

Potential and challenges in using hypodermoclysis in adult patients: an integrative review

Karoline Goulart Cordeiro¹, Laura Menezes Silveira², Karina Dal Sasso Mendes³, Angelita Stabile⁴, Carina Aparecida Marosti Dessote⁵, Fabiana Bolela⁶

ABSTRACT

Objective: to identify national and international scientific evidence about the potential and challenges of hypodermoclysis in adult patients. **Method:** an integrative literature review, carried out in April 2019, without time frame, using the MEDLINE, CINAHL, Scopus and Embase databases, resulting in a final sample of seven international articles. **Results:** from the synthesis of evidence, potentialities emerged: feasibility of the technique, possibility of treating dehydration in older adults, use in confused patients, with difficult venous access and at home, low rate of complications, less demand for team care time. The challenges highlighted were: patient acceptance, disease stage, characteristics of administered fluids, teaching the technique at graduation, training of nursing professionals and adoption of clinical protocols. **Conclusion:** despite the potentiality, there are challenges to be overcome that point to the need for training in using hypodermoclysis, both for professionals and for students in training, which could positively impact hypodermoclysis compliance.

Descriptors: Hypodermoclysis; Infusions, Subcutaneous; Nursing; Palliative Care

¹Ribeirão Preto School of Nursing. Ribeirão Preto, São Paulo, Brazil. ORCID: 0000-0002-7513-2951

²Ribeirão Preto School of Nursing. Ribeirão Preto, São Paulo, Brazil. ORCID: 0000-0002-2397-2553

³Ribeirão Preto School of Nursing. Ribeirão Preto, São Paulo, Brazil. ORCID: 0000-0003-3349-2075

⁴Ribeirão Preto School of Nursing. Ribeirão Preto, São Paulo, Brazil. ORCID: 0000-0002-3371-7038

⁵Ribeirão Preto School of Nursing. Ribeirão Preto, São Paulo, Brazil. ORCID: 0000-0002-5521-8416

⁶Ribeirão Preto School of Nursing. Ribeirão Preto, São Paulo, Brazil. ORCID: 0000-0003-1199-6205

INTRODUCTION

The term “hypermoclysis” or “subcutaneous therapy” corresponds to using the subcutaneous (SC) route for infusion of fluids and/or medications, either continuously or intermittently. It is an effective and safe route, as complications related to SC puncture are rare, when professionals adopt the correct puncture technique and respect drug dilution and infusion rate⁽¹⁾.

Hypodermoclysis should be considered when patients are unable to use the oral route (dysphagia, nausea and vomiting for prolonged periods, gastric intolerance and intestinal obstruction), venous network of difficult access (due to the veins’ natural aging process and loss of skin elasticity, particularly in patients over 80 years of age or in those who have already undergone chemotherapy), drowsiness, confusion, agitation, and advanced dementia⁽²⁻³⁾.

Studies have shown the numerous advantages of using the SC route, when compared to the intravenous (IV) route, such as easier catheter insertion and maintenance, low cost and lower occurrence of serious complications, especially infections related to puncture⁽⁴⁻⁵⁾. Furthermore, its performance allows patients to be discharged early and remain at home to control symptoms, as it is possible to handle it by a trained person, who may even be a caregiver or family member⁽⁵⁻⁶⁾.

Such advantages have contributed to its incorporation into clinical practice, which, associated with the increase in the number of older adults and those with chronic diseases, who need palliative care, requires a new perspective of care and the adoption of technological options capable of facilitating drug therapy⁽⁷⁻⁸⁾.

However, even in the face of such evidence, the technique has been underused in clinical practice, due to professionals’ lack of knowledge about the subject⁽⁹⁻¹⁰⁾. The gap in professionals’ knowledge regarding the main aspects involved in its use is one of the reasons for low compliance with performing hypodermoclysis in health services⁽¹¹⁻¹²⁾.

In order for it to be integrated into care, contributing to drug therapy, proving professional teams with the necessary tools and their knowledge are important, whether through more comprehensive training, whether through updates and in-service training.

A study points out that lack of knowledge on the subject, by medical and nursing professionals, is probably related to lack of discussion on the subject in universities^(2,10,13).

Training human resources that meet health demands is a challenge to be faced by educational institutions, and they must, even within the scope of professional training, extrapolate the more traditional drug administration techniques⁽¹⁰⁾.

Also, in-service education, a dynamic and continuous process for the construction of knowledge, must be considered. From the problematization of critical nodes that occur in the daily routine of services, qualification needs are identified and must be addressed, in order to bring about changes in the ways of acting and producing health, guaranteeing the applicability and relevance of established contents and technologies, thus giving new meaning to health and nursing work⁽¹⁴⁾.

Thus, the need for research to consolidate the performance of this procedure in Brazil is evident, considering that there is a lack of studies in this area.

Considering the above, the aspects mentioned so far may constitute potential for using hypodermoclysis in adult patients, but also challenges the nursing team regarding compliance and performance in clinical practice. The knowledge from this review will be able to support health care professionals with useful information for decision making about the performance of hypodermoclysis, information that goes beyond what has been published on the subject, for instance, in relation to the technique, the method of implementation, the drugs that are possible or not for administration, among others, of a purely technical nature.

Considering the importance of the subject and the scarcity of studies on using hypodermoclysis, the development of this review is justified, whose objective was to identify national and international scientific evidence about the potential and challenges of hypodermoclysis in adult patients.

METHOD

This is an integrative literature review, a research modality whose objective is to gather and synthesize research results on a given topic, in a systematic and orderly manner, contributing to deepening knowledge of the investigated topic⁽¹²⁾.

The study was developed through six steps: research question definition; search and selection of primary studies; data extraction; critical assessment of studies included in the integrative review; summary of results; review presentation⁽¹⁵⁾.

In order to locate the best evidence available in each database, the guiding question of this study was elaborated, using the "PICO" strategy, described as: "P" (Patient/Population), "I" (Intervention), "C" (Comparison) and "O" (Outcomes)⁽¹⁶⁾. In this study, the PICO acronym was used as follows: P – adult patients, I – hypodermoclysis, C – not applicable and O –

potential and challenges. Thus, the guiding question was defined: what is the evidence on the potential and challenges in using hypodermoclysis in adult patients?

For study search and selection, in April 2019, the Medical Literature Analysis and Retrieval System Online (MEDLINE), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Embase and Scopus databases were consulted. Controlled descriptors (Medical Subject Headings and Health Sciences Descriptors) were used: hypodermoclysis, nursing, nurses, health personnel, and uncontrolled descriptors (keywords) nurse, health professional, health professionals. Descriptors were combined in different ways, using Boolean operators AND and OR to ensure a broad search, this being the search strategy in the databases: Hypodermoclysis AND (nursing OR nurses OR nurse OR "health professionals" OR "health professional" OR "Health Personnel").

We included studies with adult individuals (18 to 59 years old) or elderly individuals (≥ 60 years old) in our sample, which addressed using hypodermoclysis, in Portuguese, English and Spanish, without delimiting the publication period. We excluded secondary studies that presented duplicity of publication in selected databases, clinical case reports, editorials, non-availability of abstract and/or article in full and that were not in the area of human health.

The option not to adopt a time frame comes from the fact that hypodermoclysis is a procedure that was first described more than 150 years ago. Although its practice fell into disuse for many years, it is making a comeback today, driven by the modern palliative care movement. The authors of this article therefore concluded that delimiting a period for the search for evidence could exclude important articles on the topic.

Study selection was carried out by two researchers, and, in case of divergences in the inclusion of studies, a third researcher was contacted for final consensus. Thus, two phases made up the selection process so that, in the first phase, selection was carried out by reading title and abstract, and, in the second phase, full reading of article. At the end of each phase, consensus among researchers was implemented. For selection, the studies identified in each database were organized in an Excel spreadsheet, with the creation of columns in which data from each abstract were copied, such as authorship, year of publication, journal title, abstract title, complete summary and DOI identifier code.

For the extraction of data from included studies, a validated instrument was used that includes article identification, authors, type of publication, methodological detailing, sample detail, the intervention studied, results and recommendations/conclusions⁽¹⁷⁾.

For study assessment, the classification of evidence hierarchies was considered according to the type of clinical question. The clinical question can be: (a) significance (with five levels of evidence, the strongest being level I, evidence obtained from meta-synthesis of qualitative studies, and the lowest, level V, evidence of expert opinion); (b) prognosis, prediction or etiology (with five levels of evidence, the strongest being level I, evidence obtained from synthesis of cohort or case-control studies, and the lowest, level V, evidence of expert opinion); and (c) intervention, treatment or diagnosis/diagnostic testing (with seven levels of evidence, the strongest being level I, evidence obtained from a systematic review or meta-analysis, and the lowest, level VII, evidence of expert opinion)⁽¹⁸⁾.

The synthesis of results was carried out in a narrative and tabular way, with emphasis on the presentation of each study regarding the objective, methodology, main results and conclusions, seeking to answer the guiding question of this study.

Figure 1 shows the selection process for studies included in this review, and followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses

(PRISMA) recommendations. The selected publications were classified according to methodological design and level of evidence.

The figure 1 clarifies the selection flowchart of studies that made up this review.

RESULTS

The final sample consisted of seven articles, all published in English. Of the total number of articles included in this study, two were carried out in Canada, two in the United States of America (USA), one in Germany, one in Spain and one in Turkey.

In order to summarize and organize the information contained in the articles, a table was used, which identified year of publication, country of origin, authors, journal name and level of evidence (Figure 2), and then the data were categorized according to objectives, method, study population, main results and conclusions (Figure 3).

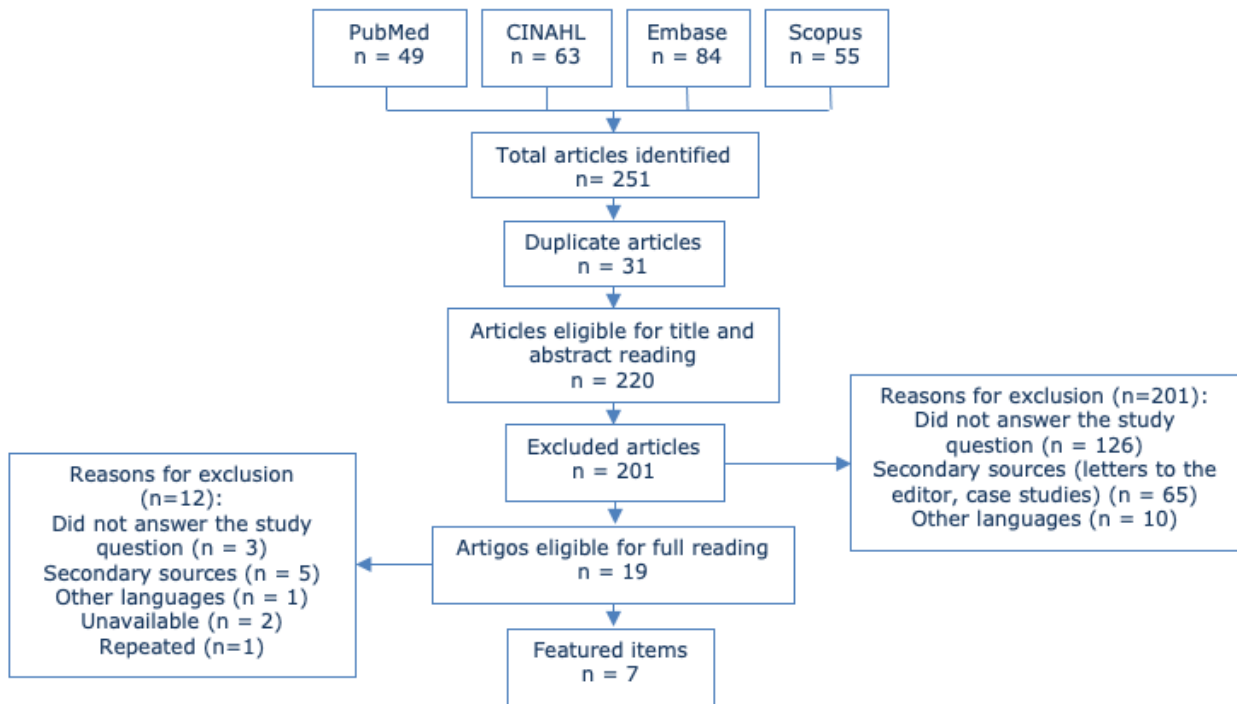


Figure 1 - Flowchart of identification and selection of primary studies. Brazil, 2019

Study, year of publication	Country of origin	Authors	Journal	Scrying level
Study⁽⁵⁾ 2016	USA	Vidal M, Hui D, Williams J, Bruera	Journal of pain and symptom management	VI
Study⁽¹⁶⁾ 1996	USA	Hussain NA, Warshaw G.	Journal of the American Geriatrics Society	VI
Studies⁽¹⁷⁾ 1997	Canada	Worobec F, Brown MK.	Journal of Gerontological Nursing	VI
Study⁽¹⁸⁾ 2000	Canada	Dasgupta M, Binns MA, Rochon PA.	Journal of the American Geriatrics Society	VI
Study⁽¹⁹⁾ 2003	Germany	Slesak G, Schnürle JW, Kinzel E, Jakob J, Dietz K.	Journal of the American Geriatrics Society	II
Study⁽²⁰⁾ 2016	Spain	Cabañero-Martínez MJ, Velasco-Álvarez ML, Ramos-Pichardo JD, Miralles MLR, Valladares MP, Cabrero-García J.	Palliative medicine	VI
Study⁽²¹⁾. 2018	Turkey	Esmeray G, Şenturan L, Döventaş A.	Turkish Journal of Geriatrics	II

Figure 2 - Synthesis of primary studies according to year of publication, country of origin, authors, journal and level of evidence. Brazil, 2019

Study	Objective	Method, study population	Main results and conclusions (potential and/or challenges)
Study ⁽⁵⁾	Assess caregivers' ability to perform the hypodermoclysis technique in the palliative care environment at home.	Prospective, descriptive study. The population consisted of 21 caregivers of older adults.	Potential: *Simple technique that does not require special technical support and infusion pumps; *Can be administered by caregivers at home, with minimal load and equipment; *Avoids costly intravenous therapy expenses; *Allows patients to stay at home longer.
Study ⁽¹⁹⁾	Determine the usefulness of hypodermoclysis in dehydration treatment in older adults residing in a Nursing Home.	Retrospective observational study. The population consisted of 36 older adults from two Nursing Homes.	Potential: after hypodermoclysis therapy, 71% of dehydrated patients returned to baseline clinical conditions, avoiding hospitalization. The nursing team can use hypodermoclysis as an alternative when patients have difficulty in oral hydration therapy.
Study ⁽²⁰⁾	Investigate using hypodermoclysis therapy in solving acute or potentially acute problems of short-term and reversible dehydration.	The population consisted of older adults residing in a 284-bed chronic care hospital in southern Ontario.	Potential: hypodermoclysis, the process of rehydrating a patient by providing isotonic fluids to the SC tissues for a short period, provides an alternative method for dealing with acute, short-term water deficit problems in older adults. Hypodermoclysis therapy can be administered in a chronic care setting, potentially decreasing the need to transfer older clients to an acute care hospital.
Study ⁽²¹⁾	Study using hypodermoclysis (SC therapy) and compare it to intravenous (IV) therapy in acute dehydration treatment in a Nursing Homes.	Observational, prospective, quantitative. The study population consisted of 55 patients.	Of the 55 patients, 37 received hypodermoclysis, nine received intravenous therapy, and nine received both therapies. Potential: hypodermoclysis was associated with fewer complications (local reactions, catheter removal, fluid leakage) when compared to IV therapy.

to be continued...

continuation of figure 3

Study⁽²²⁾	Compare the acceptance, feasibility and adverse effects of SC and IV rehydration in dehydrated geriatric patients.	Prospective, randomized clinical trial. The study population consisted of 96 patients admitted to hospital geriatric wards.	Potential: rehydration by hypodermoclysis is equally feasible with IV therapy. The technique of hypodermoclysis is better compared to IV therapy in cases of confused patients with difficult venous access. The time to installation of hypodermoclysis therapy was significantly shorter (3.4 versus 6.1 minutes) than IV. Rehydration by hypodermoclysis is equally well accepted by geriatric patients as IV therapy and offers an equally easy feasibility. Both techniques are safe and effective.
Study⁽²³⁾	Explore the perceptions, attitudes and opinions of palliative care providers about SC hydration administration.	Qualitative study. The study population consisted of 37 health professionals, physicians and nurses.	Of the four proposed themes, 56 categories of perceptions emerged, of which 22 were grouped into 22 subthemes. Challenges: the variables that most influence using hypodermoclysis are related to patient (disease type and stage, symptoms, puncture area conditions), team (team functioning and condition and interaction with the family) and family (caregivers' emotional state, characteristics) and other characteristics, such as place of care (hospital or home), type of hospital unit (specialized or not), type of fluid to be administered, time, schedule and volume of infusion and information about protocols.
Study⁽²⁴⁾	Investigate the effectiveness of SC infusion (hypodermoclysis) in geriatric patients with mild and moderate dehydration.	Randomized controlled study. The study population consisted of 30 patients.	Potential: using hypodermoclysis required less time from the nursing team to insert the catheter. The duration of therapy was 2.5 times shorter when compared to IV therapy. With the IV infusion method, more redness, bleeding and agitation occurred than with the SC infusion method. There were statistically significant differences in the number (<SC and >IV) and duration (>SC and <IV) and insertion time (<SC and >IV) of catheters used between the two infusion methods.

Figure 3 - Synthesis of primary studies according to objectives, method, study population and main results and conclusions. Brazil, 2019

Evidence on the potential for using hypodermoclysis in adult patients concerns the prevention of hospitalization and the feasibility of treating dehydration in older adults at home (when oral hydration is not available)⁽¹⁹⁾ and the reduction of complications, such as local reactions, catheter loss, fluid leakage⁽²¹⁾.

It is characterized as a technique as safe and effective as IV therapy, in addition to being useful mainly for confused patients with difficult venous access⁽²²⁾. In addition to this, the hypodermoclysis technique requires less time for the nursing team⁽²⁴⁾. Hypodermoclysis can be performed using a simple technique, whose handling can be learned by caregivers, thus

allowing patients to stay at home longer⁽⁵⁾.

Challenges related to using hypodermoclysis were highlighted as factors such as patient acceptance⁽²²⁾ as well as disease characteristics and stage in which patients are, family and caregiver characteristics, type, duration and volume of fluid to be administered⁽²³⁾.

DISCUSSION

Although the technique of hypodermoclysis has been reported for centuries, it has become more popular in recent years, due to the increase in older adults in the world and in terms of palliative care⁽²⁵⁾. Hydration and oral medication administration to geriatric patients or those who are in the final stage of life is often hampered by factors such as dysphagia, reduced level of consciousness, dyspnea, nausea, vomiting, functional loss of absorption by the digestive tract and the fragility of the venous network⁽¹⁾.

In this context, the SC route can be used for the administration of solutions and drugs in hospital and home environments, mainly because the absorption through the SC route is similar to the absorption through the oral route⁽²⁶⁾. In Nursing Homes, hypodermoclysis can be performed by the nursing team and used in mild or moderate dehydration treatment, without the need to

transfer patients to the hospital⁽¹⁾, which reaffirms the results of an American study⁽²⁰⁾.

In hospital settings, using hypodermoclysis allows for early discharge, as the device can be handled at home by caregivers, family members, or patients themselves, as long as they are trained by the nursing team⁽²⁷⁾.

The possibility of handling hypodermoclysis at patients' home, by trained family members, is a potential, as it allows for a reduction in the length of hospital stay and stay at home. However, it presents aspects that can configure challenges, such as the ambiguity of feelings presented by family members, who may feel afraid to assume such responsibilities or feel safe and satisfied with using this route of medication administration by the sick family member at home⁽⁶⁾.

This technique is considered more comfortable, less painful, complex and expensive when compared to the IV route⁽¹⁾. Although the absorption time is longer than that of IV therapy, the effectiveness is similar⁽²⁸⁾.

Using hypodermoclysis led to a lower occurrence of complications (local reactions, catheter loss, fluid leakage, etc.)⁽²¹⁾. As in this study, potential advantages related to hypodermoclysis were evidenced, such as low cost of materials for

its installation and maintenance, minimal risk of discomfort, lower degree of limitation due to the different options of puncture sites (commonly far from joints) and reduced risk of systemic complications (such as hyperhydration and cardiac overload), due to the possibility of monitoring throughout infusion⁽²⁷⁾. On the other hand, a review study including 13 articles showed that the adverse effects of hypodermoclysis are similar to those of the IV route, being described as local pain and fluid overload in 61%, local edema in 53% and cellulitis in 38% of cases, respectively⁽⁷⁾.

In this sense, it is believed that some of these adverse effects can be avoided with the appropriation of the technique and continuous training of the nursing team, caregivers and family members to perform the procedure. A study, which aimed to report the experience of a permanent education activity on hypodermoclysis with nursing professionals in the hospital context, concluded that such activity contributed to systematization of professionals' practice in SC therapy care⁽²⁸⁾.

Thus, qualification and training activities aimed at professionals are able to provide theoretical-practical depth and, therefore, improve patient care quality and greater technical security for the team in procedural actions⁽⁸⁾.

The aspect related to lack of knowledge of the technique by health professionals is a great challenge in using hypodermoclysis in adult patients and that deserves in-depth discussion in the academic setting and in health services.

A study carried out in a hospital in São Paulo, with nurses who worked in an inpatient unit, showed that 29% were superficially aware of the hypodermoclysis technique and 71% were completely unaware of it⁽¹³⁾. In another study, 78% of participants reported knowing the technique and its use; however, 53.7% reported not having received training or continuing education on hypodermoclysis at the place where they work⁽²⁹⁾.

In Brazil, using hypodermoclysis protocols is incipient. There is a lack of studies that address SC perfusion good practices as an alternative for patients, which is a knowledge gap found in this study. Therefore, health professionals have little knowledge about this technique and need specific skills and training programs to implement it⁽³⁰⁻³¹⁾.

It is important to emphasize that nursing team training, in addition to providing more safety for patients and greater effectiveness of the technique, can reduce the time spent by the nursing team in performing the procedure, as reported in the studies^(22,24).

Furthermore, the literature points to a divergence of information regarding numerous aspects related to hypodermoclysis, such as drugs that can be administered, reconstitution and recommended dilution, drug interactions, among others⁽³²⁻³³⁾.

Thus, it is necessary to build and adopt care protocols in order to standardize actions and procedures for using drugs for hypodermoclysis, directing physicians in drug prescription and enabling the nursing team to know about relevant information for their practice. Additionally, the adoption of institutional protocols involving the technique allows describing the conduct of the entire process, which involves care with the puncture and monitoring of this infusion route, including team, patient, and family education⁽³⁴⁾. Thus, with the help of well-defined guidelines, professionals involved in care have the potential to provide safer care, as recommended by the Brazilian National Patient Safety Policy (*Política Nacional de Segurança do Paciente*)⁽³⁵⁾.

In this review, the form and strategy in which it was conducted, no evidence was obtained from studies carried out in Brazil, which points to the need for greater dissemination and incorporation of the technique by health teams. Studies suggest the reassessment of the curricula of health

courses in Brazil, since gaps are identified in the training of health professionals with regard to palliative care and using hypodermoclysis⁽³⁶⁾.

The knowledge generated by this review can support health care professionals with useful information for decision-making about performing hypodermoclysis. It is also expected that this study can positively influence compliance with the benefits related to using hypodermoclysis by the health team, providing more comfort to patients and greater safety in SC therapy. Considering that the nurse is involved in performing hypodermoclysis, in direct patient care, in the guidance and training of other team members, caregivers and family members, and in working together with the medical team, it is essential that studies involving this theme are most widespread.

CONCLUSION

The study showed that using hypodermoclysis has real potential and challenges to be overcome. Based on the studies analyzed, the potential use of hypodermoclysis is considered, such as the feasibility of the technique outside the hospital environment, the possibility of treating dehydration in older adults, the

ease of use in confused patients with difficult venous access, the low rate of complications related to the technique, the lower demand for care time from the nursing team and the possibility of performing the technique by caregivers in the home environment.

The challenges highlighted relate to procedure acceptance by patient, family and caregiver, patient (disease type and stage, symptoms, puncture area conditions), team (team functioning and conditions and interaction with the family) and family (caregivers' emotional state and characteristics) characteristics and characteristics of the fluids to be administered (type, time, duration, volume).

Furthermore, teaching the technique at graduation, training nursing professionals and adopting clinical protocols are also important challenges for the propagation of the benefits of its use.

Given the above, considering the literature studied, it is essential to develop training courses on the performance and use of hypodermoclysis, both for professionals already in the job market and for students, future professionals, through including the theme in the contents taught at graduation on medication administration. Thus, the present study can have a positive impact on compliance with hypodermoclysis practice

by the nursing team, by encouraging training on the subject. Future studies may explore how the technique has been taught and applied in educational and health institutions.

As a limitation of this study, there is a scarcity of studies found in the literature that addressed the guiding question in vogue. Furthermore, the absence of national articles that answered the research question limits the knowledge about how hypodermoclysis practice is inserted in the Brazilian context. Health practices must be based on science and, often, aspects related to using hypodermoclysis in international contexts may not be viable for the Brazilian context. This fact may be related to the combinations between the descriptors and keywords in the search engine as well as the selection of searched databases.

Moreover, this study has common limitations in an investigation with secondary data, as the information is already constructed in advance.

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Corresponding author:

Fabiana Bolela. Avenida dos Bandeirantes,
3900 – Campus Universitário, Bairro Monte
Alegre. Ribeirão Preto – SP.
Cel.: (16) 98100-9513
E-mail: fbolela@usp.br