported on knowledge and attitudes and 2 (18.2%) reported on knowledge, attitudes and practices. Fig. 5 shows focus of the studies included in this review.

Of the included studies, 8 (72.7%) did not report on the validity of the questionnaire used. One study (9.1%) reported on content validity and divergent validity (Supplementary Table S3). One study reported acceptable internal consistency and another study reported low internal consistency.

One study (9.1%) reported a test–retest reliability and another study (9.1%) reported reliability as indicated by a pilot testing. The rest of studies (81.8%) did not report on the reliability of the questionnaire used (Supplementary Table S3).

3.6. Number of citations

The studies selected and included in this review received a total of 93 citations as indexed in Scopus. The studies conducted by Tedrus et al (2007), Alaqeel et al (2013), Ekenze et al (2013), and Vancini et al (2012) received the largest number of citations. The number of citations received by each of the studies is shown in Fig. 6.

3.7. Results of the methodological quality appraisal

The studies included in this review had acceptable methodological quality in many of the 11 domains of the quality assessment tool. Results of the quality appraisal are shown in Fig. 7.

All studies had clear research questions/objectives and described the study population or the sampling frame. The sampling approach was appropriate for the majority of the studies. In the majority of the studies, the questionnaire was distributed to the participants from a sampling frame using a convenience sampling approach. One study (9.1%) used different advertisement channels to recruit the participants. In the vast majority of the studies, researchers did not calculate the sample size needed for

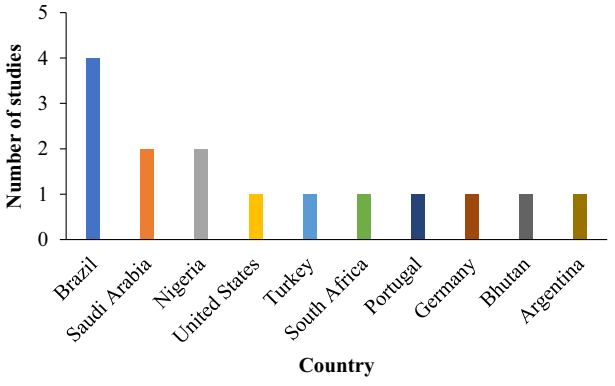

Fig. 4. Number* of studies conducted in each country. *One study was conducted in 5 different countries; therefore, the number of studies does not sum to 11.

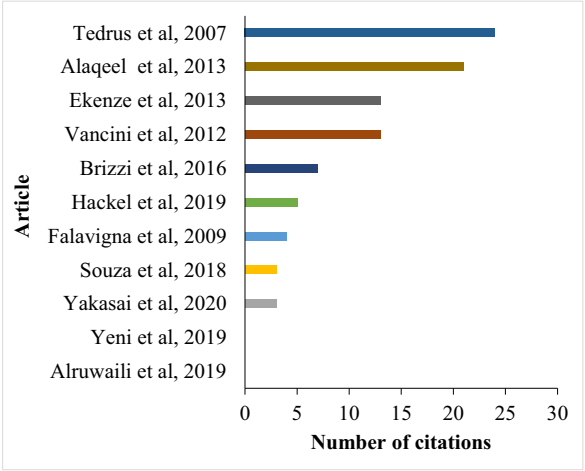

Fig. 6. Number of citations received by each of the included studies.

#	Study	Research questions/objectives clearly stated	Study population/sampling frame clearly specified/defined/appropriate	Sampling approach used was appropriate	Sample size was justified/adequate	Study subjects/setting described	The study tool was pilot tested/reviewed prior to the use	The study tool was valid and reliable	The condition was measured in a standard, reliable way for all participants	Appropriate statistical analysis was used	The response rate was adequate	Confounding factors were identified
1	Hackel et al, 2019	+	+	+	-	+	-	-	?	+	-	-
2	Alaqeel et al, 2013	+	+	+	+	+	-	-	?	+	+	-
3	Vancini et al, 2012	+	+	+	-	+	-	-	?	+	?	-
4	Falavigna et al, 2009	+	+	+	+	+	-	-	?	+	?	-
5	Brizzi et al, 2016	+	+	+	+	+	-	-	?	+	+	+
6	Tedrus et al, 2007	+	+	?	+	+	-	-	?	+	-	-
7	Yakasai et al, 2020	+	+	+	-	+	+	+	+	-	?	-
8	Souza et al, 2018	+	+	+	-	+	-	+	+	+	-	-
9	Ekenze et al, 2013	+	+	+	-	+	-	-	?	+	+	-
10	Alruwaili et al, 2019	+	+	+	+	+	-	-	?	+	?	-
11	Yeni et al, 2019	+	+	+	+	+	+	+	+	+	+	+

Fig. 7. Results of the methodological quality appraisal across the different domains, where: (+): yes/adequate, (-): no/inadequate, and (?): not clear.

the study. However, the sample size was large enough in 6 (54.5%) studies. The study participants were described and their characteristics were reported in the studies included. Two studies (18.2%) reported pilot testing or review of the questionnaire before use. Similarly, validity and reliability of the questionnaires were not reported in the majority of the studies. Therefore, it could not be determined if knowledge, attitudes, and practices were reliably measured. Statistical tests were used to analyze the results and compare responses. Descriptive statistics (numbers/percentages), correlations, chi-square, Student's t test, Fisher's exact test, one-way analysis of variance, Mann–Whitney *U* test, and Kruskal–Wallis test were used. One study (9.1%) did not apply statistics. Of the studies, 6 (54.5%) reported the response rate. The response rate in 3 (27.3%) studies was more than 50% of the invited potential participants. Although the response rate was not reported in 1 (9.1%) study, the sample size was large enough to indicate adequate response. Potentially confounding factors were not identified in the vast majority of the studies (90.9%).

3.8. Narrative review of the evidence

Contents of the included studies were grouped into the 11 themes and 8 subthemes.

3.8.1. Do physiotherapists receive education on epilepsy during their vocational training/education?

In Germany, approximately half (52%) of the physiotherapists reported that epilepsy was addressed during their vocational training [15]. In Saudi Arabia, all healthcare providers (100%) including physiotherapists stated that they have heard/studied about epilepsy during their professional training/education [44]. In another study among healthcare students in Saudi Arabia that included physiotherapy students, 87.6% of the students stated that that they have heard/studied about epilepsy during their academic training/education [53]. In Turkey, less than half (48.3%) of healthcare students including physiotherapy students stated that they have attended a curse on neurology/epilepsy [54]. In Brazil, less than half (37.6%) healthcare students including physiotherapy students stated that they have heard/studied about epilepsy during their academic training/education [55].

3.8.2. Do physiotherapists have access to information about epilepsy?

More than half (60.3%) of healthcare professionals including physiotherapists in Saudi Arabia reported that they had access to information relevant to epilepsy during their professional training/education [44]. In Brazil, the majority (73%) of the physiotherapists stated that they had access to information about epilepsy in their practice [43]. In the same study, more than half (59%) of the physiotherapists stated that they had access to information on how to deal with patients with epilepsy during their professional training/education [43].

3.8.3. How often do physiotherapists interact with patients with epilepsy?

In Bhutan, healthcare providers including physiotherapists stated that they, on average, interacted with 6.5 patients with epilepsy per month [56]. In Germany, the majority of the physiotherapists reported that they had provided services to

patients with epilepsy [15]. In Brazil, less than half (47%) of the physiotherapists reported that they had provided services to patients with epilepsy in their practice [43]. In Nigeria, 97.3% of the physiotherapists stated that they had provided services to 1–5 patients with epilepsy per year [57].

The majority (84%) of the physiotherapists in Germany reported that, in theory or practice, they have interacted with patients with epilepsy somewhere [15]. In Saudi Arabia, the majority (76%) of healthcare providers reported that they knew someone with epilepsy [44]. In another study among healthcare students in Saudi Arabia that included physiotherapy students, 44.3% of the students reported that they knew someone with epilepsy [53]. In Brazil, less than one-third (29%) of the physiotherapists reported that they had a relative/friend who experienced epileptic seizures [43]. In another study among healthcare students in Brazil, more than half of physiotherapy, psychology, and nutrition students (67.3%) knew someone with epilepsy [55]. In a third study in Brazil, 18.9% of healthcare students reported that they one of their family members had epilepsy [58]. In Turkey, 17.5% of the healthcare students including physiotherapy students stated that someone in their family/surrounding had epilepsy [54].

3.8.4. Have physiotherapists witnessed an epileptic seizure?

In Bhutan, the vast majority (96%) of the healthcare providers including physiotherapists reported that they had witnessed a patient experiencing epileptic seizures [56]. In Germany, less than half (38%) of the physiotherapists reported that they had witnessed a patient experiencing epileptic seizures [15]. In Brazil, the majority (72%) of the physiotherapists reported that they had witnessed someone experiencing epileptic seizures [43]. In Saudi Arabia, less than half (45.7%) of the healthcare providers including physiotherapists reported that they had witnessed a patient experiencing epileptic seizures [44]. In Brazil, 42.1% of physiotherapy, psychology, and nutrition students stated that they had witnessed a patient experiencing epileptic seizures [55]. In another study in Brazil, 42.2% of the healthcare students stated that they had witnessed a patient experiencing epileptic seizures [58]. In Saudi Arabia, less than half of the healthcare students stated that they had witnessed someone experiencing epileptic seizures [53]. In Turkey, 38.1% of the healthcare students reported that they had witnessed someone experiencing epileptic seizures [54].

3.8.5. How do physiotherapists self-rate their knowledge about epilepsy?

In Germany, more than half of the physiotherapists self-rated their knowledge about epilepsy either average or good [15]. In Brazil, the vast majority (93%) of healthcare students reported that they had knowledge about epilepsy [58]. In Germany, less than half (38%) of the physiotherapists stated that they would administer a prescribed antiepileptic drug to a patient experiencing seizures [15]. In Turkey, 21.9% of the healthcare students felt competent to intervene in a seizure [54]. In Germany, the vast majority (97%) of the physiotherapists expressed willingness to receive more information about epilepsy [15].

3.8.6. How do physiotherapists perform in knowledge tests with regard to epilepsy?

3.8.6.1. Nature of the disease. In Nigeria, 77.9% of healthcare providers agreed that epilepsy is a brain disorder [59]. In Brazil, 65.5% of the physiotherapy, psychology, and nutrition students stated that epilepsy was a brain disease [55]. In Nigeria, 95.6% of the physiotherapists agreed that electroencephalogram (EEG), computed tomography (CT) scans, and magnetic resonance imaging (MRI) are frequently used in the diagnosis of epilepsy [57]. In Germany, when the physiotherapists were asked to assign 5 descriptions to the correct seizure type, 35% of the physiotherapists could assign descriptions to the correct type of seizure [15]. When Turkish healthcare students (including physiotherapy students) were provided with descriptions of seizures, the vast majority (95.8%) of the students could recognize tonic-clonic seizures [54]. In the same study, only 38.1% of the students could recognized focal seizures [54]. In Saudi Arabia, the vast majority (97%) of the healthcare providers including physiotherapists knew that symptoms of epilepsy vary by type of seizures [44]. In Nigeria, all physiotherapists but one (99.1%) knew that epileptic seizures occurred as a result abnormal electrical activity in the brain [57]. In Saudi Arabia, all healthcare students including physiotherapy students knew that epilepsy was a brain disease [53]. In Nigeria, 81.7% of the physiotherapists thought that injuries to the brain, infections, and inflammations might lead to seizures [57]. In another study in Nigeria, 63.2% of healthcare providers including physiotherapists thought that epilepsy may occur following head injury [59]. In the same study, 80% of the healthcare providers also thought that epilepsy could arise from birth injury [59]. In Turkey, healthcare students including physiotherapy students could identify stress (93.9%), lack of adherence to antiepileptic drugs (96.7%), and insomnia/fatigue (83.5%) as triggers of seizures [54].

3.8.6.2. Prevalence and incidence of epilepsy. In Saudi Arabia, more than half (63.9%) of the healthcare providers including physiotherapists stated that there was no particular age of onset for epilepsy [44]. In the same study, more than half (55%) of the healthcare providers including physiotherapists stated that prevalence of epilepsy in developing countries was similar to that in developed countries [44]. In Nigeria, 41.7% of the physiotherapists thought that people in developing countries are twice more likely to develop epilepsy compare to those living in developed countries [57]. In the same study, 60% of the physiotherapists stated that epilepsy affected infants/children more than any other age group [57].

3.8.6.3. Consequences of epilepsy. About half of the physiotherapists in Germany assumed death as a potential consequence of epilepsy and seizures [15]. In Nigeria, 44.3% of the physiotherapists thought that people with epilepsy are 11 times more likely to suffer premature death compared to the general public [57]. The majority of the physiotherapists in Germany agreed that epilepsy and seizures could impair the quality of life of patients with epilepsy [15]. In Nigeria, almost all physiotherapists (99.1%) agreed that epileptic seizures disturbed consciousness, behaviors, emotions, motor functions and/or sensations [57]. In the same study, the physiotherapists thought that epilepsy and seizures had significant effects on the development of the brain (88.7%), local seizures were less likely to cause mental retardations (80.9%), and generalized seizures may deteriorate intelligence (78.1%) [57]. Additionally, 64.3% of the physiotherapists agreed that patients with epilepsy were at higher risk of cardiovascular disease, type 2 diabetes, hypertension, osteoporosis, and cancer as a result of lack of exercise [57]. Moreover, 74.8% of the physiotherapists agreed that patients with epilepsy were at higher risk of weight gain as a result of using antiepileptic drugs. Of the physiotherapists, the majority (80.9%) agreed that patients with epilepsy were less likely to exercise because of the adverse effects of their antiepileptic drugs [57]. In Nigeria, 74.7% of the healthcare providers thought that epilepsy was a barrier to happy life among people with epilepsy [59].

3.8.6.4. Management strategies. In Saudi Arabia, the majority (82.3%) of the healthcare providers including physiotherapists stated that epilepsy could be treated with antiepileptic drugs [44]. Of the physiotherapy students in Saudi Arabia, 60% agreed that epilepsy could be managed by antiepileptic drugs [53]. In the same study, 33.6% of the physiotherapy students thought that epilepsy needs no treatment or did not know what treatment can be used

for patients with epilepsy [53]. In Turkey, 28.5% of the healthcare students including physiotherapy students thought that antiepileptic drugs should be interrupted during pregnancy until birth [54]. In Bhutan, the majority of the healthcare providers including physiotherapists thought that epilepsy was not a permanent condition [56]. In the same study, the vast majority (97.3%) of healthcare providers thought that modern medicine was the best way to treat epilepsy [56]. In Nigeria, 95.7% of the physiotherapists agreed that antiepileptic drugs are the first line in the management of seizures [57]. In Brazil, 90.9% of physiotherapy, psychology, and nutrition students knew that epilepsy can be managed with antiepileptic drugs [55]. When presented with pictures, 46% of the physiotherapists in Germany could identify rectal diazepam and 10% could identify buccal midazolam [15]. In Saudi Arabia, more than half (62.1%) of the healthcare providers including physiotherapists thought that not every patient with epilepsy would need to use antiepileptic drugs [44]. In the same study, more than half (56%) of the healthcare providers including physiotherapists thought that surgical interventions had no role in advanced cases of epilepsy [44]. In Brazil, 23.4% of physiotherapy, psychology, and nutrition students stated that epilepsy can be managed by surgery [55]. In Nigeria, 57% of the physiotherapists agreed that Ketogenic Diet and Modified Atkins Diet were essential alternatives for patients with intractable seizures [57]. In the same study, 55.7% of the physiotherapists agreed that vagus nerve stimulation can be beneficial for patients with seizures that do not respond to antiepileptic drugs [57]. Additionally, 87.8% of the physiotherapists agreed that the benefits of exercise for patients with epilepsy outweigh the risks. Similarly, 89.6% of the physiotherapists agreed that exercise improve the mental status of patients with epilepsy [57].

3.8.7. Practices of physiotherapists with regard to patients with epilepsy

In Nigeria, 70.9% of the physiotherapists used aerobic, strength, coordination, stretching, and balance exercises in the rehabilitation of patients with epilepsy [57]. In Saudi Arabia, all (100%) of the healthcare providers including physiotherapists stated that they would suggest consulting a doctor in case a relative/friend had epilepsy [44]. In Nigeria, 92.6% of the physiotherapists stated that they would invite other healthcare providers in case needed when they provide rehabilitation services to patients with epilepsy [57]. In the same study, 72.8% of the physiotherapists stated that they would refer patients with epilepsy to neurologists [57]. In Bhutan, 73.3% of healthcare providers stated that they would seek medical attention for a patient experiencing seizures [56]. In Germany, less than 80% of the physiotherapists stated that they would call an ambulance in case a patient experienced epileptic seizures in their care [15]. In the same study, about 55% of the physiotherapists stated that they would try to calm the patient in case the patient experienced a seizure in their care [15]. The majority (about 70%) of the physiotherapists in Germany stated that they would call for help from colleagues in case a patient experienced a seizure in their care [15]. In Saudi Arabia, the vast majority (98%) of the healthcare providers including physiotherapists stated that they would take patients with epilepsy away from danger while experiencing seizures [44]. Similarly, the majority (about 90%) of the physiotherapists in Germany stated that they would try to secure the surrounding in case a patient experienced a seizure in their care [15]. In Brazil, 60.5% of the medical and nursing students stated that they would move objects that could harm the patient while experiencing seizures compared to 48.2% of physiotherapy, psychology, and nutrition students [55]. In Turkey, the majority (87.1%) of the healthcare students stated that they would try to prevent head trauma of a patient experiencing seizures [54]. Additionally, the majority (97.2%) of the healthcare students stated that they would check the consciousness of the patient [54]. In Germany, about 63% of the physiotherapists stated that they would place something hard into the mouth of the patient in case the patient experienced a seizure in their care [15]. In Saudi Arabia, more than half (67.2%) of the healthcare providers including physiotherapists stated that they would put a spoon/cloth in the mouth of a patient in case the patient experienced a seizure in their care [44]. In Bhutan, 32% of the healthcare providers stated that they would put something in the mouth of a patient with epilepsy while the patient experiencing seizures [56]. In Brazil, 44.2% of physiotherapy, psychology, and nutrition students stated that they would put something inside the mouth of the patient in case the patient experienced a seizure [55]. In Saudi Arabia, about 1 in 4 (26.2%) of the healthcare providers including physiotherapists stated that they would force antiepileptic drugs down the throat of a patient, put the head of the patient in a toilet hole, hold, or tie the patient down in case the patient experienced an epileptic seizure in their care [44]. In the same study, about 8% of the healthcare providers including physiotherapists stated that they would suggest using herbal medicines, acupuncture, getting a medicine from a pharmacy store, or would suggest no treatment in case a relative/friend had epilepsy [44]. Additionally, half (50%) of the healthcare providers including physiotherapists stated that they would suggest reading the Quran in case a relative/friend had epilepsy [44]. In Bhutan, 18.7% of healthcare providers thought that spirituality/prayer was the best way to treat epilepsy [56]. In the same study, 14.7% of the healthcare providers thought that herbal medicine was the best way to treat epilepsy [56]. In Brazil, 99.5% of the medical and nursing students stated that they would leave the patient to rest after experiencing a seizure compared to 95.4% of physiotherapy, psychology, and nutrition students [55]. In Turkey, 12.5% of the healthcare students stated that they would make the patient sniff onion, garlic, cologne, or drink water [54].

3.8.8. Barriers to management

Fear legal repercussions in case the physiotherapists committed an error while administering the recue antiepileptic drugs was stated by 43% of the physiotherapists in Germany [15]. In Bhutan, the healthcare providers cited lack of medical equipment, lack of knowledge of diagnostic tests, lack of availability of antiepileptic drugs, and lack of enough providers to care for patients with epilepsy as major barriers to care for patients with epilepsy [56].

3.8.9. Attitudes of physiotherapists toward patients with epilepsy

3.8.9.1. Working with or employing a patient with epilepsy. The majority of the physiotherapists (73%) in Germany stated that they had no reservations against a colleague with epilepsy [15]. In Saudi Arabia, all but one (99%) of the healthcare providers including physiotherapists thought that it was acceptable for them to work with a colleague who experience seizures [44]. In the same study, the vast majority (97.9%) of healthcare providers including physiotherapists stated that they thought that patients with epilepsy can be employed in jobs like other individuals [44]. In Brazil, 91.4% of physiotherapy, psychology, and nutrition students stated that they would employ someone with epilepsy [55]. In Nigeria, 34.7% of the healthcare providers stated that they would employ someone with epilepsy [59]. In Saudi Arabia, 43.3% of the healthcare students stated that they would employ someone with epilepsy [53].

3.8.9.2. Socializing or marrying with a patient with epilepsy. In Brazil, all (100%) of the physiotherapists stated that they were not afraid of living with patients with epilepsy [43]. In the same study, the majority (77%) of the physiotherapists stated that they would maintain their relationships with a person with epilepsy [43]. In Saudi Arabia, the vast majority (92.6%) of healthcare providers including physiotherapists stated that they would not object to

their children playing with a patient with epilepsy [44]. In Bhutan, the majority of the healthcare providers including physiotherapists stated that they would let their child socialize with another child with epilepsy [56]. In Nigeria, 53.7% of the healthcare providers stated that they would socialize with patients with epilepsy in social gatherings [59]. In the same study, 65.3% of the healthcare providers stated that they would allow their children play with a patient with epilepsy [59]. Additionally, 57.9% of the healthcare providers stated that they would have a patient with epilepsy as a close friend [59]. In Bhutan, the majority of the healthcare providers including physiotherapists stated that they would be friends with someone with epilepsy [56]. In the same study, few healthcare providers including physiotherapists thought that patients with epilepsy should be prevented from participation in community events [56].

In Saudi Arabia, more than half (67%) of healthcare providers including physiotherapists stated that they would object to their son/daughter marrying a patient with epilepsy [44]. In Brazil, 89.3% of the physiotherapy, psychology, and nutrition students stated that they would marry someone with epilepsy [55]. In Nigeria, 12.6% of the healthcare providers stated that they would marry someone with epilepsy [59]. In Saudi Arabia, 30.9% of the healthcare students stated that they would marry someone with epilepsy [53]. In Saudi Arabia, the majority (86.6%) of healthcare providers including physiotherapists stated that patients with epilepsy could have children [44]. In Bhutan, the majority of healthcare providers including physiotherapists thought that patients with epilepsy can have children [56].

3.8.9.3. Participation of patients with epilepsy in social aspects of life. In Saudi Arabia, more than half (76.5%) of healthcare providers including physiotherapists thought that patients with epilepsy should not be prevented from participation in sportive activities [44]. In the same study, more than half (67.2%) of healthcare providers including physiotherapists thought that patients with epilepsy cannot live alone [44]. In Bhutan, the majority of the healthcare providers including physiotherapists thought that patients with epilepsy should not ride horses [56]. In Nigeria, 60% of the healthcare providers stated that patients with epilepsy should not engage in competitive sports [59]. In the same study, 85.3%, 52.6%, 65.3%, and 67.4% of the healthcare providers stated that patients with epilepsy should not drive, work as police officers, work in factories, or work in armed forces, respectively [59]. In Saudi Arabia, 39% of healthcare providers stated that they would not abide to instructions in case they had epilepsy and were instructed not to drive [44]. Of those, 91% stated that they would not abide to instructions because of public transportation, 26.9% for social reasons, 10.2% for financial reasons, and 35.5% did not see a reason to prevent people with epilepsy to drive [44].

3.8.9.4. Stigma against people with epilepsy. The majority of healthcare providers including physiotherapists and the majority of healthcare students including physiotherapy students thought that epilepsy was not contagious. In Nigeria, 6.3% of healthcare providers thought that epilepsy was contagious [59]. In Saudi Arabia, 24.7% of the physiotherapy students thought epilepsy was contagious [53]. In Turkey, only 0.7% of the healthcare students thought that epilepsy was contagious [54]. In Bhutan, very few healthcare providers thought that epilepsy was contagious [56]

In Saudi Arabia, about 1 in 10 (10.5%) healthcare providers including physiotherapists thought that epilepsy was caused by Jinn/supernatural power [44]. In Bhutan, 18.7% of healthcare providers thought that epilepsy was caused by karma/past actions and 5.3% of healthcare providers thought that epilepsy was caused by spirits [56]. In the same study, few healthcare providers including physiotherapists thought that patients with epilepsy had special spiritual powers [56]. In Nigeria, 8.4% of healthcare providers thought that epilepsy was caused by evil spirit [59].

In Nigeria, 16.8% of healthcare providers thought that epilepsy was a form of mental retardation [59]. In Saudi Arabia, 15.7% of healthcare students thought that epilepsy was a mental disease [53]. In the same study, 38.1% of the physiotherapy students thought that people with epilepsy had severe psychiatric disease [53]. In Brazil, 28.9% of physiotherapy, psychology, and nutrition students thought epilepsy was a mental disease [55]. In Turkey, 34.2% of the healthcare students thought that epilepsy impaired cognitive functioning in people with epilepsy [54]. In Saudi Arabia, 41.2% of the healthcare students thought that people with epilepsy should study in special classes [53]. In Nigeria, the vast majority 97.9%) of the healthcare providers thought that people with epilepsy can achieve academic education [59]. In Bhutan, more than half of the healthcare providers including physiotherapists thought that patients with epilepsy would need extra help in schools [56].

3.8.10. Factors associated with knowledge and attitudes

Professional experience of physiotherapists in Germany was not associated with knowledge of symptoms of epilepsy, fatal seizures, ability to help, willingness to administer a rescue medication, and attitudes toward colleagues with epilepsy [15]. In the same study, more physiotherapists stated that they would place something in the mouth of patients with epilepsy while experiencing seizures compared to occupational therapists, and speech therapists [15]. In Saudi Arabia, more physicians and health educators reported having access to information about epilepsy during their professional training compared to other healthcare providers including physiotherapists [44]. In Brazil, physiotherapists had similar access to knowledge compared to physical educators [43]. In the same study, physiotherapists as well as other healthcare professionals had less knowledge scores compared to physicians. Additionally, physiotherapists, nurses, and psychologists had higher knowledge scores compared to nutritionists and physical educators [43]. The study showed that the healthcare providers who had higher access to information had higher knowledge scores [43]. In Bhutan, healthcare providers reported higher knowledge and more positive attitudes toward people with epilepsy compared to patients with epilepsy themselves [56]. In Brazil, medical and nursing students reported higher knowledge and more positive attitudes compared to physiotherapy, psychology, and nutrition students [55].

3.8.11. Interventions to improve knowledge and attitudes

In Brazil, Tedrus et al organized an educational workshop intervention improved knowledge and attitudes of healthcare students toward epilepsy and people with epilepsy [58]. Compared to baseline knowledge, the workshop resulted in improving knowledge of the healthcare students including physiotherapy students with regard to causes of epilepsy, age of onset of epilepsy, differences between epilepsy and psychiatric disorders, the importance of removing objects away from a patient when the patient was experiencing an epileptic seizure, the dangers of placing any object in the mouth of a patient while the patient was experiencing an epileptic seizure, and the importance of adhering to taking antiepileptic drugs to control seizures [58]. Attitudes of the healthcare students relevant to marrying and employing someone with epilepsy were also improved [58].

4. Discussion

Physiotherapists are important healthcare service providers in different healthcare institutions [13]. In different healthcare systems, physiotherapists are increasingly providing care services to patients with epilepsy [14]. This is the first systematic scoping

review of studies reporting on knowledge, attitudes, and practices of physiotherapists toward epilepsy and patients with epilepsy. The review sought to identify, summarize, and present narrative synthesis of qualitative evidence on knowledge, attitudes, and practices of physiotherapists toward epilepsy and patients with epilepsy. The contents of the 11 studies were grouped into the 11 themes and 8 subthemes. Findings of this systematic scoping review could be informative to decision makers in academia, professional groups, healthcare authorities, and patient advocacy groups who could be interested in improving knowledge, attitudes, and practices of physiotherapists toward epilepsy and patients with epilepsy.

The literature search showed scarcity of studies reporting on knowledge, attitudes, and practices of physiotherapists with regard to epilepsy and patients with epilepsy. The studies selected for this review included practicing physiotherapists and students with a relatively small number of participants [15,43,44,53–64]. Additionally, the majority of the studies included a small percentage of physiotherapists. The majority of the studies selected in this review included physiotherapists/physiotherapy students along with other healthcare providers/students. More than half of the studies were published in the last 5 years. This could be explained by the recent expansions of the profession of physiotherapy and inclusion of physiotherapists in the healthcare teams in different settings around the world [13].

In this review, the physiotherapists and physiotherapy students were of both male and female gender, belonged to different age groups, practice or studies in different settings/universities, had different academic degrees, and provided services or interacted with people with epilepsy. The studies selected in this review were conducted in different settings in Europe, North America, Latin America, Africa, and Asia. With the continuous expansion of the physiotherapy services, physiotherapists are important healthcare providers in different healthcare systems around the world [13,14].

The studies included in this review highlighted some high and low awareness areas among physiotherapists and physiotherapy students with regard to the nature of epilepsy, prevalence and incidence of the disease, consequences of seizures, and management strategies. It is important for healthcare providers to understand the nature of epilepsy and seizures [20,25,26,65–68]. This might help healthcare providers including physiotherapists provide optimized services for patients with epilepsy. Knowledge of what causes epilepsy might also reduce stigma against patients with epilepsy [27]. Similarly, knowledge of consequences of seizures might dispel myths about epilepsy and people with epilepsy. Additionally, knowledge of management strategies might help physiotherapists intervene when necessary to protect patients with epilepsy and administer emergency medications.

Inclusion of course materials on epilepsy in the curricula of physiotherapists during their professional/vocational training varied by setting and country [15,44,53–55]. Similarly, access to information on epilepsy was less than optimal in different studies [44]. Addressing epilepsy in professionals was shown to impact knowledge of physiotherapists and other healthcare providers with regard to epilepsy [43]. Interestingly, physiotherapists and other healthcare professionals recognized knowledge deficiencies with regard to epilepsy and expressed willingness to more information about epilepsy [15,54]. It has been argued that recognition of knowledge deficits is an important prerequisite for knowledge seeking behavior.

In the studies included in this review, practicing physiotherapists provided services to patients with epilepsy and physiotherapy students expected to provide services to patients with epilepsy [43,56,57]. Similarly, physiotherapists and students of physiotherapy knew family members or individuals in the surrounding who had epilepsy [53,54]. The percentage of physiotherapists and physiotherapy students who reported witnessing an epileptic seizure varied by practice and setting [44,56]. In general, practicing physiotherapists were more likely to report witnessing a seizure compared to physiotherapy students. Previous studies have shown that knowing someone with seizures improved might stimulate knowledge seeking behavior, improve knowledge, and attitudes toward epilepsy and patients with epilepsy.

4.1. Strengths and limitations

The results of this systematic scoping review should be interpreted after considering a number of strength and limitation points. First, this is the first systematic scoping review of the literature reporting on knowledge, attitudes, and practices of physiotherapists toward epilepsy and patients with epilepsy. In this scoping review, the contents of the included articles were summarized and qualitatively synthesized into themes and subthemes. Qualitative synthesis could be informative to those interested in summaries of key results reported in the literature. Second, a systematic search of the main databases in which articles are indexed was conducted. Systematic approaches to literature search have been advocated to yield more reliable and reproducible results compared to non-systematic approaches. Third, appropriate quality appraisal tools were used to assess the quality of the included studies. The quality appraisal step should have identified gaps in the quality of the conducted studies. Researchers might need to focus on improving the quality of future studies. On the other hand, this systematic scoping review had a number of limitations. First, only English language articles were included. Exclusion of articles in languages other than English might have allowed missing some important findings that could have been reported in other languages. Second, a quantitative meta-analysis was not conducted in this study. Quantitative meta-analyses have emerged as powerful tools in evidence synthesis. Finally, the focus of this systematic scoping review was physiotherapists. Findings of this study could have been more interesting should other healthcare professionals be included.

5. Conclusions

Findings of this systematic scoping review identified important knowledge gaps among physiotherapists with regard to epilepsy that need to be addressed. Additionally, attitudes and practices of physiotherapists with regard to epilepsy might need to be improved. Currently, high-quality interventional studies are needed to improve knowledge, attitudes, and practices of physiotherapists with regard to epilepsy and patients with epilepsy. Future studies are still needed to investigate if improving knowledge, attitudes, and practices of physiotherapists with regard to epilepsy and patients with epilepsy can improve health-related outcomes of the patients.

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Declaration of competing interest

The authors declare no competing interests.

Data statement

The datasets used and analyzed during this study are available from the corresponding author on reasonable request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.yebeh.2021.108367.

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