Scientific Research Publishing

Open Journal of Nursing, 2023, 13, 875-889
https://www.scirp.org/journal/ojn
ISSN Online: 2162-5344
ISSN Print: 2162-5336

# Support from Healthcare Professionals for Couples/Partners Undergoing Assisted Reproductive Technology in Japan: A Literature Review

**Mikio Watanabe, Naohiro Hohashi***

Division of Family Health Care Nursing, Graduate School of Health Sciences, Kobe University, Kobe, Japan
Email: *naohiro@hohashi.org

**How to cite this paper:** Watanabe, M. and Hohashi, N. (2023) Support from Healthcare Professionals for Couples/Partners Undergoing Assisted Reproductive Technology in Japan: A Literature Review. *Open Journal of Nursing*, **13**, 875-889.
https://doi.org/10.4236/ojn.2023.1312058

**Received:** November 27, 2023
**Accepted:** December 18, 2023
**Published:** December 21, 2023



## Abstract

**Background and Purpose:** A growing number of couples/partners have been undergoing assisted reproductive technology (ART) in Japan. The purpose of this study was to clarify the support from healthcare professionals based on the support vectors in the Family Care/Caring Theory proposed by Hohashi (2015) through a literature review. **Methods:** Using Ichushi-Web, we searched for original articles using the keywords "assisted reproductive technology", "infertility", "family", "couple", "nursing", "care", and "support". Thirteen articles suitable for the purpose of this study were subjected to content analysis. Family support was encoded and grouped into subcategories and categories, and classified according to support vectors. **Results:** A total of 21 categories of support from healthcare professionals was extracted. Intervention for family internal environment included seven categories, such as "Nursing professionals stay close to females". Intervention for family system unit included five categories, such as "Nursing professionals adjust couple/partner relationships". Intervention for micro system only included "Nursing professionals provide opportunities for peer support to the couples/partners" and intervention for macro system only included "Nursing professionals encourage medical doctors to relate to females". Intervention for family chrono environment included seven categories, such as "Healthcare professionals resolve female's anxieties". **Conclusion:** The support from healthcare professionals could be organized by the support vectors of Family Care/Caring Theory, but intervention for supra system (culture, religion, etc.) was lacking. Moreover, because most support was directed toward females or couples/partners, male-focused direct and/or indirect support are also needed.

**Keywords**

Assisted Reproductive Technology, Infertility, Family Support, Family Care/Caring Theory, Literature Review

## 1. Introduction

Infertility is a disease of the male or female reproductive system, defined by the failure to achieve pregnancy after 12 or more months of regular unprotected sexual intercourse [1]. In Japan, assisted reproductive technologies (ART) has been covered by the medical insurance scheme since 2022 in order to reduce the financial burden of affected individuals, and this change is expected to increase the number of families undergoing ART in the future. ART in Japan is the term for *in vitro* fertilization-embryo transfer (IVF-ET), intracytoplasmic sperm injection-embryo transfer (ICSI-ET), and frozen-thawed embryo transfer (FTET) [2]. Japan is said to be the world's largest fertility treatment country [3], with 88,362 IVF-ETs, 170,350 ICSI-ETs, and 239,428 FTETs in 2021, and the numbers have been increasing every year. It has been reported that 54% of women receiving ART have indications of mild depressive symptoms at early stages of treatment [4], and economic, psychological, and social problems also exist [5].

The Certified Nurse in Infertility Nursing program was launched in 2003 to certify nursing professionals in the field of ART in Japan, with the aim of providing necessary information and support for self-determination to couples/partners undergoing ART. The program was renamed Certified Nurse in Reproductive Health Care in 2021, with new requirements added for advanced knowledge and skills in the following areas: assessment of fertility based on knowledge of sexual and reproductive functions, disorders, and risk factors; decision-making support for sexual and reproductive health issues; nursing practice and care coordination in order to protect the safety, comfort, and understanding of patients and their families during the examination, treatment, and termination phases; and guidance on fertility preservation and fertility control. Certified Nurses are professionals who have completed a total of 792 hours of curriculum after having accumulated a certain amount of experience and having obtained a national license for nurses. They are responsible for high standards of practice, instruction, and consultation.

However, Certified Nurses in Reproductive Health Care are the fewest among all categories of Certified Nurse, and no Certified Nurses in Reproductive Health Care can be found in six of Japan's 47 prefectures. In Japan, ART clinics are concentrated in urban areas, and nursing professionals at these clinics are few in number, so the total number of Certified Nurses in Reproductive Health Care is also relatively small. The ratio of males to females is 2:177, with the majority women [6], and while the number of families undergoing ART is increasing, a

shortage of Certified Nurse in Reproductive Health Care exists who can provide specialized support for couples/partners undergoing ART.

In our previous preliminary studies [7] [8] [9] [10], numerous studies were conducted on the psychological aspects of ART for wives and husbands, and on marital relationships and changes in these relationships, as well as on the experience of undergoing ART and psychological changes. However, few studies on professional support by Certified Nurses were observed, and no original articles were found. On the other hand, regarding support by nursing professionals, numerous studies have appeared regarding support for families' termination of ART.

The support provided by healthcare professionals should be limited not only to direct care for the couple/partner undergoing ART, but should also take into account the family environment, such as the time span (increased miscarriage rate with aging, and age limit prior to menopause), and stresses brought on by relatives or external ambient factors.

The Concentric Sphere Family Environment Theory (CSFET) proposed by Hohashi (2011) is a theory that also considers the family chrono environment system and family external environment system. It is a middle-range family nursing theory that can holistically view the family environment [11]. In the Family Care/ Caring Theory (FC2T) proposed by Hohashi (2013) as a special theory [12], support is provided through intervention for family internal environment, intervention for family system unit, intervention for family external environment (for micro, macro and supra systems), and intervention for family chrono environment. This categorization of support by vectors of the Family/Family Environment Model will not only assist healthcare professionals in organizing the support they are currently providing, but also to consider support that is presently lacking or new forms of support.

The purpose of this study was to clarify the support provided by healthcare professionals to couples/partners undergoing ART by FC2T support vectors of Family/Family Environment through a literature review.

## 2. Methods

### 2.1. Definitions of Terms

The operational definitions of terms were as follows.

• ART: *in vitro* fertilization/embryo transfer, intra-cytoplasmic sperm injection, and frozen embryo/thawing/transfer.

• infertility treatment: from the diagnosis of infertility to conception through ART and delivery.

• family: a unit/organization as a system of the OR operation (logical operation) of individuals, that is, living people, having the cognition of belonging by other constituent member(s) [13].

• couple/partner: combination of two people (husband and wife, engaged couple, lovers, etc./spouse or equivalent [13].

• supra system: the outer frame that creates the family environment system, which is directly or indirectly related to other family environments systems, and encompasses the family environment in its entirety [13].

• macro system: family members' sphere of daily activities that is distant from the family system unit, based on comprehensive physical/objective and psychological/subjective assessments [13].

• micro system: a familiar area in the neighborhood of the family system unit, based on comprehensive physical/objective and psychological/subjective assessments [13].

• family external environment system: the family environment system outside of the family system unit (supra system, macro system, and micro system) [13].

• family internal environment system: the family environment system that exists within the family system unit, which is the area within the family system unit where individual family members interact with each other [13].

• family chrono environment system: a concept to indicate the process of temporal change and transformation of the family internal environment system, family external environment system and family system unit in a time frame from the past to the future [13].

• family system unit: another term for family to clarify that the family is a system and a unit [13].

### 2.2. Literature Collection Method

Ichushi-Web, a database of medical literature, was utilized. The database was confined to Japanese sources because the results may differ due to differences in religious and cultural backgrounds. Also due to the small number of studies, the publication year of the papers was not limited. The key words used in the search included ((((assisted reproductive technology/TH or ART/AL)) or ((infertility/TH or infertility/AL)) or (infertility treatment/AL)) and (((family/TH or family/AL)) or (couple/AL)) and (((nursing/TH or nursing/AL)) or (care/AL) or (support/AL))) and (PT = original article). From the literature of all years in the database, 254 original articles were retrieved (retrieved on March 21, 2022). We narrowed these references down to 74 articles by reading the titles and abstracts, and then carefully read the 74 articles. Thirteen articles [14]-[26] were included in the analysis based on the inclusion criterion that the study results described support to couples/partners undergoing ART by healthcare professionals.

### 2.3. Data Analysis

In order to systematically and comprehensively identify the support from healthcare professionals to couples/partners undergoing ART, we analyzed what healthcare professionals were doing or wanted to do. Directed content analysis [27] based on FC2T support vectors of Family/Family Environment was performed on the results of the articles [28], with the flow of analysis as follows: 1) the con-

tents of the support from health professionals to the couple/partner were extracted, and were divided into small, meaningful units, or codes; 2) the codes were classified by focusing on similarities and differences, and codes that were found to be conceptually similar were grouped into more abstract concepts termed subcategories; 3) the subcategories were grouped to create categories and abstraction levels were heightened; and 4) categories were classified into FC2T support vectors of Family/Family Environment. This method was adopted for three reasons: 1) to analyze the support holistically, including the family internal environment system of couples/partners; 2) to analyze the family chrono environment system, such as anxiety and hope resulting from the decline in fertility due to aging; and 3) to clarify which healthcare professionals are assisting how and where.

In the subcategorization and categorization, category names underwent repeated reviews until two researchers were in accord on category terminology. To ensure trustworthiness, seven experts in family nursing and qualitative research supervised the process.

### 2.4. Ethical Consideration

Because this study did not involve human or animal subjects, approval by an institutional review board was not required, but adherence was devoted to research ethics. Copyright laws were strictly observed for reference materials and the sources were clearly indicated. The content of the research was accurately read and care was taken so as to avoid contradicting the authors' intentions.

## 3. Results

Regarding support from healthcare professionals to couples/partners undergoing ART, a total of 21 categories and 35 subcategories were extracted (**Table 1**, **Figure 1**). Support for supra system could not be extracted. Out of the 13 references, one was quantitative [26], 10 were qualitative [15] [16] [17] [18] [20]-[25], and two were mixed studies [14] [19]. In the following, the categories are enclosed in double quotation marks. Healthcare professionals include nursing professionals, physicians, clinical psychologists and counselors, embryologists, and others.

### 3.1. Intervention for Family Internal Environment

Intervention for family internal environment had 7 categories and 16 subcategories. The 7 categories are: "Nursing professionals make it easy for females to talk about their feelings during ART", "Healthcare professionals are attuned to females' feelings", "Nursing professionals provide information on ART that is appropriate for females", "Nursing professionals provide holistic support to females", "Nursing professionals encourage females to clarify their purpose for undergoing ART", "Nursing professionals build trusting relationships with females" and "Nursing professionals stay close to females".

### 3.2. Intervention for Family System Unit

Intervention for family system unit had 5 categories and 8 subcategories. The 5 categories are "Healthcare professionals are engaged in consulting services to couples/partners", "Nursing professionals adjust couple/partner relationships", "Nursing professionals support the decision-making process by couples/partners", "Healthcare professionals provide satisfactory medical care to the couples/partners" and "Nursing professionals provide financial support to the couples/partners".

**Table 1.** Types of support provided by healthcare professionals for couples/partners undergoing ART.

| Support vector | Category | Subcategory | Reference No. |
|---|---|---|---|
| Int | Nursing professionals make it easy for females to talk about their feelings during ART | Nursing professionals ask females about the internal and external current status of the couples/partners | 14 |
| | | Nursing professionals create opportunities for females to talk about their experiences of ART | 14 |
| | Healthcare professionals are attuned to females' feelings | Nursing professionals actively listen to females' narratives | 14, 18, 20 |
| | | Nursing professionals complement what females have overcome through ART | 14, 15, 18 |
| | | Healthcare professionals talk to females in a manner attuned to their feelings | 19, 21, 22 |
| | | Nursing professionals encourage females to express their feelings | 14, 15, 18 |
| | | Nursing professionals empathize with females' feelings during their ART | 14, 18, 20, 22, 24 |
| | Nursing professionals provide information on ART that is appropriate for females | Nursing professionals provide ART information that females are seeking | 14, 15, 18, 25 |
| | | Nursing professionals communicate their suggestions as professionals to females | 14, 15 |
| | Nursing professionals provide holistic support to females | Nursing professionals provide holistic support to females | 18 |
| | | Nursing professionals provide health support for females apart from infertility | 18 |
| | | Nursing professionals provide mental health support to females undergoing ART | 15, 18 |
| | Nursing professionals encourage females to clarify their purpose for undergoing ART | Nursing professionals encourage females to clarify the reason for undergoing ART | 15, 18 |
| | | Nursing professionals encourage females to discuss the continuation of ART among couples/partners | 15, 18 |
| | Nursing professionals build trusting relationships with females | Nursing professionals build trusting relationships with females | 16, 18 |
| | Nursing professionals stay close to females | Nursing professionals maintain close contacts with the females | 22 |

**Continued**

| | | | | |
|---|---|---|---|---|
| Fsu | | Healthcare professionals are engaged in consulting services to couples/partners | Healthcare professionals provide counseling to couples/partners | 20, 26 |
| | | | Nursing professionals inform couples/partners about counseling services for ART | 15, 18, 26 |
| | | Nursing professionals adjust couple/partner relationships | Nursing professionals adjust couple/partner relationships | 18 |
| | | Nursing professionals support the decision-making process by couples/partners | Nursing professionals help couples/partners understand the current status of ART | 15, 16, 18 |
| | | | Nursing professionals show empathetic understanding of the decision-making process of couples/partners undergoing ART | 14 |
| | | | Nursing professionals support the decision-making process of females undergoing ART | 18 |
| | | Healthcare professionals provide satisfactory medical care to the couples/partners | Healthcare professionals provide satisfactory medical care to couples undergoing ART | 15, 17, 18 |
| | | Nursing professionals provide financial support to the couples/partners | Nursing professionals provide financial support to couples/partners undergoing ART | 18 |
| Ext | Mic | Nursing professionals provide opportunities for peer support to the couples/partners | Nursing professionals provide opportunities for peer support to couples/partners | 16 |
| | Mac | Nursing professionals encourage medical doctors to relate to females | Nursing professionals encourage medical doctors to relate to females | 18 |
| Chr | | Nursing professionals encourage females to set and evaluate goals for ART | Nursing professionals discuss future ART goals with females | 15, 18 |
| | | | Nursing professionals encourage females to reflect on and self-evaluate their ART experience | 14, 18 |
| | | Healthcare professionals resolve female's anxieties | Healthcare professionals resolve females' anxieties | 14, 18, 23 |
| | | Nursing professionals respect females' demands | Nursing professionals respect females' demands | 18 |
| | | Nursing professionals facilitate the female's process of becoming a mother | Nursing professionals encourage females to develop their identity as mothers | 14, 16 |
| | | Nursing professionals help to prevent complications of pregnancy | Nursing professionals help to prevent complications during pregnancy | 16 |
| | | Nursing professionals continuously engage with females | Nursing professionals continue to engage with females on the impact of ART | 15 |
| | | Healthcare professionals arrange time to provide personalized attention to the females | Nursing professionals have time to support females | 20, 22 |
| | | | Healthcare professionals time their visits to coincide with the females' ovulation | 21 |

Note: Int = family internal environment; Fsu = family system unit; Ext = family external environment; Mic = micro system; Mac = macro system; Chr = family chrono environment system.

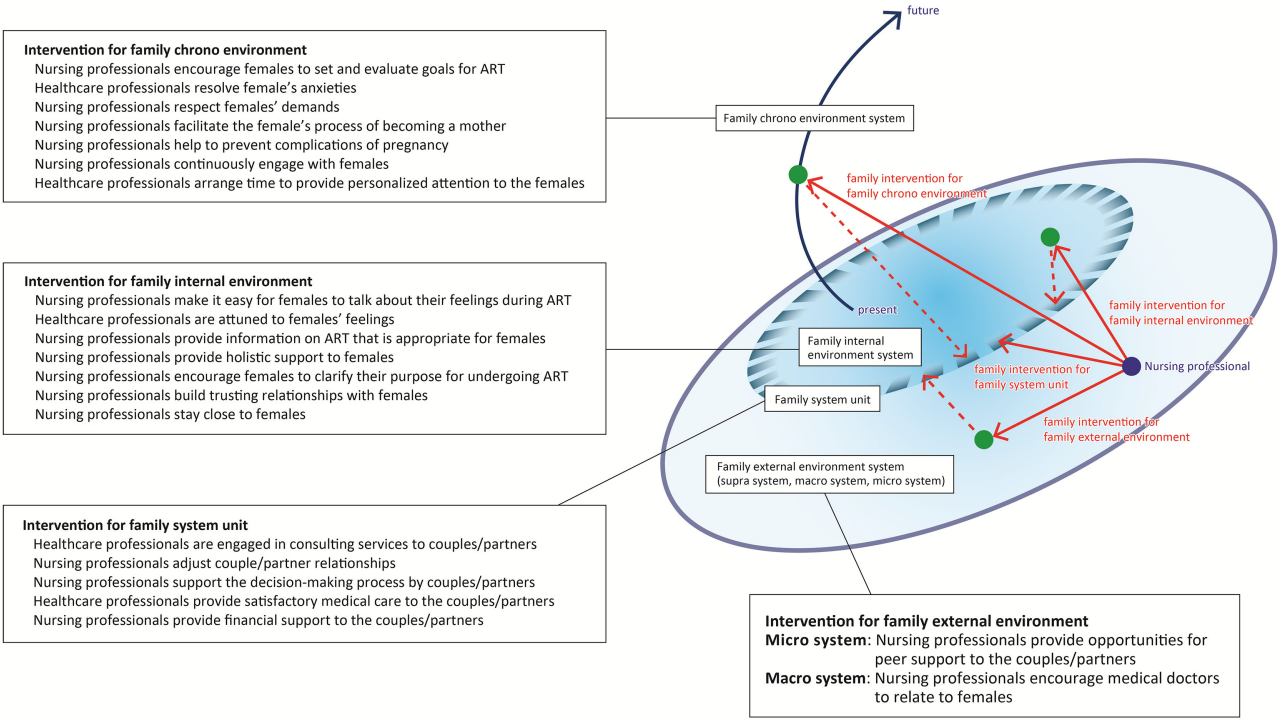


**Figure 1.** Categories classified according to support vectors of Family Care/Caring Theory.

### 3.3. Intervention for Family External Environment

For intervention for family external environment, support for micro system had one category and one subcategory. The one category was "Nursing professionals provide opportunities for peer support to the couples/partners". Support for macro system had one category and one subcategory. The one category was "Nursing professionals encourage medical doctors to relate to females".

### 3.4. Intervention for Family Chrono Environment

Intervention for family chrono environment had 7 categories and 9 subcategories. The 7 categories are: "Nursing professionals encourage females to set and evaluate goals for ART", "Healthcare professionals resolve female's anxieties", "Nursing professionals respect females' demands", "Nursing professionals facilitate the female's process of becoming a mother", "Nursing professionals help to prevent complications of pregnancy", "Nursing professionals continuously engage with females" and "Healthcare professionals arrange time to provide personalized attention to the females".

## 4. Discussion

### 4.1. Current Status and Issues of Support for Couples/Partners Undergoing ART

Healthcare professionals provide most support to couples/partners undergoing ART to females only, and less support to couples/partners. The reason for the disproportionate support for females may be that females are the main target of

ART, such as ART in accordance with their hormonal cycles and hospital visits after pregnancy. It has also been reported that prolonged ART tends to aggravate the marital relationship [29]. Consequently it is believed the reason for this is that females want their infertility and fertility treatment problems to be understood, which in turn may cause such feelings as anger and unhappiness, and that couples/partners find it difficult to understand their mutual feelings or engage in constructive discussions.

Males on ART are concerned and worried not only about the mental and physical burden on their couple/partners, but also feel anguish about inability to have children in cases where ART is prolonged [30]. However, in terms of coping behaviors for stress among couples/partners on ART, males are less likely than females to engage in behavior for coping with stress [31]. On the other hand, as for the support from nursing professionals to males, although Certified Nurses in Reproductive Health Care encounter male infertility patients with high frequency, most of their consultations are received from females, with male infertility patients comparatively few [32]. Furthermore, 10.9% of Certified Nurse in Reproductive Health Care were aware of the difficulty of talking to male clients, and 54.0% of them stated they lacked confidence in their ability to deal with male clients.

For these reasons, males on ART are less likely to engage in coping behaviors and may be more reluctant to seek help, which may lead to stress and emotional distress. It was also possible that while healthcare professionals do have opportunities to meet males on ART, they are unable to provide effective support due to lack of opportunities to consult with them or lack of confidence in their responses. Cooperation between couples/partners is essential for females on ART to have children, and males are important for females to share their anxieties. The inability of males to cope with the stress of undergoing ART and to have constructive discussions with females not only impacts negatively on family functioning, but also leads to the dissolution of the couple/partner relationship. Consequently we believe that it is necessary to enhance support for males in the future. However, because this study was confined to a literature review, it is possible that the reason for the lack of support for males is that few studies exist targeting males exclusively. In the future, it will be necessary to consider direct and indirect support for males by conducting male-oriented studies.

### 4.2. Support by Vectors of Family/Family Environment

With regard to intervention for family external environment, studies involving support for micro system and support for macro system were few, with only one category each. No study was found dealing with support for supra system.

In the support for micro system, peer support was found, but support from healthcare professionals to relatives of the closest couple/partner was lacking. One reason for this may be that females who are infertile suffer from feeling of being unable to tell their parents out of an inferiority complex, as well as the

couple/partner's beliefs [33], such as not wanting to make their relatives suffer because of infertility. In addition, although advances in ART have improved rates of pregnancies, the rates of miscarriage have increased due to the effects of later age of marriages and childbearing. Therefore, while pregnancies resulting from ART have the hope of fulfilling the family demands to have a child, the higher risks of miscarriage and premature delivery during the course of pregnancy have led to repeated positive and negative feelings over the course of each treatment cycle [34]. This is also related to the sexuality of the couple/partner. Due to an inferiority complex brought on by infertility, and the fears of despair and demands to have a child, it is thought that it is difficult to inform the relatives of both couples/partners that they are undergoing ART or that they are pregnant through ART. Therefore, healthcare professionals are unable to provide indirect support to the couple/partner by means of providing support to their relatives as well.

In Japan, the value that giving birth to a child is "natural" for females has been decreasing due to increased cases of what is termed "harassment". However, the expectations of relatives toward a baby's birth can put pressure on the couple/partner, causing negative feelings. On the other hand, words of encouragement from relatives can be a source of support and strength for the couple/partner. Therefore belief support [33] for the couple/partner who understands the relationship with relatives is necessary.

Support from those who have never experienced infertility has different meanings depending on how the couple/partner perceives it [35], and it is possible that even the concerns voiced by a close friend who has never experienced infertility would be negatively perceived. In addition, it has been found that infertile females perceive support from other individuals who had struggled with infertility as either negative or positive, depending on the level of fertility [35]. On the other hand, infertile females tend to perceive their friends' words, acts, and attitudes as positive and supportive [36], making those having experienced ART an important source of support for couples/partners who are unable to confide in others. Therefore, it is important for healthcare professionals to understand relationships between the couple/partner and their friends, and to consider whether they can be supportive.

Problems and difficulties vary among couples/partners, as fertility such as age and the stage of ART differ between individuals. There are differences in how support is received even from the same infertile female, and there are limitations to the effectiveness of peer support that can be expected [34]. Therefore, it is necessary to holistically assess the environment and situation of the couple/partner; provide the kind of support that the couple/partner want; and implement support adapted to the couples/partner's demands.

In support for the macro system, nursing professionals served as intermediaries between medical doctors and the couples/partners, but did not provide support for the work environment of couples/partners or linkage to other healthcare

facilities. Support for the work environment is difficult to approach from the standpoint of healthcare professionals because of the relationship with social policy. However, in the 2020 survey [37], 39.2% of respondents expect "the development of a work environment that facilitates both infertility treatment and work", and "the work environment is not conducive to balancing work with infertility treatment". In April 2022, the Japanese Ministry of Health, Labour and Welfare revised the Act on Advancement of Measures to Support Raising Next-Generation Children, and established a new certification system for companies that offer initiatives to balance infertility treatment and work [38], so it can be expected that the workplace environment will gradually improve.

The reason for the lack of support for connecting to other medical facilities or medical professionals is that facilities exist with infertility counselors, IVF coordinators, and clinical psychologists within the facility, so there may be no need to connect to other facilities. In addition, medical doctors may be consulting with other healthcare professionals within the facility. Therefore, it will be necessary to expand the search to include other literature databases, in order to investigate how other healthcare professionals intervene with the couple/partner.

One possible reason for the lack of support for the supra system is that many Japanese are said to be non-religious. It is also possible that the authors of the paper were themselves non-religious and were unaware that any aspects related to religion might provide effective support by the nursing profession. However, in studies of Japanese who undergo ART, prayers directed to a transcendent being, such as God or Buddha [22], or words such as "to receive a child from a transcendent being" [39] are often used, suggesting the influence of transcendent existence. In addition, couples/partners undergoing ART have the belief that they can have children, do not consider terminating the treatment, and continue treatment with pregnancy and childbirth as the ultimate goal, as such finding meaning in their lives as couples/partners and family members solely through the birth of their children [33]. Hohashi defines family spirituality as "a set of core beliefs of the family system unit that cognize the meaning of the existence of the family system unit in a transcendental dimension" [40], and the family demands to have a child is a form of family spirituality that underscores the meaning of the existence of the couple/partner and family. Accepting the physical burden and continuing *in vitro* fertilization-embryo transfer (IVF-ET) is the only way to positively present one's way of being to the male and family [41], and the anguish of not having children may unsettle the meaning of existence of the couple/partner, affecting family adaptation, family self-actualization, and family well-being. These findings suggest that couple/partners may need to consider belief support such as belief conversion [33] and spirituality support [41].

### 4.3. Limitations of the Study

This study was a literature review limited solely to Japanese-language articles, which has limitations of generalizing the research findings. Support from healthcare professionals for couples/partners undergoing ART may well vary depend-

ing on the culture, religious beliefs, insurance system, and demographic composition of the particular country or region. Further study will be needed to investigate and compare the situation in Japan with other countries and regions. In addition, because the literature review included a mixture of quantitative and qualitative studies, the abstraction level of categories and subcategories varied when creating categories and subcategories, resulting in a large number of categories. The literature review included numerous studies in which the targets were females or couples/partners, as opposed to only a small number of studies focusing on males.

## 5. Conclusion

Support from healthcare professionals to couples/partners undergoing ART could be systematically organized according to the support vectors of the Family/Family Environment Model of Family Care Caring Theory. Furthermore, there was no intervention for the supra system. In Japan, where many people are said to be non-religious, it is essential to consider support that takes into account the diversity among couples/partners, such as culture, religion, spirituality, and national and regional characteristics. Because much of the support from healthcare professionals is directed toward females or couples/partners, it will be necessary to consider direct and indirect support exclusively for males in the future.

## Acknowledgements

We would like to express our deep appreciation to our laboratory members for their discussions in the data analysis.

## Funding Sources

This research was funded in part by a Grant-in-Aid for Scientific Research (B) from the Japan Society for the Promotion of Science (JSPS) in Japan (Grant Number: JP22H03400).

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

[1] World Health Organization (WHO) (2023) Infertility. https://www.who.int/news-room/fact-sheets/detail/infertility

[2] Japan Society for Reproductive Medicine. http://www.jsrm.or.jp/document/funinshou_qa11.pdf

[3] Japanese Society of Fertility Nursing (2023) Reproductive Nursing Guidebook. 1st Edition, Igaku-Shoin, Tokyo.

[4] Kato, T., Sampei, M., Saito, K., Morisaki, N. and Urayama, K.Y. (2021) Depressive Symptoms, Anxiety, and Quality of Life of Japanese Women at Initiation of ART Treatment. *Scientific Reports*, **11**, Article No. 7538.

https://doi.org/10.1038/s41598-021-87057-6

[5] Takahata, K., Kato, T., Sampei, M., Saito, K., Morisaki, N. and Urayama, K. (2023) Stress Experienced by Women in the Early Stage of Assisted Reproductive Technology Treatment: Mixed Methods Research. *Journal of Fertilization and Implantation*, **40**, 232-245.

[6] Japanese Nursing Association (JNA) (2023) Certified Nurse. https://www.nurse.or.jp/nursing/qualification/vision/cn/index.html

[7] Watanabe, M. and Hohashi, N. (2021) A Literature Review of Influencing Factors of Family Symptoms/Signs of Families Unsuccessful in Having Offspring, Which Have Been Receiving Assisted Reproduction Treatment. *Proceedings of the* 28*th Annual Conference of Japanese Association for Research in Family Nursing*, Tokyo, 2-3 October 2021, 76.

[8] Watanabe, M. and Hohashi, N. (2021) A Literature Review of Family Demands in Families Receiving Assisted Reproduction Treatment. *Proceedings of the* 28*th Annual Conference of Japanese Association for Research in Family Nursing*, Tokyo, 2-3 October 2021, 104.

[9] Watanabe, M. and Hohashi, N. (2022) Literature Review on the Demands of Couples/Partners with Unrealized Desire for Offspring (Family Symptoms/Signs) Who Are Recipients of Assisted Reproductive Technology. *Proceedings of the* 29*th Annual Conference of Japanese Association for Research in Family Nursing*, Fukuoka, 10 September 2022, 127.

[10] Watanabe, M. and Hohashi, N. (2022) Support from Healthcare Professionals for Couples/Partners Undergoing Assisted Reproductive Technology in Japan: A Literature Review. *Proceedings of the* 2*nd International Allied Health Student Conference* (*IAHSC*), Jawa Barat, 15 September 2022, 31.

[11] Hohashi, N. and Honda, J. (2011) Development of the Concentric Sphere Family Environment Model and Companion Tools for Culturally Congruent Family Assessment. *Journal of Transcultural Nursing*, **22**, 350-361. https://doi.org/10.1177/1043659611414200

[12] Hohashi, N. and Honda, J. (2015) Concept Development and Implementation of Family Care/Caring Theory in Concentric Sphere Family Environment Theory. *Open Journal of Nursing*, **5**, 749-757. https://doi.org/10.4236/ojn.2015.59078

[13] Hohashi, N. (2023) Understanding Family Health Care Nursing through Applicable Terminology: Concentric Sphere Family Environment Theory (Ver. 3.4). 1st Edition, Editex, Kanagawa.

[14] Maehara, K., Sakajo, A., Iwata, H. and Mori, E. (2020) A Study on Nursing Interventions Aiming to Support the Review and Integration of the Experiences of Infertility and/or Treatment for Pregnant Women following Assisted Reproductive Technology. *Journal of Japanese Society of Fertility Nursing*, **17**, 5-14.

[15] Mio, A., Sato, M. and Komatsu, M. (2020) Support for Women Who Decide to Discontinue Fertility Treatment, and Associated Nursing Practices and Challenges. *Japanese Journal of Maternal Health*, **61**, 50-58.

[16] Matsuyama, K. and Hattori, R. (2017) Practice of Support Program during the Gestation Period Aiming to Encourage Post-Fertility Treatment Primiparas to Obtain Mother Roles. *Journal of Gifu College of Nursing*, **17**, 3-15.

[17] Yamamoto, C., Ito, Y., Fujita, W., Okawa, K., Nakaya, S. and Sagawa, T. (2018) Emotions of Young Females Diagnosed with Polycystic Ovarian Syndrome (PCOS). *Japanese Journal of Maternal Health*, **59**, 355-364.

[18] Nukazuka, A. (2016) Nursing Interventions for Infertile Women during the Process

of Deciding to End Fertility Treatment: Investigation into "Factors Related to Women's Decisions to End Fertility Treatment" and "Nursing Care for the Process of Ending Fertility Treatment". *Journal of Japanese Society of Fertility Nursing*, **13**, 5-12.

[19] Sugai, T. and Saito, M. (2015) Study on Necessity of Psychological Support to Both Husbands and Wives Undergoing Infertility Treatment: In Particular, Psychological Support to Husbands. *Journal of Reproductive Psychology*, **1**, 72-76.

[20] Sakiyama, T. (2015) Women's Needs Focused on Nursing Care in Early Pregnancy after Undergoing Assisted Reproductive Technology. *Japanese Journal of Maternal Health*, **56**, 349-358.

[21] Sakiyama, T. and Muramoto, J. (2013) Understanding the Psychology of Rural Japanese Women Undergoing Fertility Treatment. *Journal of Japanese Society of Fertility Nursing*, **10**, 5-12.

[22] Tamaue, M. (2012) Study on the Resilience of Women Who Experienced Miscarriage after Infertility Treatment. *Japanese Journal of Maternal Health*, **53**, 55-64.

[23] Jitsuzaki, M. (2011) Factors Involved in Deciding Whether to Continue Infertility Treatment: A Qualitative Investigation of Women Undergoing Long-Term Treatment. *Journal of Japanese Society of Fertility Nursing*, **8**, 33-39.

[24] Arai, H., Sakamoto, S., Kunikiyo, K., Tokiwa, Y. and Nakajima, K. (2011) Understanding the Infertility Experience of Women Who Became Pregnant and Delivered a Child after Infertility Treatment. *Journal of Japanese Society of Fertility Nursing*, **8**, 23-31.

[25] Sakiyama, T. (2011) Care Needs at Pregnancy Period That Women Who Got Pregnant via Infertility Treatment. *Journal of Japanese Society of Fertility Nursing*, **8**, 5-12.

[26] Niino, Y. and Okai, T. (2008) A Study for Support of Infertility Patients (the Second Report): Infertility Patient Characteristics and Necessary Support according to Questionnaire and Free Answer Survey. *Japanese Journal of Maternal Health*, **49**, 145-151.

[27] Hsieh, H.F. and Shannon, S.E. (2005) Three Approaches to Qualitative Content Analysis. *Qualitative Health Research*, **15**, 1277-1288. https://doi.org/10.1177/1049732305276687

[28] Elo, S. and Kyngäs, H. (2008) The Qualitative Content Analysis Process. *Journal of Advanced Nursing*, **62**, 107-115. https://doi.org/10.1111/j.1365-2648.2007.04569.x

[29] Mori, E., Origuchi, K., Endo, K. and Misumi, J. (1999) Marital Relationship of Husbands and Wives during Sterility Treatment in Japan: From Comparison with Marital Relationship of Pregnant Women and the Husbands. *Japanese Journal of Maternal Health*, **40**, 168-175.

[30] Hayashitani, H. and Suzui, E. (2010) Experiences and Psychology of Husbands Treated for Infertility: From Interview Surveys with Husbands. *Japanese Journal of Infertility Counseling*, **9**, 91-96.

[31] Chen, D. and Mori, E. (2005) Relationship between Coping Strategies and Marital Adjustment in Couples Undergoing Treatment for Infertility. *Journal of Japanese Society of Infertility Nursing*, **2**, 4-11.

[32] Yumura, Y. (2016) Research Study on Testing of and Treatment for Male Infertility in Japan, FY 2014. http://www.j-andrology.org/news/web2017118.pdf

[33] Hohashi, N. (2023) Understanding Family Health Care Nursing through Applicable Terminology: Family Belief Systems Theory (Ver. 1.1). 1st Edition, Editex, Kanagawa.

[34] Awai, K. and Naitoh, N. (2009) Study of Change of Feelings and Beliefs of Sterile

Women through Their Narratives. *Nursing Journal of Kagawa University*, **13**, 55-65.

[35] Akizuki, Y., Takahashi, M., Saitou, T. and Kai, I. (2004) A Qualitative Study on the Negative Support Experienced by Women Undergoing Infertility Therapy from Their Social Network Members. *Japanese Journal of Maternal Health*, **45**, 126-135.

[36] Akizuki, Y. and Kai, I. (2020) Source-Specific Effects of Negative Social Interactions and Positive Social Interactions on Depression in Infertile Japanese Women. *Journal of Japanese Society of Psychosomatic Obstetrics and Gynecology*, **25**, 103-114.

[37] Nomura Research Institute (NRI) (2021) Survey Research Report on Actual Conditions of Infertility Treatment during FY 2020. https://www.nri.com/-/media/Corporate/jp/Files/PDF/knowledge/report/mcs/2021/0408.pdf?la=ja-JP&hash=A6B75461B5B0CDE8FEDCDBC6BE4578514F8235FA

[38] Children and Families Agency Japan (2023) Measures to Support Raising Next-Generation Children. https://www.cfa.go.jp/policies/shoushika/jisedaishien/

[39] Habuta, C., Izumi, M. and Kabeyama, K. (2011) The Examination of the Experience of Women who Have Become Pregnant through ART (Assisted Reproductive Technology). *Japanese Journal of Maternal Health*, **52**, 256-262.

[40] Hohashi, N. (2023) Understanding Family Health Care Nursing through Applicable Terminology: Family Transcendence Theory (Ver. 2.1). 1st Edition, Editex, Kanagawa.

[41] Kato, K., Yokoo, K. and Nakagomi, S. (2005) Meaning of Repeated *in-vitro* Fertilization and Embryo Transfer. *Journal of Japan Academy of Midwifery*, **19**, 19-29. https://doi.org/10.3418/jjam.19.1_19