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ORIGINAL ARTICLE

Interprofessional team approach to infertility treatment in Japan

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Abstract
Purpose At present, a team approach involving gynecologists, nurses, embryologists, and the other professionals is considered necessary to provide successful infertility treatment. First, we documented which professionals were in charge during various phases of infertility treatment. Second, clinical staff and patients were surveyed regarding their expectations regarding which of these professionals should contribute during examination, during treatment and after treatment for infertility.
Methods We surveyed the actual situation perceived by staff as well as the desired situation for staff and patients in relation to 21 procedures related to infertility treatment. We distributed 781 questionnaires to staff and patients at 86 facilities. Of 380 returned by mail, we analyzed 128 responses from staff who worked with four types of professionals or specialists, i.e., medical doctors, nurses, embryologists, and medical clerks, and 46 from patients who consulted these professionals during their treatment.
Results Most staff recognized 5 of 15 procedures before and after treatment as being conducted by medical doctors alone. However, explanation and consultation regarding the methods and schedule were mainly performed with an interprofessional team approach. Expectations regarding professionals in charge differed between staff and patients. A team approach including infertility counselors and medical clerks was utilized and considered desirable during counseling.
Conclusions An effective team approach should be established for each step of infertility treatment.

Keywords Infertility treatment · Interdisciplinary · Interprofessional team approach · Multidisciplinary · Transdisciplinary

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Introduction

As assisted reproductive technology (ART) has been developing rapidly, the number of infertility centers has increased, resulting in 1.8% of newborn babies in 2006 in Japan being born following infertility treatment [1, 2]. At present, a team approach involving gynecologists, urologists, nurses, embryologists, counselors and the other professionals is considered necessary to achieve successful treatment of infertility [3, 4]. However, the actual situation of the team approach in infertility treatment remains unclear, and the effectiveness of collaboration among professionals providing infertility treatment is unidentified.

Mailick et al. reported thata team approach in medical treatment and health care is an interpersonal process in which members of the working group contribute to a common product or goal [5]. Graham et al. defined it as a relational system in which two or more stakeholders pool resources in order to meet objectives that neither could meet individually [6]. The interprofessional team approach to research [7], education [8] and clinical practice [9] can be divided into three types: multidisciplinary, interdisciplinary, and transdisciplinary. In a multidisciplinary team approach, many disciplines work toward the same goal set by the team leader. Team members work in parallel or sequentially from disciplinary-specific bases to address common problems. Interdisciplinary means working

together with the integration of separate disciplinary approaches. All team members, sometimes including patients, are involved in any discussions regarding the process of treatment. The transdisciplinary approach involves individuals from separate disciplines who work jointly using their own conceptual frameworks. It provides thorough discussion by professionals with a greater range of knowledge and experience than members in other team approaches. Each of these approaches to medical treatment and health care should be flexible in order to change with the situation.

Numerous studies on the multidisciplinary team approach, both original articles and case reports, have been reported from several fields of medical treatment and health care. In these studies, models of collaboration, individual roles in teamwork and possession of information among team members have been examined using teams of several professionals. Multidisciplinary team approaches have been reviewed in treatment for cancers [10], cardiovascular diseases [11], stroke [12], chronic obstructive pulmonary disease [13], genetic disorders [14] and primary care [15]. Interdisciplinary team approaches have mainly been conducted in hospice care [16], intensive care units [17] and for geriatric care [18, 19], whereas there have been few reviews concerning the interdisciplinary team approach, which involve a greater number of specialists than a multidisciplinary approach. As medical treatment for infertility has made rapid progress during the last 30 years, a team approach among professionals has not yet been established in infertility treatment.

We first began to document the professionals in charge during examination and treatment for infertility according to a medical model of infertility counseling reported by Craig [20] and developed original questionnaires for this research. Second, staff working in an infertility laboratory and patients, including persons with experience in receiving infertility treatment, were surveyed as to which of the various professionals should positively contribute to particular aspects of examination and treatment for infertility.

Materials and methods

Questionnaire

Based on the Medical Counseling model reported by Craig [20], 21 services were defined as procedures related to examination and treatment for infertility (Table 1). These procedures were divided into three stages during fertility treatment: during examination, during treatment and after treatment. Counseling procedures were analyzed separately.

Staff who worked in facilities for fertility treatment were asked two questions: "Who is in charge of providing this service in your workplace?" and "Who do you think should be in charge of this service in the future?" Answers to the former question were regarded as the actual situation of professionals in charge and answers to the latter was considered the staff's expectation. Women who were receiving fertility treatment or had previously experienced infertility treatment, referred to as "patients" in the study, were also asked two questions: "Do you know which professions participated in your treatment" and "Who do you think should be in charge of this service in the future?" (patient's expectation). Participants respectively indicated "yes" or "no" on a list of 12 professions or specialties (gynecologist, nurse, medical clerk, midwife, urologist, embryologist, clinical technologist, pharmacist, public health nurse, radiological technician, nutritionist, clinical psychologist). In addition, participants answered the same questions regarding infertility counselor and IVF coordinator.

Subjects

The study was approved by the ethical committee of the Japan Society for Infertility Counseling. We invited 466 facilities belonging to the Japan Society for Infertility Counseling to participate in this study and obtained agreement for participation from 86 facilities. After obtaining information on the number of staff and patients to be surveyed, an explanation letter, questionnaires and a

Table 1 Process of infertility treatment

1. During examination	**2. During treatment**	**3. After treatment**
History taking	Decisions regarding treatment	Termination of treatment
Planning	Planning	Prenatal care
Explanation of methods and schedule	Explanation of methods and schedule	Consultation during pregnancy
Examination	Treatment	**4. Counseling**
Explanation of results	Explanation of results	Emotional problems
Consultation regarding methods and schedule	Consultation regarding methods and schedule	Social problems
Consultation regarding results	Consultation regarding results	Economic problems
	Consultation regarding prognosis	

prepaid envelope were sent to each facility by mail. We sent 5–20 questionnaires to each facility in order to prevent an imbalance in the number of responses among facilities and left the selection of patients to staff at the facilities after advising that patients who had experienced treatment for infertility at two or more infertility centers were considered more desirable in order to obtain objective opinions. Of 781 questionnaires distributed, 380 were returned by mail. Excluding 93 incomplete questionnaires, we used 287 that were recovered from 181 medical staff members (31 gynecologists, 22 midwives, 50 nurses, 56 embryologists, 16 medical clerks, 6 others) and 106 patients.

The workplaces of medical staff were hospitals (72), infertility clinics (76), obstetrics and gynecology clinics(29), and others (4). Staff ages were in their 20s (38), 30s (66), 40s (51), 50s (25) and one unknown. Mean duration of involvement in infertility treatment was 12.0 ± 7.8 (0.5–33) years.

Of 106 women who had undergone infertility treatment, 10 women were in their 20s, 74 were in their 30s, 18 were in their 40s, and 3 were in their 50s. One patient did not report her age. The mean duration of infertility treatment was 3.6 ± 3.2 years and the mean number of facilities where women had experienced infertility treatment was 2.1 ± 0.6, with a range from 1 to 3.

The addresses of facilities and those of the patient's residences were located in Hokkaido and Tohoku regions for 45 participants, Kanto region for 80, Chubu region for 65, Kinki region for 52, Shikoku and Kyushu regions for 43 and unknown in 2.

Based on the patients' responses to the question "Do you know which professions participated in your treatment?", the percentage of "yes" was 100% for gynecologists and nurses. The percentages of patients who recognized the participation of medical clerks, midwives and embryologists were 65.1, 63.2 and 59.4%, respectively. The remaining 7 occupations were recognized by less than half of patients as being related to their fertility treatment. In the study, we intended to analyze the interprofessional team approach to fertility treatment, but professionals with low perception rate could not be analyzed. We also excluded midwives from analysis to avoid confusion between nurses and midwives. We focused on four professionals with the highest perception rates among patients: gynecologists, nurses, medical clerks and embryologists. To analyze the team approach during examination, during treatment and after treatment, we used data obtained from 128 medical staff who worked with the other four professionals and from 46 patients who recognized these four professionals. In the study, we used the term 'medical doctor' to indicate gynecologist. Perception rates for infertility counselor and IVF coordinator were 71.7 and 40.6% and we intended to analyze team approaches to counseling among medical doctors, nurses, infertility counselors and medical clerks. Of 128 staff responses, 85 responses obtained from staff working with counselors and medical clerks were analyzed to examine the actual situation regarding counseling.

Data analysis

The answers were classified into 5 groups: medical doctor (MD), medical doctor and nurse (MD + Ns), medical doctor, nurse and embryologist (MD + Ns + Em), medical doctor and embryologist (MD + Em), and other collaboration (others). At counseling, the answers were presented as percentages of MD, MD and/or Ns, MD and/or Ns and/or infertility counselor (IC), and MD and/or Ns and/or IC and/or medical clerk (MC).

Data analysis was performed with SPSS (version 15.0, SPSS, Chicago, IL, USA). The answers were divided into two groups, "medical doctor alone" and others. Chi-square test was used to analyze data between staff and patient expectations. A difference of $P < 0.05$ was considered significant.

Results

Staff perception of the actual situation and staff and patients' expectations of a team approach during examinations are shown in Table 2. Procedures that half or more of the staff recognized as the duty of the medical doctor alone were 'planning' (92.9%), 'explanation of results' (74.2%), 'consultation regarding results' (57.0%) and 'history taking' (50.0%). Procedures recognized as collaboration between medical doctors and nurses were 'explanation of methods and schedule' (52.3%) and 'consultation of methods and schedule' (52.0%). The majority of staff and patients also expected medical doctors alone to perform duties of 'planning', 'examination', 'explanation of results' and 'consultation regarding results'. On comparison of staff expectation with those of patients, there was significant difference in whether history taking was a task for the medical doctor alone (37.4% vs. 54.3%, $P < 0.05$).

Of 8 procedures during treatment, as shown in Table 3, 6 were mainly conducted by medical doctors alone and the percentage of responses indicating medical doctor alone ranged from 96.9% for 'decisions regarding treatment' to 49.2% for 'consultation regarding prognosis'. 'Explanation of methods and schedule' and 'consultation regarding methods and schedule' were conducted cooperatively by medical doctors with nurses and/or embryologists (66.4 and 66.1%, respectively). Regarding responses indicating medical doctor alone, there were significant differences between staff and patient's expectations for 'treatment'

Table 2 Actual situation and expectations of staff and patients regarding professionals in charge during examinations

	Number (%)					*n*
	MD	MD + Ns	MD + Ns + Em	MD + Em	Others	
History taking*						
Actual	62 (50.0)	28 (22.6)	4 (3.2)	3 (2.4)	27 (21.8)	124
Staff	46 (37.4)	46 (37.4)	5 (5.7)	0	24 (19.5)	123
Pt	25 (54.3)	13 (28.3)	2 (4.3)	2 (4.3)	4 (8.7)	46
Planning						
Actual	117 (92.9)	5 (4.0)	4 (3.2)	0	0	126
Staff	102 (81.6)	8 (6.4)	5 (4.0)	5 (4.0)	5 (4.0)	125
Pt	34 (73.9)	6 (13.0)	2 (4.3)	2 (4.3)	2 (4.3)	46
Explanation of methods and schedule						
Actual	36 (28.1)	67 (52.3)	11 (8.6)	4 (3.1)	10 (7.8)	128
Staff	38 (30.4)	46 (36.8)	10 (8.0)	7 (5.6)	24 (19.2)	125
Pt	19 (41.3)	19 (41.3)	2 (4.3)	1 (2.2)	5 (10.8)	46
Examination						
Actual	54 (42.5)	31 (24.4)	17 (13.4)	11 (8.7)	14 (11.0)	127
Staff	67 (53.2)	23 (18.3)	10 (7.9)	9 (7.1)	17 (13.5)	126
Pt	26 (57.8)	10 (22.2)	2 (4.4)	2 (4.4)	5 (11.1)	45
Explanation of results						
Actual	95 (74.2)	19 (14.8)	7 (5.5)	6 (4.7)	1 (0.8)	128
Staff	97 (78.2)	15 (12.1)	5 (4.0)	5 (4.0)	2 (1.6)	124
Pt	31 (67.4)	8 (17.4)	3 (6.5)	2 (4.3)	2 (4.3)	46
Consultation regarding methods and schedule						
Actual	27 (21.3)	66 (52.0)	11 (8.7)	7 (5.5)	16 (12.6)	127
Staff	31 (24.8)	43 (34.4)	15 (12.0)	8 (6.4)	28 (22.4)	125
Pt	16 (35.6)	18 (40.0)	2 (4.4)	1 (2.2)	8 (17.8)	45
Consultation regarding results						
Actual	73 (57.0)	35 (27.3)	7 (5.5)	9 (7.0)	4 (3.1)	128
Staff	76 (61.3)	16 (12.9)	11 (8.9)	11 (8.9)	10 (8.1)	124
Pt	26 (57.8)	13 (28.9)	2 (4.4)	1 (2.2)	3 (6.7)	45

MD medical doctor, *Ns* nurse, *Em* embryologist, *Pt* patient, *Others* responses other than four professions listed in the table, *Actual* actual situation perceived by staff, *staff* staff's expectation, *Pt* patients' expectation

* $P < 0.05$ using the χ^2 test to compare between staff's expectations and those of patients

(76.8% vs. 58.7%, $P < 0.05$), 'explanation of results' (70.4% vs. 50.0%, $P < 0.05$) and 'consultation regarding results' (64.8% vs. 53.3%, $P < 0.05$).

Table 4 shows responses regarding 3 procedures after infertility treatment. Less than half of the staff recognized that medical doctors alone were actually in charge to these procedures. Moreover, a team approach without participation of the medical doctors, referred to as 'others' in Table 4, was more expected by both staff and patients after treatment in comparison with those during examination and treatment.

Medical clerks and infertility counselors were more likely to contribute to processes in counseling, so a team approach in counseling was analyzed using responses of staff who worked together with both professionals and patients who recognized both medical clerks and infertility counselors during their treatment. As shown in Table 5, counseling regarding emotional and social problems was mainly performed by a team approach including infertility counselors, and counseling on economic problems was performed by a team including medical clerks. Only 16.0% or less of counseling was actually performed by medical doctors and/or nurses, and a team approach was not expected by either staff or patients.

Discussion

To analyze the team approach in infertility centers, we drew 21 procedures from 4 stages of infertility treatment according to Craig's Medical Counseling model [20] and examined the actual situation of the team approach and

Table 3 Actual situation and expectations of staff and patients regarding professionals in charge during treatment

	Number (%)					*n*
	MD	MD + Ns	MD +Ns + Em	MD + Em	Others	
Decisions regarding treatment						
Actual	124 (96.9)	1 (0.8)	2 (1.6)	1 (0.8)	0	128
Staff	112 (89.6)	2 (1.6)	3 (2.4)	6 (4.8)	2 (1.6)	125
Pt	41 (89.1)	3 (6.5)	0	2 (4.3)	0	46
Planning						
Actual	106 (84.8)	11 (8.8)	2 (1.6)	6 (4.8)	0	125
Staff	98 (78.4)	7 (5.6)	5 (4.0)	8 (6.4)	7 (5.6)	125
Pt	34 (73.9)	5 (10.9)	1 (2.2)	4 (8.7)	2 (4.3)	46
Explanation of methods and schedule						
Actual	36 (28.1)	54 (42.2)	23 (18.0)	8 (6.3)	7 (5.5)	128
Staff	41 (32.7)	41 (32.8)	18 (14.4)	7 (5.6)	18 (14.4)	125
Pt	14 (30.4)	17 (37.0)	5 (10.9)	4 (8.7)	6 (13.0)	46
Treatment*						
Actual	92 (71.9)	15 (11.7)	13 (10.2)	8 (6.3)	0	128
Staff	96 (76.8)	11 (8.8)	10 (8.0)	6 (4.8)	2 (1.6)	125
Pt	27 (58.7)	5 (10.9)	8 (17.4)	5 (10.9)	1 (2.2)	46
Explanation of results*						
Actual	76 (59.4)	17 (13.3)	17 (13.3)	18 (14.1)	0	128
Staff	88 (70.4)	13 (10.4)	6 (4.8)	17 (13.6)	1 (0.8)	125
Pt	23 (50.0)	12 (26.1)	5 (10.9)	4 (8.7)	2 (4.3)	46
Consultation regarding methods and schedule						
Actual	38 (29.9)	51 (40.2)	22 (17.3)	11 (8.7)	5 (3.9)	127
Staff	52 (41.6)	26 (20.8)	18 (14.4)	12 (9.6)	17 (13.6)	125
Pt	19 (42.2)	12 (26.7)	5 (11.1)	4 (8.9)	5 (11.1)	45
Consultation regarding prognosis						
Actual	62 (49.2)	30 (23.8)	19 (15.1)	10 (7.9)	5 (4.0)	126
Staff	70 (56.0)	15 (12.0)	12 (9.6)	18 (14.4)	10 (8.0)	125
Pt	22 (50.0)	8 (18.2)	5 (11.4)	5 (11.4)	4 (9.1)	44
Consultation regarding results*						
Actual	66 (52.0)	23 (18.1)	19 (15.0)	15 (11.8)	4 (3.1)	127
Staff	81 (64.8)	7 (5.6)	10 (8.0)	18 (14.4)	9 (7.2)	125
Pt	24 (53.3)	9 (20.0)	5 (11.1)	3 (6.7)	4 (8.9)	45

MD medical doctor, *Ns* nurse, *Em* embryologist, *Pt* patient, *Others* responses other than four professions listed in the table, *Actual* actual situation perceived by staff, *staff* staff's expectation, *Pt* patient's expectation

* $P < 0.05$ using the χ^2 test to compare between staff expectations and patient expectations

which professionals were considered desirable to be in charge of each step during infertility treatment.

During examination, planning and explanation of results were conducted mainly by medical doctors alone, suggesting that there was no team approach to these procedures. However, explanation of methods and schedule and consultations regarding these were performed exclusively by a team approach involving medical doctors and nurses and/or embryologists. Team members probably work in parallel or sequentially and were involved in any discussions regarding the treatment process. Staff expected collaboration including embryologists in consultations on methods and schedule more strongly than patients (22.4% vs. 6.7%, $P < 0.05$, data not shown). While staff considered it desirable to apply an interprofessional approach for history taking, patients expected more interaction with the medical doctor alone than did staff. When staff other than medical doctors took the history, it became necessary to explain the reason why staff other than medical doctors were performing history taking. All medical staff should understand the patient's expectations in order to present an effective image of interprofessional collaboration. 42.5%

Table 4 Actual situation and expectations of staff and patients regarding professionals in charge after treatment

	Number (%)					*n*
	MD	MD + Ns	MD + Ns + Em	MD + Em	Others	
Termination of treatment						
Actual	61 (49.2)	31 (25.0)	2 (1.6)	6 (4.8)	24 (19.4)	124
Staff	63 (50.8)	18 (14.5)	8 (6.5)	5 (4.0)	30 (24.2)	124
Pt	20 (43.5)	7 (15.2)	2 (4.3)	1 (2.2)	16 (34.8)	46
Prenatal care						
Actual	50 (41.0)	62 (50.8)	2 (1.6)	0	8 (6.6)	122
Staff	57 (45.6)	41 (32.8)	2 (1.6)	0	25 (20.0)	125
Pt	14 (33.3)	17 (40.5)	1 (2.4)	0	10 (23.8)	42
Counseling during pregnancy						
Actual	35 (29.7)	55 (46.6)	3 (2.5)	2 (1.7)	23 (19.5)	118
Staff	34 (27.4)	43 (34.7)	2 (1.6)	0	45 (36.3)	124
Pt	8 (19.0)	16 (38.1)	2 (4.8)	0	16 (38.1)	42

MD medical doctor, *Ns* nurse, *Em* embryologist, *Pt* patient, *Others* responses other than four professions listed in the table, *Actual* actual situation perceived by staff, *staff* staff's expectation, *Pt* patients' expectation

Table 5 Actual situation and expectations of staff and patients regarding professionals in charge of counseling throughout infertility treatment

	Number (%)				*n*
	MD	MD/Ns	MD/Ns/IC	MD/Ns/IC/MC	
Emotional problems					
Actual	6 (7.5)	8 (10.0)	58 (72.5)	58 (72.5)	80
Staff	8 (6.4)	12 (9.6)	94 (75.2)	94 (75.2)	125
Pt	1 (2.2)	7 (15.6)	39 (86.7)	39 (86.7)	45
Social problems					
Actual	8 (10.7)	12 (16.0)	40 (53.3)	46 (61.3)	75
Staff	10 (8.0)	14 (11.2)	82 (65.6)	92 (73.6)	125
Pt	2 (4.4)	5 (11.1)	32 (71.1)	37 (82.2)	45
Economic problems					
Actual	6 (7.5)	10 (12.5)	14 (17.5)	54 (67.5)	80
Staff	4 (3.2)	12 (9.7)	24 (19.4)	88 (71.0)	124
Pt	2 (4.3)	4 (8.7)	8 (17.4)	37 (80.4)	46

MD medical doctor, *Ns* nurse, *IC* infertility counselor, *MC* medical clerk, *Pt* patient, *MD/Ns* MD and/or Ns, *MD/Ns/IC* MD and/or Ns and/or IC

MD/Ns/IC/MC MD and/or Ns and/or IC and/or MC, *Actual* actual situation perceived by staff, *staff* staff's expectation, *Pt* patients' expectation

of responses indicated that examination was actually performed by medical doctor alone. However, more staff and patients expected a medical doctor alone to perform examinations, suggesting that examination is the medical doctor's duty, although medical staff other than medical doctors may perform examinations when medical doctors are too busy.

During treatment, staff recognized decisions regarding treatment planning, treatment, and explanation of results as procedures particular to medical doctors alone. Patients expected nurses and embryologists to participate in treatment and explanation of results more frequently than did staff. Needless to say, medical doctors are responsible for the total process of treatment. However, a team approach that includes nurses and embryologists might be more common in treatment and explanation of results in the future, considering patient's expectations. Consultation regarding prognosis and consultation regarding results were actually performed equally by medical doctors alone and by an interprofessional team. Interestingly, 64.8% of staff expected a medical doctor alone to perform consultations regarding results, so this percentage was higher than the actual situation or patients' expectations, suggesting that staff considered this procedure to be particular to the medical doctors. Results concerning explanation and consultation of methods and schedule indicated that a team approach was actually performed and was considered appropriate for these procedures.

It was considered that termination of treatment was one of the more serious situations during infertility treatment. Half of the responses regarding the actual situation indicated that the medical doctor alone was involved in termination of treatment; that response rate did not substantially differ from staff and patients' expectations. Moreover, patients expected other collaboration (34.8%) more than those including medical doctors and nurses and/or embryologists (21.7%), suggesting that patients' expectations varied with regard to an interprofessional team approach to the termination of treatment. Prenatal care was conducted by medical doctors alone in 41.0% of responses and collaboration between medical doctors and nurses in 50.8%. However, staff expected other team

approaches including midwives. In the study, we did not include the answer "midwife" in the data analysis, but 83 of 128 staff worked with midwives or as midwives. Analyzing 82 responses regarding prenatal care, 31.7% of staff expected a team approach including medical doctors, nurses and midwives and 13.4% expected a team approach including medical doctors and midwives, but not nurses. These results suggest that midwives should actively participate in infertility treatment and play an important role as a midwife especially after conception. Moreover, midwives were expected to participate in an interprofessional team at counseling during pregnancy (data not shown).

Responses to counseling for emotional problems and social problems demonstrated that infertility counselors actually worked in an interprofessional collaboration that resolves such problems effectively. Patients expected infertility counselors to participate more actively than they did in the actual situation. Emotional and social problems of infertility patients varied and it was considered necessary for specialists to resolve them. Therefore, a team approach in which professionals or specialists use their conceptual frameworks should be applied for counseling. However, medical clerks were recognized by staff and patients as key specialists in resolving economic problems, suggesting that medical clerks might be one of the indispensable members on an infertility treatment team and we should reevaluate the role of medical clerks based on the situation of employees in each facility.

Planning regarding examination and treatment, decision and practice of treatment and explanation of results in examination were mainly performed by medical doctors alone. In these procedures, some patients preferred to receive a team approach including medical doctors, nurses and embryologists. This finding raises the possibility that a multidisciplinary team (MDT) approach could be introduced into these procedures. In the MDT, team members need to understand the policy of the facility and the most recent knowledge regarding the management of infertile couples. Every member practices his/her specialty according to the policy and the medical doctor plays the role of team leader. Adoption of an MDT approach has progressed in cancer treatment and care over the past 20 years and importance of MDT meetings has been emphasized [21]. The benefits of MDT meetings include improved patient outcomes due to evidence-based practice. Additionally, better job satisfaction of professionals in a team and educational opportunities could be provided by the MDT meetings. For success, it is necessary for team leaders to hold MDT meetings regularly and urgently even if all team members are always busy.

Explanation and consultation of methods and schedule during examination and treatment was actually performed using an interprofessional team approach. Though such collaboration might be partially caused by the persistently busy schedule of the medical doctor, it was evaluated favorably by staff and patients. It might reflect the flexible coping skills of medical staff, but the type of team approach was not identified. As medical staff performed these works independently using their skills, an interdisciplinary team (IDT) approach was considered more suitable for this works than an MDT approach. Wilcox et al. described a close relationship among staff as most important in an interdisciplinary approach [22]. To maintain IDT, it is indispensable for all staff to recognize the practice of other professionals during examination and treatment by using the IDT meetings. If there is not enough time to discuss clinical problems during the routine workday, staff should develop good communication skills to exchange their information on the job. Recently, clinical training and simulation programs have been introduced to the IDT in rehabilitation units [23] and operating rooms [24]. Such training programs might be necessary to improve IDT in infertility treatment.

It has been shown that counseling in infertility treatment needs an interprofessional team approach that includes infertility counselors or medical clerks. As infertility counselors need to acquire specialized knowledge regarding infertility and skills in counseling, nurses or embryologists sometimes doubled as infertility counselors. If an infertility counselor is established as one of the specialists in infertility treatment in the future, he/she will participate in this process as a transdisciplinary team member. In the study, we analyzed professionals or specialists recognized by 50% or more patients and other important specialists, such as clinical psychologists and IVF coordinators, were excluded from the data analysis at this time. When patient perception of these specialists elevates in the future, further studies should be performed to identify the contribution of these specialists to infertility treatment, especially counseling.

Recently, an interprofessional team approach in infertility treatment has gradually been noted and the multidisciplinary team approach was reported effective for helping egg donation patients to continue infertility treatment [25]. Van der Schoor-Knijnenburg et al. produced a national multidisciplinary guideline for patient-centered subfertility care encouraging cooperation between patients and professionals. The guideline suggests that a team approach to infertility treatment has to include infertile couples in making their treatment decisions, thus respecting the patient's view and avoiding confusion of subfertility care among professionals who may use their own guidelines [26].

An interprofessional team approach, especially an MDT approach, is generally thought to have been established when practices previously performed by medical doctors

alone are performed by professionals other than medical doctors. Based on study results, an IDT approach, which requires higher skill levels and better communication among staff than an MDT approach, might be introduced for explanations and consultations regarding method and schedule during examination and treatment. Moreover, it might be possible for a transdisciplinary team approach that includes infertility counselors to contribute to counseling during infertility treatment. However, the introduction of these interprofessional team approaches into infertility treatment has been interrupted mainly by the hectic schedule of routine clinical practice, even though the introduction of such an approach may be conducive to simpler routines. In previous clinical research regarding team approaches to medical and health care, the types of team approach were not always distinguished clearly. To clarify the issues disrupting the development of an effective interprofessional team approach for infertility treatment, a study using these criteria of team collaboration might be useful.

In conclusion, an effective interprofessional team approach should be established at each step during infertility treatment to provide good services for patients and to achieve a good treatment outcome. Moreover, care providers should be careful that their opinions regarding desirable collaboration for patients may sometimes differ from those of their staff.

Limitation

The percentage of facilities participating in the study was modest. We invited 466 facilities to participate in the study, but agreement to participate was obtained from only 86 facilities (18.5%). Of staff analyzed in the study, 94.5% worked at IVF centers, and there are 600 or more IVF centers registered by the Japan Society of Obstetrics and Gynecology. We should therefore recruit more facilities in order to generalize opinions expressed by staff and patients.

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