

## Lactation induction for transgender women and transfeminine people in health care: a scoping review

Indução da lactação para mulheres transgênero e pessoas transfemininas no cuidado à saúde: uma revisão de escopo

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**Abstract** *There are countless proven benefits of breastfeeding, and the demand for such a right in health for transfeminine people is rarely addressed in the literature, reinforcing inequities in health. The article aims to conduct a scoping review of lactation induction for transfeminine people in the health care context. Systematic literature review in six selected databases, looking for articles with terms related to lactation and transfeminine people. Data were extracted and analyzed, summarizing the main results in tables. Three hundred ninety articles were found. After the exclusion of the duplicates there was a selection by title/abstract and a following selection by the full reading of the remaining articles, considering the pre-determined exclusion and inclusion criteria. Twenty-one articles were included, published between 2018 and 2023. Among them, six are case reports with unprecedented information on the topic, and the others are publications in various formats. Lactation induction was achieved in all the case reports. There is a fragile and recent body of evidence affirming the success of lactation induction in transgender women. There is a necessity to support this demand by health professionals and robust studies to optimize necessary interventions.*

**Key words** *Lactation, Breastfeeding, Transgender, Transexual, Systematic review*

**Resumo** *São inúmeros os benefícios comprovados do aleitamento materno, e a demanda por tal direito em saúde para as pessoas transfemininas é pouco abordada na literatura, reforçando as iniquidades em saúde. O artigo objetiva realizar uma revisão de escopo sobre a indução da lactação para pessoas transfemininas no contexto de assistência à saúde. Revisão sistemática da literatura em seis bases de dados selecionadas, buscando artigos com termos relacionados à lactação e pessoas transfemininas. Os dados foram extraídos e analisados, resumindo os principais resultados em tabelas. Foram encontrados 390 artigos. Após a exclusão dos duplicados, procedeu-se à seleção por título/resumo e posterior seleção pela leitura na íntegra, considerando os critérios de exclusão e inclusão. Foram incluídos 21 artigos, publicados entre 2018 e 2023. Entre eles, seis são relatos de casos com informações inéditas sobre o tema, e os demais são publicações em diversos formatos. A indução da lactação foi alcançada em todos os relatos de casos. Existe um corpo de evidências frágil e recente que afirma o sucesso da indução da lactação em mulheres trans. Há necessidade de respaldar essa demanda por parte dos profissionais e estudos robustos para otimizar as intervenções necessárias.*

**Palavras-chave** *Lactação, Aleitamento, Transgênero, Transexual, Revisão sistemática*

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## Introduction

A person's gender identity is self-referenced, not necessarily corresponding to the gender assigned at birth. People who do not identify with their assigned sex at birth may be considered transgender (or "trans"), a term currently used in the scientific literature as an "umbrella" term, which encompasses transgender/transsexual, non-binary, agender, other transmale or transfeminine people, etc.<sup>1</sup>

The LGBTIA+ population suffers discrimination in numerous contexts, which, unfortunately, is not different in health care. In particular, transgender individuals suffer from various types of violence that stem, among other reasons, from the lack of training and preparation of professionals and health services to welcome them<sup>2,3</sup>.

There is a scarcity of scientific evidence and care protocols that are specific to the needs of this population, such as the lactation induction in transgender women<sup>1</sup>.

The benefits of breastfeeding for a newborn are widely known, especially those related to nutrition, development, immunity and reduction of mortality rates, in addition to other biopsychosocial issues such as closer bonding and neuropsychic development of the baby<sup>4,5</sup>.

The reasons that lead a family to want to breastfeed their baby are notable, especially transgender women, who add to these many benefits of breastfeeding the possibility of gender affirmation<sup>6</sup>. However, the current literature does not have materials with good scientific evidence to support these people's desire to breastfeed<sup>7</sup>.

Thus, the present study aims to conduct a scoping review of lactation induction in transgender women in the health care context.

## Materials and methods

A scoping review was carried out, aiming at a broad look at the body of evidence related to the subject, allowing to summarize what already exists in the literature, and to point out gaps and directions for future research<sup>8-11</sup>.

The present study followed the 5 steps suggested by Pham *et al.*<sup>8</sup> which was based on the framework proposed by Arksey *et al.*<sup>9</sup>: identifying the research question; identifying relevant studies; selecting the studies; extracting the data; summarizing and analyzing the results.

The bibliographic search was carried out in broad databases, some more specific to the med-

ical area and some directed to other areas of healthcare: Biblioteca Virtual em Saúde (BVS)/PubMed/Scopus/Web of Science/Embase/PsycInfo/CINAHL/Dimensions. The Cochrane Database of Systematic Reviews was not included as there was no published Cochrane systematic review/meta-analysis on the subject.

A search strategy was structured with DECS/MeSH descriptors and all listed synonyms, based on the defined population and concept. Additional terms that the authors deemed synonymous or relevant equivalents were also included. The search strategy can be found in Chart 1.

The database's initial search was carried out on 4/19/2021. The initial step of selecting articles by title/abstract was carried out independently by the authors and disagreements were resolved by consensus. Inclusion criteria was: articles that addressed lactation in LGBTIQA+ people. Exclusion criteria was: articles that exclusively addressed lactation in transmasculine people. One article was excluded due to impossibility of access, despite contact by sending an e-mail to the authors<sup>12</sup>.

Afterwards, the reviewers read all the full articles and disagreements were resolved by consensus. The inclusion criteria was: articles that addressed, even if not as their focus, the lactation process in trans women. The exclusion criteria was: articles that did not address, in any way, the lactation process in trans women.

The search in the databases was repeated on 11/19/21. No new articles were included in the review.

A new database search was held on 8/6/2023 and repeated on 9/11/2023, keeping the same indexes and descriptors defined in the first search. Thirteen articles were included at this time and submitted following the same inclusion and exclusion criteria previously used.

Two articles from this new research, Bower-Brown<sup>13</sup> and Achong<sup>14</sup>, the latest one being a series of four case reports, were excluded due to the impossibility of access, despite the attempt to contact both authors by email and through magazines where these articles were published.

A data extraction worksheet was prepared, which underwent dynamic changes due to scarcity of information. Thus, many fields initially thought were modified to allow a compatible analysis with the available material. Data extraction was done independently and a final extraction spreadsheet was assembled together.

The extracted data were: title, journal of publication and impact factor, year of publication,

**Chart 1.** Database search strategy.

(“Milk Secretion” OR “Milk Secretions” OR “Lactation, Prolonged” OR “Lactations, Prolonged” OR “Prolonged Lactation” OR “Prolonged Lactations” OR “Lactation” OR “Breast feeding” OR “Breastfed” OR “Breastfeeding” OR “Breast Fed” OR “Milk Sharing” OR “Sharing, Milk” OR “Breast Feeding, Exclusive” OR “Exclusive Breast Feeding” OR “Breastfeeding, Exclusive” OR “Exclusive Breastfeeding” OR “Wet Nursing” OR “Breast Feeding” OR “Breast Feeding, Exclusive” OR “Breastfeeding” OR “Exclusive Breast Feeding” OR “Feeding, Breast”)

AND

(“Transsexuals” OR “Transgendered Persons” OR “Transgenders” OR “Transsexual Persons” OR “Two-Spirit Persons” OR “Person, Transgender” OR “Persons, Transgender” OR “Transgender Person” OR “Transgenders” OR “Transgender” OR “Transgendered Persons” OR “Person, Transgendered” OR “Persons, Transgendered” OR “Transgendered Person” OR “Two-Spirit Persons” OR “Person, Two-Spirit” OR “Persons, Two-Spirit” OR “Two-Spirit Persons” OR “Two-Spirit Person” OR “Transsexual Persons” OR “Persons, Transsexual” OR “Transsexual Person” OR “Transsexual” OR “Agender” OR “Gender neutral” OR “Non-binary” OR “Nonbinary” OR “Transvestite” OR “Transvestism” OR “Queer” OR “Travesti” OR “Fa’afafine” OR “Hijra”)

Source: Authors.

country of origin of the researchers, type of study, theoretical definition of the population of interest, characteristics of the studied population (age, previous hormone therapy), offered or demanded intervention, health environment and by which health professional the intervention was conducted, intervention characteristics (use of hormones/galactagogues/mechanical stimulation), lactation support interventions, outcomes, challenges and difficulties of the process and criticisms and observations related to the article.

Two new spreadsheets were created for summarizing and analyzing the data: one containing the main characteristics and contributions of each article (Chart 2) and another with greater detail of the four case reports (Chart 3).

There was an attempt to contact the authors of the case reports to request information that might not have been included in the articles, when found to be necessary. We had no response to the requested information.

## Results

Twenty one studies were included in the review (Figure 1). The extracted data and their main contributions to the review are shown in Chart 2.

A notable point about the set of studies included is that most of them originate from Nor-

th American countries, with ten being from the USA and four from Canada. All articles were published from 2018 onwards.

Among the selected articles, five were case reports and one was a conference abstract, whose data are organized in Chart 3 and better analyzed in the text below, subdivided by topics that supported the data extraction.

### Characteristics of the studied population

In the six reported cases, the participants were already in hormone therapy before the lactation induction. Spironolactone, estradiol and progesterone were among the drugs used priorly, but some of them with few or no details about dosages and duration of usage reported. Especially regarding the use of progesterone, there is no clarification on its purpose, whether with the aim of breast development for body modification (although there is no scientific proof of its effect on breast size), or for lactation induction.

The participants of the six reported cases identified themselves as transgender women, with a desire to breastfeed. At the time of the reports, the participants had an age range between 30 and 46, and in one of the cases this data was not revealed.

**Chart 2.** Main features and contributions of the articles included in the review.

Article title and authors	Publication year	Country	Type of study	Main contribution
Case report: Induced lactation in a transgender woman (Reisman & Goldstein) <sup>15</sup>	2018	US	Case report	Case report of a 30-year old transgender woman who wanted to breastfeed her child since her pregnant partner did not have the intention to breastfeed. The authors created a protocol mimicking nonpuerperal lactation induction for cisgender women, lowering estradiol dosage to a very low dose such as in delivery. The patient was able to breastfeed her baby exclusively for six weeks. The case had a nine month follow up, and the patient was still breastfeeding complementing with formula when the baby was 6 months old, when the article was published.
Induced lactation in a transgendered female partner (Sperling & Robinson) <sup>30</sup>	2018	US	Case report (congress abstract)	Poster presentation abstract that mentions the case of a trans woman who breastfed her biological child in tandem with her partner, who delivered the baby.
Trans woman breastfeeds baby (Hamzelou) <sup>21</sup>	2018	not described	News	News about the Reisman and Goldstein's case report. The news article also presents opinions on the matter, including statements that more studies are needed before the practice can be recommended.
Breastfeeding in the transgender; recent advances (Madu) <sup>22</sup>	2018	UK	Opinion article	The article raises concerns and criticisms about the applicability of the protocol used in the Reisman and Goldstein's case report and conducting the practice itself before more studies are done.
A review of breast development in cisgender women and implications for transgender women (Reisman <i>et al.</i> ) <sup>24</sup>	2019	US	Review	Review article focusing on describing the hormonal pathways required for breast development in cisgender women and reviewing the current available literature describing breast growth and breast cancer risk in transgender women. Describes a basic framework of regimens to induce non-puerperal lactation and within their argument regarding the similarity of breast tissue between cisgender and transgender women, states that their case report mimicking this framework was successful in inducing lactation in a trans woman.
Trans* pregnancy and lactation: A literature review from a nursing perspective (García-Acosta <i>et al.</i> ) <sup>25</sup>	2019	Spain	Systematic review	Review article describing pregnancy and lactation care for transgender men and women, as well as barriers in healthcare for this population. It describes the usual hormone therapy used by transgender women and their breast tissue development. The rationale for lactation induction for non-birthing cisgender women is presented, as well as the interventions modified by Reisman and Goldstein for a transgender woman.
Queering lactation: Contributions of queer theory to lactation support for LGBTQIA2S+ individuals and families (Lee) <sup>27</sup>	2019	Canada	Original perspective	Opinion article exploring the perspective of queer theory to support lactation for LGBTQIA+ Individuals and Families. The article examines how queer and feminist theories, despite the tensions between them, can each support a lactation practice outside of binary gender roles. It cites the possibility of inducing lactation for transgender women, as in the Reisman and Goldstein's case report.
Lactation care for transgender and non-binary patients: Empowering clients and avoiding aversives (MacDonald) <sup>6</sup>	2019	Canada	Insights into practice and policy	Insights into the care of transgender and non-binary people focusing on creating care providers undergoing specific training for care in this population and then signaling patients that they have done so, as this could reduce some of the uncertainty and fear that frequently causes these patients to avoid or delay seeking care. It cites briefly the possibility of lactation induction for transgender women, as described by Reisman and Goldstein.

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Article title and authors	Publication year	Country	Type of study	Main contribution
Lactation can be successfully induced in transgender women while maintaining gender-congruent serum hormone levels (Moravek & Pasque) <sup>16</sup>	2019	US	Case report (congress abstract)	Scientific congress abstract of a case report of inducing lactation in a transgender woman without interrupting her gender-congruent hormone therapy. A 34-year-old transgender woman wanting to breastfeed her baby conceived by her cisgender partner used an adapted model from the protocol created by Newman-Goldfarb for inducing lactation for adoptive mothers, without interrupting or significantly reducing her previous hormone therapy with estradiol and spironolactone. Both mothers were able to breastfeed, with a six month follow-up.
Medication and facilitation of transgender women's lactation (Paynter) <sup>23</sup>	2019	Canada	Insights into practice and policy	Opinion article responding to concerns and negative reactions in the media regarding the lactation induction in trans people following the publication of the Reisman and Goldstein's case report. The article provides evidence for the examination of safety concerns raised by the use of drugs for lactation induction and focuses on deconstructing potential biases and prejudices on the matter. The article also discusses the importance of health professional support to provide adequate care and break through stigmas that transgender people face.
ABM clinical protocol #33: Lactation care for lesbian, gay, bisexual, transgender, queer, questioning, plus patients (Ferri <i>et al.</i> ) <sup>1</sup>	2020	US	Clinical protocol	Clinical protocol for reproductive and lactation care for LGBTQIA+ families, suggesting respectful terms and how to create an adequate health care environment for this population. Briefly describes hormonal therapies used for body transformations in the transgender population and discusses possibilities on fertility, lactation and support for LGBTQIA+ families. Regarding the lactation process for trans women, the article suggests interventions such as the case report by Reisman and Goldstein and includes other unreferenced interventions.
Maternal health in the transgender population (Patel & Sweeney) <sup>26</sup>	2020	US	Narrative review	Review article that describes a wide range of care for transgender people regarding fertility, contraception, pregnancy and lactation. The article cites the possibility of inducing lactation for transgender women, describing the case report by Reisman and Goldstein.
Knowledge and practice of induction of lactation in trans women among professionals working in trans health (Trautner <i>et al.</i> ) <sup>3</sup>	2020	US	Cross-sectional study	Cross-sectional study that interviewed participants of the World Professional Association for Transgender Health (WPATH) symposium. Eligible participants had professional experience serving the transgender population. A third of respondents reported having known a trans woman who wanted to induce lactation, and one in five reported knowledge of providers or clinics that were able to help trans women breastfeed. Only one in four respondents reported current knowledge of an appropriate protocol for inducing lactation in trans women.
Lactation induction in a transgender woman wanting to breastfeed: Case report (Wamboldt <i>et al.</i> ) <sup>7</sup>	2021	Canada	Case report	Case report describing lactation induction in a transwoman who wanted to breastfeed her 11-month old baby, who had already evolved from exclusive breastfeeding (from her partner) to solid complementary feeding. Lactation induction was successful for the patient's goals (bond, maintenance of human milk after her partner returned to work, breast development), and the case presented a follow up of nine months. A protocol for lactation induction was created by the authors based on cisgender nonpuerperal women lactation induction.

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**Chart 2.** Main features and contributions of the articles included in the review.

Article title and authors	Publication year	Country	Type of study	Main contribution
Reproductive health in transgender and gender diverse individuals: A narrative review to guide clinical care and international guidelines. (Rodriguez-Wallberg <i>et al.</i> ) <sup>28</sup>	2022	USA	Narrative review	Narrative review that summarizes the current findings in literature on reproductive healthcare issues in transgender people. The study mentions the possibility of inducing lactation in transgender women based on two successfully published case reports that used a combination of estrogen, progesterone, domperidone and breast pumping.
The breast in the transgender woman. Systematic review (Gonzalez Marino) <sup>29</sup>	2022	Venezuela	Systematic review	Systematic review about the technical particularities of the breast in transgender women in use of hormone therapy. The article mentions the possibility of breastfeeding using lactation induction techniques.
Perinatal considerations for care of transgender and nonbinary people: A narrative review. (McCracken <i>et al.</i> ) <sup>33</sup>	2022	USA	Narrative review	Narrative review about pregnancy related care of transgender and nonbinary individuals during the antepartum, intrapartum and postpartum periods. It briefly discusses the benefits and importance of the possibility of breastfeeding for this population.
Chestfeeding and Lactation Care for LGBTQ+ Families (Lesbian, Gay, Bisexual, Transgender, Queer, Plus). (Rosen-Carole and Greenberg) <sup>34</sup>	2022	USA	Book chapter	Book chapter about care on chestfeeding and lactation focusing on the LGBTQ+ population. It mentions the Reisman and Goldstein report as an example of a well succeeded case of lactation induction in a transwoman.
Inducing lactation in a transgender woman without galactogues: a case report. (Elkin <i>et al.</i> ) <sup>18</sup>	2023	USA	Case report (meeting abstract)	Meeting abstract of a case report of a 36 years-old transgender woman wanting to breastfeed her child, carried and delivered by her partner, a transgender man that wished to return to testosterone use shortly after delivery. The protocol involved mimicking physiological levels of estrogen and progesterone during pregnancy and after birth. Galactogues weren't included due to FDA recommendations against domperidone and the patient's concerns of side effects. The patient was able to lactate, but it wasn't described the duration of the follow-up.
Lactation Induction in a Transgender Woman: Macronutrient Analysis and Patient Perspectives (Weimer) <sup>17</sup>	2023	USA	Case report	Case report of a 46 years-old transgender woman who underwent successful induction of lactation in order to breastfeed her infant, who was gestated by her partner. The protocol used included modification of exogenous hormone therapy, use of domperidone as a galactagogue, breast pumping, and ultimately direct breastfeeding as mechanical stimulation. The participant was able to co-feed her infant for the first 4 months of life. The report provided a detailed description and timeline of the lactation induction process, results of the participant's milk analysis showing robust macronutrient content and description of the participant's experience in her own words.
Domperidone (no authors listed) <sup>35</sup>	2023	not described	Drug review	Review describing the usage and effects of domperidone as a galactagogue aiming lactation induction and the increase of milk supply for people wanting to breastfeed. It mentions the cases of Reisman and Goldstein, Weimer and Wamboldt to exemplify cases of lactation induction in transgender women. It provides a thorough analysis of domperidone's excretion through breast ducts and describes the discussion on the established dosage for each result and the side effects during the use and after discontinuing domperidone.

Source: Authors.

**Chart 3.** Description of main characteristics, interventions and outcomes of the included case reports.

Article title	Previous hormone treatment	Context	Hormonal interventions			Intervention by galactagogue	Mechanical intervention	Outcomes
			Estrogen	Progesterone	Anti androgenic			
Case report: Induced lactation in a transgender woman <sup>15</sup>	Prior hormone treatment for six years for body transformation. At the beginning of the interventions*, she was using: - Spironolactone 50 mg po bid; -Estradiol 2 mg po bid; - Micronized progesterone 100 mg po bid	A 30-year-old transgender woman whose partner conceived the child but had no intention of breastfeeding. Therapy started three and a half months before delivery with the intention of being their baby's main food source.	-Time 0*: Estradiol 4 mg/day -Time 1**: Increase to 8 mg/day -Time 2***: Increase to 12 mg/day -Time 3****: Reduction to 0.025mg/day	-Time 0*: Micronized Progesterone 100mg 2x/day -Time 1**: Micronized Progesterone 200 mg/day -Time 2***: Increase to 400 mg/day -Time 3****: Reduction to 100 mg/day	Anti androgenic Spironolactone 50mg twice a day throughout the process	-Time 0*: Introduction of Domperidone 10 mg po tid -Time 1**: Increase to 20 mg po qid	-Time 0*: Breast pump 5 minutes per breast 3x/day -Time 1**: Increase to frequency of 6x/day	-Time 1**: Production of a few drops of milk -Time 3****: Production of eight ounces per day After birth, there is no mention of the volume produced, but it was sufficient for exclusive breastfeeding up to six weeks of age with good development of the child. After this period, breastfeeding was supplemented with milk formula.
Lactation can be successfully induced in transgender women while maintaining gender-congruent serum hormone levels. <sup>16</sup>	Prior hormone treatment for 15 years for body transformation. At the beginning of the interventions, she was using: -Estradiol 6 mg/day -Spironolactone 100mg twice a day	A 34-year-old transgender woman with a cisgender partner who conceived the child, with a desire to co-breastfeed. Therapy started before delivery, at a time not described by the report.	Previous use of 6 mg estradiol/day. Reduced to 2 mg/day five weeks before birth. Increase to 3 mg/day two months after birth due to facial hair growth.	Medroxyprogesterone 1.25mg/day was discontinued five weeks before delivery. It does not report how long it was used, since it does not define a start date for the intervention.	Previous use of spironolactone 100mg twice a day. Reduction to 50 mg twice a day just before delivery. Return to initial dose two months after birth due to facial hair growth.	Domperidone 10 mg po qid introduced one month after the start of the intervention	Pumping started five weeks before delivery, without mentioning pumping technique, frequency or time. She kept pumping after the child was born	Production of two to three ounces of milk every 3 hours just before delivery. After birth, the child was co-breastfed by the two mothers for more than six months.

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**Chart 3.** Description of main characteristics, interventions and outcomes of the included case reports.

Article title	Previous hormone treatment	Context	Hormonal interventions			Intervention by galactagogue	Mechanical intervention	Outcomes
			Estrogen	Progesterone	Anti androgenic			
Induced lactation in a transgender female partner <sup>30</sup>	Prior hormone treatment for 1 year before the intervention. No details about prescription.	Transgender woman with a desire to co-breastfeed her biological child with a cisgender partner who conceived their baby.	Not reported	Not reported	Not reported	Not reported	Co-breastfeeding obtained with satisfaction by the family, without details on volume or time of milk production.	
Lactation induction in a transgender woman wanting to breastfeed: Case report <sup>7</sup>	Prior hormone treatment for 9 years with spironolactone and estradiol for body transformation. At the beginning of the interventions, she was using: - Spironolactone 100mg po bid; - Estradiol 5mg/day - Progesterone 100 mg/day; (started a few months before the initial visit)	A 38-year-old transgender woman with a cisgender partner who was already breastfeeding the couple's 11-month-old biological baby at the beginning of the interventions. Therapy was started with the aim of co-breastfeeding after the partner returned to work with nutritional motivation, for bonding with the child and breast development.	Initially, the patient preferred not to abruptly reduce the estrogen dose, however, she retrospectively reported having tried the abrupt reduction without supervision, without further details described in the text.	-Previous use: Progesterone 100 mg/day -First visit: Increase to 200 mg/day She returned to initial dose after verifying little variation in laboratory tests, but not specifying when it had occurred.	-Started Domperidone 10 mg 3x/day on first visit -After 8 weeks, increased to 30 mg 3x/day due to reduced milk production -After 6 months, 20 mg 3x/day -After 9 months, reported not having used it continuously	-Previous use: Manual pumping 3-4x/day for 5 minutes duration for 4 months -First visit: Guided to use electric pump, however, manual pumping was maintained 3 times during the day and 1 time at night for 5 minutes on each side	Prior to the start of follow-up, it was possible to accumulate a few drops of milk per day after 4 months of manual pumping. After 1 month of follow-up: Production of 3-5 ounces of milk per day. After 6 months: reduction to 1 teaspoon daily	

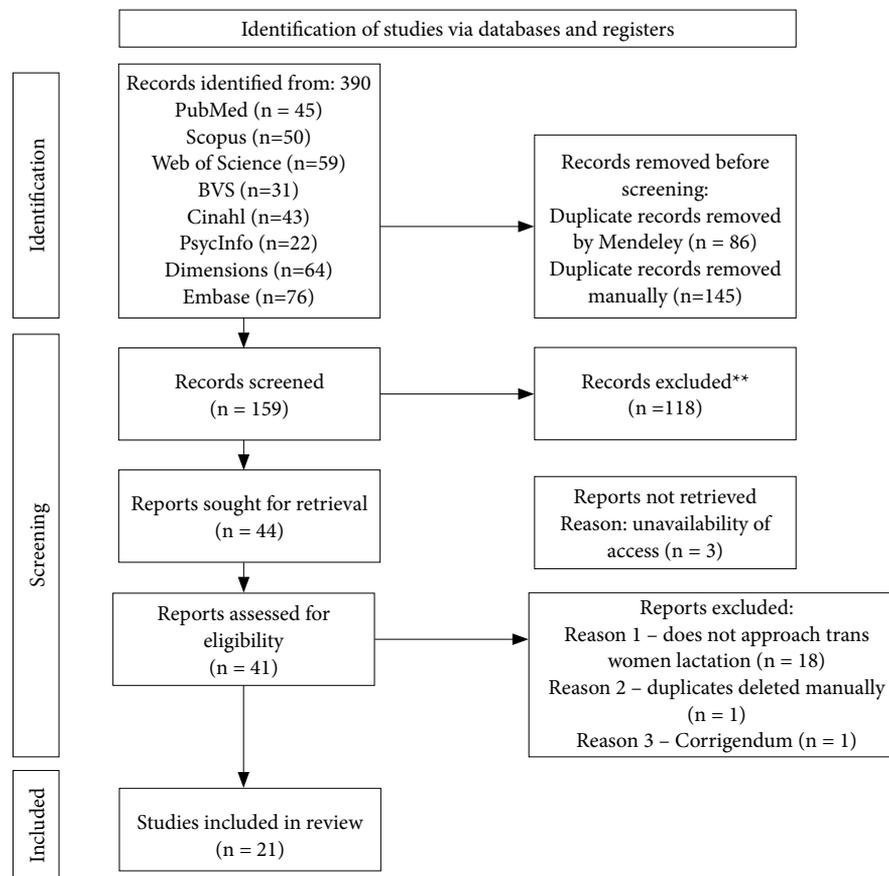
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Article title	Previous hormone treatment	Context	Hormonal interventions		Intervention by galactagogue	Mechanical intervention	Outcomes
			Estrogen	Progesterone			
Lactation Induction in a Transgender Woman: Macronutrient Analysis and Patient Perspectives. <sup>17</sup>	Prior hormone treatment for 19 years with estradiol and for 13 years with spironolactone before orchiectomy. At the beginning of the interventions she was using: - Sublingual estradiol 2mg/day (paused 4 months prior to the report to preserve sperm viability)	A 46 years-old transgender woman with a cisgender woman partner with a due date 4 months in the future that wanted to breastfeed to support her partner during the early postpartum months and as a personal experience as well.	Days before due date (DD): - DD-121: 2mg twice daily; - DD-107: 4mg twice daily; - DD-34 until DD+128: 25mcg/d transdermal	Days before due date (DD): - DD-107: 100mg once daily; - DD-94 until D-34: 200mg once daily	Use of domperidone. Days before due date (DD): - DD-107: 10mg four times daily; - DD-94: 20mg four times daily; - DD+27 until DD+128: 20mg three times daily	6 weeks prior to the due date the protocol initiated a regimen of pumping with a goal of six 15-min sessions per day.	During the first 14 days after delivery the participant produced approximately 150ml per day over five pumping sessions. After this first period, she started directly breastfeeding the infant once to twice daily for 4 months, until she desired to stop breastfeeding, weaned off the domperidone and resumed her previous dose of estradiol. The stored milk supply lasted two more months following the stop of the interventions.
Inducing lactation in a transgender woman without galactagogues: a case report. <sup>18</sup>	Prior hormone treatment without further details of duration or previous regimens. At the beginning of the interventions she was using: - 17-beta estradiol 4mg/day	A 36 years-old transgender woman who was planning on having a child with her partner, a transgender man, who wished to return to testosterone use shortly after delivery. Her goals included sufficient milk production to allow bonding, even if not the sole source of infant nutrition.	Initially, estrogen dose was increased to mimic physiological levels during pregnancy starting 377 days prior to the due date and it was reduced shortly before delivery to mimic physiological levels after birth. No details were described about the dose or the exact duration of usage.	Initially, progesterone was introduced in a dose high enough to mimic physiological levels during pregnancy starting 377 days prior to the due date and it was reduced shortly before delivery to mimic physiological levels after birth. No details were described about the dose or the exact duration of usage.	Not used due to the FDA recommendations against domperidone and due to the patients concerns of side effects with other galactagogues.	The protocol involved physical nipple stimulation using a breast pump. No details about the frequency, duration or when it was initiated were described.	The participant started seeing the first drops of milk 40-50 days after beginning nipple stimulation and the report states that the participant was able to lactate, allowing bonding with her baby. No details were described about the frequency, duration or if there was milk enough for storing.

\* Three and a half months before birth. \*\* One month after starting the interventions. \*\*\* Two months after starting the interventions. \*\*\*\* Three months after starting the interventions (two weeks before birth).

Source: Authors.



**Figure 1.** PRISMA flow diagram.

Source: Authors.

## Hormonal interventions

### Estrogen

The cases used different strategies regarding the use of estrogen. In the case of Reisman and Goldstein<sup>15</sup>, there was an increase in the estradiol dose from 4mg/day to 8mg/day and then 12mg, with an abrupt drop to 0.025mg/day two weeks before the expected date of delivery, maintaining this dose until the submission of the case report. In the case of Moravek and Pasque<sup>16</sup>, there was a decrease in the dose previously used of 6mg/day to 2mg/day five weeks before the expected date of delivery, with an increase to 3mg/day when the baby was two months old, due to maternal complaint of increase of facial hair. In the case of Wamboldt *et al.*<sup>7</sup>, there is mention that the patient abruptly decreased the use of estrogens on her own to increase milk production, not specifying the doses and for how long they were main-

tained. In the case of Weimer<sup>17</sup>, the estradiol dose was increased from 4mg/day to 8mg/day, with an abrupt drop to 0.025mg/day 34 days before the delivery and it was kept constant in 0.025mg/day until 128 days after the delivery. For Elkin<sup>18</sup>, the protocol was initiated 98 days prior to the partner's pregnancy and 377 days before the due date. It started with a non specified increase in the prior estradiol dose to 4mg/day, in order to get close to physiological levels during pregnancy, and an abrupt decrease of the dosage right after the birth, even though the variation and period of time that each dosage was used was not specified.

### Progesterone

The use of progestogen was quite different between the interventions. In the case of Moravek and Pasque<sup>16</sup>, medroxyprogesterone 1.25mg/day was introduced during the child's prenatal period,

without specifying the exact starting date, until five weeks before delivery. In the case of Reisman and Goldstein<sup>15</sup>, there was an increase in the progesterone dose in previous use from 200mg/day to 400mg/day, with a reduction to 100mg/day two weeks before the child's birth. In the case of Wamboldt *et al.*<sup>7</sup>, the patient had recently been using progesterone at a dose of 100mg/day, without specification of time length of this usage. The dose was increased to 200mg/day at the first visit, and then, at some unclear point, reduced again to 100mg/day as there were no changes in serum progesterone levels with this intervention. In the case of Weimer<sup>17</sup>, dose of 100mg/day was introduced at an unspecified point, which was increased to 200mg/day after two weeks and suspended 34 days before the delivery. In the case of Elkin<sup>18</sup>, progesterone was introduced at the start of the protocol, since it wasn't a part of the previous hormone therapy that the participant was on, and right before the birth, it was abruptly decreased, without any description of the timing of the interventions and the dosages in this case.

#### Antiandrogen

Spironolactone was cited as an antiandrogen used in three reports (Moravek and Pasque<sup>16</sup>; Reisman and Goldstein<sup>15</sup>; Wamboldt *et al.*<sup>7</sup>), but with different doses, ranging from 100 to 200 mg per day. In one of the case reports (Moravek and Pasque<sup>16</sup>), spironolactone was reduced to 100mg/day right before the child was born, but after two months, it returned to the previous regimen (200mg/day) due to the growth of facial hair. This did not cause a change in the milk production already established at the time. In the other two cases, there was no change in the previous dose during the entire process. For Weimer<sup>17</sup> and Elkin<sup>18</sup>, the participants had already gone through orchiectomy years before, therefore, they had previously suspended the use of spironolactone as an antiandrogen at some point years previously to the case reports.

#### Hormonal dosages

Hormonal serum measurements of estradiol, progesterone, testosterone, and prolactin were performed in three of the case reports (Moravek and Pasque<sup>16</sup>; Reisman and Goldstein<sup>15</sup>; Wamboldt *et al.*<sup>7</sup>). In the case reported by Weimer<sup>17</sup>, besides these measurements, serum levels of estrone, estriol, and QTc on electrocardiogram in four different moments of the process were also analyzed. In the case reported by Elkin<sup>18</sup>, it was only reported the sequential dosage of 17-beta

estradiol, although the intervals of dosing weren't specified.

#### Mechanical interventions

Mechanical interventions included manual or pump stimulation, generally performed for five minutes on each breast with variation in frequency and start date of interventions among reported cases. Moravek and Pasque<sup>16</sup> does not provide details on the frequency and duration of pumping, and also does not define whether it was done manually or with the assistance of a pump, starting five weeks before the child's birth. Reisman and Goldstein<sup>15</sup> describe initial use of the pump three times a day for five minutes, increasing the frequency to 6 times a day after one month, with no details on the rest of the process. Wamboldt *et al.*<sup>7</sup> reports initiation of manual stimulation prior to case follow-up, three to four times a day for five minutes in each breast. Afterwards, she was instructed to use an electric pump, which irritated the nipple, and then began to perform manual stimulation three times a day and once a night for five minutes on each breast. Weimer<sup>17</sup> reports that the participant started pumping six weeks before the delivery, with a goal of six 15-min sessions per day. The protocol used in the case of Elkin<sup>18</sup> involved nipple stimulation with the use of a breast pump, without specifying frequency, duration or the starting date of the sessions.

#### Interventions by galactagogues

Domperidone, an antiemetic medication commonly used off-label as a galactagogue internationally, was prescribed in four of the reports found (Moravek and Pasque<sup>16</sup>; Reisman and Goldstein<sup>15</sup>; Wamboldt *et al.*<sup>7</sup>; Weimer<sup>17</sup>), with doses ranging from 20 to 90 mg daily, divided into three to four daily doses. This medication is not cleared for use in the US due to FDA concern about its association with cardiac dysfunction when used intravenously. In addition, they do not recommend use as a galactagogue due to unknown risks in breastfeeding<sup>19</sup>. In the abstract from Elkin<sup>18</sup>, domperidone was not used due to FDA recommendations against it. Other galactagogues were also not used due to the participant's concerns about possible collateral effects.

The use of other galactagogues has not been described in any of the reports. No side effects have been reported with the use of domperidone in any of the cases that included it in the protocol used.

## Outcomes

There was production of human milk achieved in all reported cases with variation between the amounts of milk produced and the waiting time between the start of lactation induction and first drops of milk reported. After initiation of breastfeeding, the quantification of production was poorly described, since it wasn't quantified how much each baby ingested in each breastfeeding session. In the Canadian report by Wamboldt *et al.*<sup>7</sup>, it was possible to quantify the maintenance of milk production of one teaspoon per day even six months after the beginning of the interventions, however the form of quantification was not described. Elkin<sup>18</sup> described an increase in the amount of milk produced to about two milliliters of breast milk extracted in each pumping session, one week after decreasing the estradiol and progesterone dosage.

Only in the case of Reisman and Goldstein<sup>15</sup> it was possible to observe that exclusive breastfeeding was obtained (for six weeks). In the others, variables such as both mothers breastfeeding and formula introduction already installed made it difficult to observe this data.

In the case of Weimer<sup>17</sup>, the participant started breastfeeding 14 days after the delivery, once to twice daily, after the gestational parent's breastfeeding was well established. The participant decreased the domperidone to 20mg three times daily but noticed that further dose reductions resulted in a decrease of milk supply. The dose was continued during the duration of her breastfeeding and once per month a sample of 40mL was analyzed. The participant's milk showed values of protein, fat, lactose, and calorie content at or above those of standard term milk.

The authors of the case reports did not respond to emails sent in an attempt to clarify doubts.

The other articles in this review are opinion articles, narrative review, systematic review, news, congress poster, book chapter, drug review, clinical protocol and cross-sectional studies and in its majority, refer to the case of Reisman and Goldstein<sup>15</sup>. The texts contributed to the discussion about difficulties and limitations of access to health care for the trans population and other LGBTIA+ groups.

The cross-sectional study by Trautner *et al.*<sup>3</sup> shows that, despite being answered by professionals with specific practice in the care of the transgender population and 34% had contact with a transfeminine person who had expressed

a desire to induce lactation, only 21% knew of places to help this demand, and only 9% participated directly in this care. Furthermore, although 91% believed that protocols were needed to help induce lactation in transfeminine people, only 27% were familiar with an existing protocol, citing mostly the Mount Sinai/Zil Goldstein case study<sup>15</sup> and the Newman-Goldfarb protocol<sup>20</sup>.

Some of the opinions and new articles on this topic included in the review<sup>21-23</sup> criticize the applicability of the proposed article by Reisman and Goldstein<sup>15</sup>. Some consider lactation in transfeminine people a subject that has not yet been studied and question the practice of induced breast milk regarding its quality and presence of medications, in addition to the impact on the child's development. Some of these articles point out that questioning the support for this demand from the transfeminine population based on these arguments would be questionable and would reinforce inequities and barriers to health care.

The research of Weimer<sup>17</sup> objectified analyzing the characteristics of macronutrients and calories of the milk produced and concluded that transgender women or nonbinary people with breast development from exogenous hormone therapy, when in lactation induction, can produce human milk with adequate caloric content for infant growth and development, and that supplementation may be necessary depending mainly on the volume of milk produced. It reinforces that in the future, further analysis of the human milk produced is recommended for a more detailed assessment of macronutrients as well as the analysis of micronutrients and bioactive factors.

The reviews, clinical protocol, and other opinion articles included<sup>6,24-29</sup> have broader themes and provide brief descriptions of the possibility of inducing lactation in transfeminine people.

Finally, some systematically extracted data were not included in the final tables presented, as most articles did not provide information or the information was not very relevant. Some points to be discussed:

- Only the article by Ferri *et al.*<sup>1</sup> mentions the use of natural galactogogues, citing that herbal galactogogues can be tried, without bringing references.

- Regarding the place and health professional who offered the intervention, the report by Reisman and Goldstein<sup>15</sup> mentions that it was performed in an outpatient setting, the report by Wamboldt *et al.*<sup>7</sup> mentions having been in an endocrinology clinic and the report by Weimer<sup>17</sup> mentions that the management of the lactation

process was delivered by the participant's primary care provider. The study by Trautner *et al.*<sup>3</sup> provides more detailed information.

- Regarding the interventions to support the practice of lactation described, no article brought specific actions for the transfeminine population.

- Regarding the challenges and difficulties of the lactation process described, barriers to access to health care were highlighted, linked to misgendering, prejudice, lack of preparation of professionals and health environments; little support from the family network; difficulty in accessing health rights related to lactation; difficulty obtaining domperidone in the United States; need for formula supplementation. Ferri *et al.*<sup>1</sup> poses a specific potential difficulty for the transfeminine population: augmentation mammoplasty may mask inadequate development of breast tissue or result in pressure atrophy of the remaining tissue. It can also increase the risk of engorgement during induced lactation.

## Discussion

The literature about lactation induction in transgender women provides little evidence-based material to support this demand. The only scientific productions that bring unprecedented data on the subject are case reports.

There is no protocol in the literature with robust scientific evidence to support the process of inducing lactation in women outside the pregnancy-puerperal period<sup>1</sup>. What exists follows a physiological rationale of lactation<sup>1</sup>, as well as the references for the interventions in the case reports found. These studies are referenced indirectly and grouped by Reisman and Goldstein<sup>15</sup> and Wamboldt *et al.*<sup>7</sup>, which do not make clear the correlation between references and interventions, nor whether these were created or modified from base references. Moravek and Pasque<sup>16</sup> directly mentions that their interventions were adapted from the Newman-Goldfarb protocol for adoptive mothers, but also does not make it clear what the proposed adaptations are. Sperling and Robinson<sup>30</sup> does not provide any reference on interventions.

Reisman and Goldstein<sup>15</sup> problematizes that perhaps not all interventions were necessary, and questions whether medication doses were adjusted based on laboratory results or the outcome of interest. It also states that prolactin levels would likely increase with breast pumping regardless of domperidone use.

It is understood that case reports have limitations due to their methodology. Despite this, the four reports included have numerous gaps that make data interpretation and reproducibility difficult. The authors' main considerations are the following:

- Motivation for lactation: Reisman and Goldstein<sup>15</sup>, Wamboldt *et al.*<sup>7</sup>, Elkin<sup>18</sup> and Weimer<sup>17</sup> describe well the motivation for lactation of patients. On the other hand, Moravek and Pasque<sup>16</sup>, Sperling and Robinson<sup>30</sup> only provide information on the desire to co-breastfeed.

- Temporality of the interventions carried out: Reisman and Goldstein<sup>15</sup> and Weimer<sup>17</sup> clearly details the chronology of the interventions. The other articles, on the other hand, bring time references that are difficult to interpret or do not bring data about it.

- Pre-intervention hormone usage: Moravek and Pasque<sup>16</sup>, Elkin<sup>18</sup> and Weimer<sup>17</sup> detail the pre-intervention hormone regimen. Sperling and Robinson<sup>30</sup> do not provide information about it. Reisman and Goldstein<sup>15</sup> and Wamboldt *et al.*<sup>7</sup> mention the previous use of progesterone by patients, without making the objective clear. Specifically in the case of Wamboldt *et al.*<sup>7</sup>, the purpose of previous progesterone use is even more uncertain, as the patient had recently started using it.

- Description of interventions: Sperling and Robinson<sup>30</sup> do not provide information about it. Reisman and Goldstein<sup>15</sup>, Weimer<sup>17</sup>, Moravek and Pasque<sup>16</sup> and Elkin<sup>18</sup> do not specify the milk pumping technique, and the last two also do not provide data on the frequency and duration of this intervention. In the article by Wamboldt *et al.*<sup>7</sup>, the interpretation becomes challenging because the patient has performed interventions different from those proposed by the authors.

- Description of outcomes: considering milk production as the primary outcome of interest, Reisman and Goldstein<sup>15</sup> and Weimer<sup>17</sup> detail the results obtained, quantifying the milk produced until the beginning of breastfeeding and mentioning whether there was exclusive breastfeeding and for how long. Weimer<sup>17</sup> also analyzes the nutritional quality of the milk produced. Moravek and Pasque<sup>16</sup> specifies the amount of milk produced until the start of breastfeeding, but does not mention whether the breastfeeding obtained for 6 months was exclusive for some period. Sperling and Robinson<sup>30</sup> only mentions that co-breastfeeding was obtained with satisfaction by the family. Wamboldt *et al.*<sup>7</sup> quantifies the milk produced, but does not detail how this data was obtained, what would be relevant, since breastfeeding was

already underway. Elkin<sup>18</sup> only estimates the average amount of milk obtained from each pumping session one week after delivery without mentioning for how long the participant has breastfed.

- Follow-up: none of the reports make it clear the duration and form of maintenance of the interventions and if there was a proposal for follow-up.

Some of the references in the present study questioned the composition of induced milk in transfeminine people compared to that of cisgender women and the impact on child development<sup>21,22</sup>. Based on this, these articles recommend that the practice should not be reproduced without further studies. The article by Reisman *et al*<sup>24</sup> mentions two references<sup>31,32</sup> that showed that the breast tissue of trans women after hormone therapy was radiologically and histologically indistinguishable from that of cis women. Paynter<sup>23</sup> discusses possible interferences of hormones and galactagogue on outcomes related to breastfeeding and child health and finds no evidence to support a concern about the use of these medications. Even though Weimer<sup>17</sup> found higher values for all macronutrients and calories compared to a standard term milk, micronutrients and bioactive factors were not analyzed. Future research is necessary to confirm the data and analyze other components.

Breastfeeding is increasingly recognized as a health right, however, mostly linked to cis women, specifically those in the puerperal period<sup>27</sup>. This fact is one of the topics discussed by several of the references found in this review, which highlight the urgency of not only advancing in

studies, but also starting the implementation of basic and inclusive practices in the health care of trans people<sup>1</sup>.

The general lack of knowledge by health professionals about the particularities of the trans population and the scarcity of specific guidelines for the care of this group corroborate for the existence of inequities<sup>3,25</sup>.

## Conclusion

Evidence on lactation induction for transfeminine people is scarce, fragile, and recent. There is also no evidence to support a position contrary to embracing this demand. The non-recommendation of the practice, therefore, can reinforce inequities and barriers to health access for this population, since the same questions and concerns are not applied to the milk and breastfeeding of cis women outside the puerperal period, whose lactation induction protocols are also not based on robust evidence. Further academic debate and studies on the subject should be encouraged, seeking stronger evidence to offer this care in the best possible way, aiming to understand which are the necessary interventions. Searching for the best protocol for lactation induction for the transfeminine people will also be challenging due to the confounding factors with the possible hormonal therapy in use, ideally requiring adequate randomized controlled clinical trials.

There are some limitations on this review: non-inclusion of gray literature, impossibility of accessing three of the articles that should be read in full and a low number of articles found.

## Collaborations

LPG Bertollo, TA Suzuki, LAS Campos contributed to the study design, analysis and interpretation of results, writing and approving the final version. APA Amorim and ACCG Germani participated in the study design, writing and approving the final version. MS Chao and VC Santos contributed to the analysis and interpretation of the results, writing and approving the final version.

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