Patient-centred infertility care: a qualitative study to listen to the patient's voice

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BACKGROUND: High-quality care for patients faced with infertility should be patient-centred. Few studies have provided in-depth insights into the patient's perspective on care and, to the best of our knowledge, no study has provided a model of the complex concept 'patient-centred infertility care'. Therefore, a qualitative study aimed at understanding 'patient-centred infertility care' from the patient's perspective was conducted.

METHODS: Fourteen focus group discussions were organized with patients ($n = 103$) from two European countries to find out about patients' positive and negative experiences with infertility care. Content analysis of the transcripts and analysis of patients' priority lists were conducted.

RESULTS: The patient-centredness of infertility care depends on 10 detailed dimensions, which can be divided into system and human factors, and there is a two-way interaction between both kinds of factors. System factors, in order of patient's priority, are: provision of information, competence of clinic and staff, coordination and integration, accessibility, continuity and transition and physical comfort. Human factors, in order of patient's priority, are: attitude of and relationship with staff, communication, patient involvement and privacy and emotional support.

CONCLUSIONS: This study provides a detailed patient's description of the concept 'patient-centred infertility care' and an interaction model that aids understanding of the concept. Fertility clinics are encouraged to improve the patient-centredness of their care by taking into account the detailed description of the dimensions of patient-centred infertility care, and by paying attention to both system and human factors and their interaction when setting up 'patient-centred improvement projects'.

Key words: patient-centered care / patients / assisted reproductive techniques / quality of health care / infertility

Introduction

There are numerous reasons for fertility clinics and staff to provide patient-centred care (PCC). First, 'patient-centredness' is important to all segments of health care, and it is defined as one of the six dimensions of quality of care (Corrigan *et al.*, 2001). Secondly, despite the success of current Medically Assisted Reproduction (MAR; Zegers-Hochschild *et al.*, 2009), one-third of the infertile couples finally do not deliver a child (Pinborg *et al.*, 2009; Brandes *et al.*, 2010). Hence, process indicators, such as patient-centredness, are very important in addition to outcome indicators. Thirdly, recent reports confirm that besides effective medical treatment, patients

also want patient-centred infertility care (Schmidt *et al.*, 2003; Dancet *et al.*, 2010; Van Empel *et al.*, 2010a,b). Fourthly, infertility and its treatment involve a physical and emotional burden for both women and men (Pook and Krause, 2005; Cousineau and Domar, 2007; Peterson *et al.*, 2007; Verhaak *et al.*, 2007; Malik and Coulson, 2008; Peterson *et al.*, 2009; Johansson *et al.*, 2010), and that burden contributes to high drop-out rates from treatment (Brandes *et al.*, 2009; Van den Broeck *et al.*, 2009). For instance, patients who voluntary dropped out from treatment have reported the impact of the psychological burden (72%) and the lack of staff empathy (32%) on their decision (Van den Broeck *et al.*, 2009). This implies that a lack of patient-centredness of care can cause patients

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to drop out from treatment for non-medical reasons. These four reasons clearly indicate the need for reproductive medicine to focus on other quality dimensions besides 'effectiveness' (pregnancy rate), in particular the 'patient-centredness' of care.

However, in order to provide patient-centred infertility care, an insight into the patient's perspective on infertility care is required. A recent literature review made a first effort to define patient-centred infertility care with 10 dimensions (Dancet et al., 2010). This review, however, did not provide a detailed description of what patients want for each dimension, nor did it give insight into the relationship between the dimensions. Indeed, the review concluded with the need for qualitative research into patient-centred reproductive medicine. Therefore, the present qualitative study aims at providing an in-depth understanding of the concept 'patient-centred infertility care' from the patient's perspective.

Materials and Methods

An international, multicentre, monolingual study with focus groups (FGs) was conducted in two Dutch-speaking European countries (the Dutch-speaking part of Belgium and the Netherlands), and was analysed with constant comparison content analysis.

Ethical approval was obtained from a multicentre Ethics Committee (s51509) in Belgium; and was not required in the Netherlands. Potential participants received both oral and written information, and in Belgium, participants gave their written consent.

Data collection

Eligible patients were couples who consulted one of the 20 participating fertility clinics across Belgium and the Netherlands for one of the following MAR treatments: timed intercourse, IUIs, IVF or ICSI. The aim was to recruit couples, but individual patients with a partner not willing or unable to take part could also participate.

Patients received study information from their physicians and were telephoned afterwards by the researchers. FGs were organized between August 2008 and December 2009 at neutral locations. FGs included 4–11 participants and lasted 2 h. The number of FGs was determined by data saturation (Polit and Beck, 2004). A short questionnaire also collected data on the participant's demographic and medical characteristics.

The FGs were moderated by female qualitative researchers and observed by research assistants. Participants were asked to discuss their most positive and negative experiences with infertility care. Additional open-ended questions were asked based on patient's stories and on a topic list, in order to prevent missing relevant care aspects. The topic list was based on a literature review (Dancet et al., 2010), pilot study (Van Empel et al., 2010a) and comments from an expert panel (consisting of physicians, nurses and psychologists). FGs were recorded digitally and transcribed verbatim. Transcript accuracy was checked.

At the end of each FG, participants were asked to independently draw up an individual priority list of the five care aspects (self-formulated) of care most important to them, ranked in order of importance.

Analysis of the FG discussions

Data were analysed using content analysis with constant comparison (Glaser, 1965). Each category was searched for in all FGs, and all meaningful units were compared until no new categories could be identified (Glaser, 1965; Pope and Mays, 1995; Graneheim and Lundman, 2004). This method comprises four stages: (i) comparing meaningful units between categories, (ii) integrating categories, (iii) delimiting the theory

and (iv) writing the theory (Glaser, 1965). The first two stages resulted in the development of a coding tree, and stages three and four resulted in an interaction model for patient-centred infertility care.

Development of a coding tree

First, a coding tree (Morison and Moir, 1998) was developed for each country. This was based on the 10 dimensions of patient-centred fertility care (Dancet et al., 2010) in order to limit the differences between the countries. Within each country, data were analysed by two independent researchers (i.e. investigator triangulation) and discussed until consensus was achieved. If necessary, a senior researcher (W.L.D.M.N. and P.R.) was consulted. Data were analysed concurrently with the data collection. This way insight from analysis was used to guide further data collection, and the credibility of identified themes was checked in subsequent FGs.

Secondly, the Dutch coding tree (based on all seven Dutch FGs) and the Belgian coding tree (based on the first six Belgian FGs) were merged into one communal coding tree by the international coding team (E.A.F.D., I.W.H.E., P.R., W.L.D.M.N.) using an established consensus process (Hill et al., 1997). The seventh Belgian FG was coded using the communal coding tree.

Development of an interaction model

First, the 10 dimensions of patient-centred infertility care were divided into 'system factors' and 'human factors' based on FG participant's description of the actual care situation. The terms were derived from healthcare safety literature, distinguishing the system approach and the person approach (Reason, 1995, 2000). 'System factors' are determined by the organization and can be modified at an organizational level. 'Human factors' are determined by what occurs in the staff–patient interface and can be changed at a personnel level (e.g. by staff training).

Secondly, the interaction between human and system factors was detected. The direction (one-way versus two-way) and the meaning of the interaction were examined. The specific system and human factors that interacted were examined.

Format of data presentation

For each dimension and kind of interaction, an exemplifying quotation from the transcripts was selected and identified with the first letter of the country (B/N) and FG number (FG1-7).

Analysis of the patient's priority lists

Care aspects in patient's priority lists were first allocated to a dimension of patient-centred infertility care using the communal coding tree. Subsequently, the respective dimensions received a score according to their ranking on the patient's priority lists. Care aspects ranked first received five points, second four, etc. Each patient could allocate 15 points. If one care aspect on a list included two dimensions, the score based on the ranking was split over both dimensions. If two separate care aspects relevant to two separate dimensions were mentioned on one place in a ranking list, both dimensions received scores. Finally, adding up the scores of all patients resulted in total scores for the dimensions.

Results

Participants

Participants, 57 women and 46 men (mean age = 33.5), were evenly spread throughout the Netherlands (7 FGs) and Belgium (7 FGs) (Table I). Forty-six heterosexual couples, 1 lesbian couple and 9 individual women from a heterosexual relationship took part.

Table I Demographics of 103 participants.

Characteristic	n (%)
Country	
The Netherlands	54 (52.4%)
Belgium	49 (47.6%)
Age	
Mean (SD)	33.5 (4.91)
Gender	
Female	57 (55.3%)
Male	46 (44.7%)
Education status	
Low[a]	24 (23.3%)
Medium[b]	54 (52.4%)
High[c]	25 (24.3%)
Parental status	
No children	59 (57.3%)
Pregnant	4 (3.9%)
Children	40 (38.8%)
Experience with fertility treatment	
No, end of investigation phase	4 (3.9%)
Yes, in treatment phase	99 (96.1%)
Median number of treatment cycles[d] (range)	6 (1–16)
Kinds of treatments experienced[d]	
Ovulation induction with timed intercourse	36 (35.0%)
IUI[e]	53 (51.5%)
IVF/ICSI[f]	64 (62.1%)

[a]Low education status in Belgium included 'BSO, TSO, ASO'. In the Netherlands this included 'Mavo, LBO, Havo, VWO'.
[b]Medium educational status in Belgium includes 'Hoger onderwijs'. In the Netherlands this included 'MBO, HBO'.
[c]High education status included a University degree in both Belgium and the Netherlands.
[d]Patient who did not yet start with treatment (n = 4) were excluded from this calculation.
[e]From the 55 patients who experienced IUI (besides other treatments or not), some had IUI with ovulation induction (n = 32), some without ovulation induction (n = 15) and some experienced both (n = 8).
[f]All IVF/ICSI treatments included ovulation induction.

Most participants (76.7%) had medium or high education. The majority (57.3%) were childless and not pregnant. All but four patients had already gone through fertility treatments (4.5 cycles on average; often different treatments types). Sixty-two percent had experienced IVF/ICSI, 51.5% IUI and 35.0% timed intercourse.

The coding tree

For the Dutch coding tree, which was based on seven FGs, data saturation was reached by the sixth FG. For the Belgian coding tree, which was based on six FGs, data saturation was reached by the fifth FG. Finally, data saturation was confirmed for the communal coding tree by the seventh Belgian FG. The Dutch and Belgian coding trees were closely comparable. The 10 dimensions are
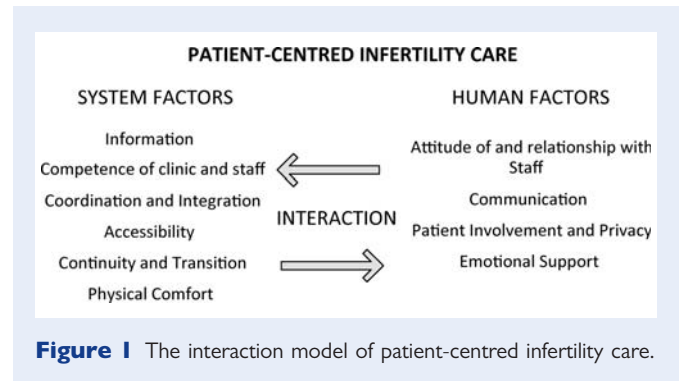
Figure I The interaction model of patient-centred infertility care.

described in detail below. For even more detail, the communal coding tree is presented online in Supplementary data, Appendix SI.

The interaction model of patient-centred infertility care

Patient-centredness of infertility care depends on six 'system factors' and four 'human factors' and both types of factors interact (Fig. 1).

System factors

The system factors of patient-centred infertility care can be described by the following six dimensions, listed according to patient's priority: 'information', 'competence of clinic and staff', 'coordination and integration', 'accessibility', 'continuity and transition' and 'physical comfort' (Supplementary data, Appendix SI).

Information

Patients expressed concrete information needs, including general and personal information. Patients expressed their ideas about appropriate information channels (e.g. face to face) and addressed the nature of the information (e.g. the timeliness): '*A lot of the communication and explanation comes afterwards and that is of course very frustrating*' (B,FG1). Furthermore, patients appreciated hands-on injection training.

Competence of clinic and staff

Clinical expertise, including a thorough diagnostic investigation and good medical follow-up without unnecessary care, was important to patients. Patients liked to be referred on time and disliked disorder: '*Three times in a row the same questions of the gynaecologist, and three times the files got lost. That does really bother me*' (B,FG6). Patients appreciated it when staff stuck to appointments, had a complete file and were prepared for consultations. Furthermore, patients attached importance to the competence of their clinic and staff and valued quality management.

Coordination and integration

Patients appreciated minimal waiting times for appointments, for receiving results of examinations, for starting a subsequent cycle and due to fertility clinic's holidays: '*Once you are in, it all goes very fast and she doesn't miss out on any opportunity*' (B,FG4). Additionally, patients wanted minimal waiting time in waiting rooms and appreciated a smooth organization (e.g. coordination between staff). Furthermore, patients expressed some concrete organizational needs, for

example, the need to be invited for periodically planned evaluations of treatment(s). Patients commented on the financial administration.

Accessibility

Patients emphasized the importance of telephone accessibility of their clinic. They appreciated accessibility for emergency. Patients hoped for flexibility with the time of their appointments: '*The three times a week ultrasounds can only be done in the morning between 8.30 and 9.30 a.m. There would be a big difference in travel time and traffic jams if we could come later*' (N,FG1). Some patients suggested telephone consultations and collaboration with professionals closer to their homes in order to limit their travel time. Others experienced the travel time to be worthwhile.

Continuity and transition

Patients appreciated continuity of staff, but did not agree on how necessary it is. Some wanted absolute continuity, some did not, and others expressed a need for a lead physician, i.e. someone who is responsible for their case and sees them on scheduled evaluations but who could be replaced by others for technical procedures. Patients appreciated it when staff stuck to a consistent medical policy and shared information within their team: '*To prevent contradictory information, it would help if physicians would discuss treatment possibilities together, formulate one advice and write this down in the patients' file*' (N,FG3). Paying attention to the transition of patients and documents between clinics was important when clinics collaborated or when patients changed clinics. Furthermore, patients wanted follow-up care after medical procedures and assistance with injections, if necessary. Patients wanted to be cared for when definitely ending treatment and upon referral to another clinic. Patients appreciated fertility clinics following up their early pregnancy, but disagreed on the need to follow up their entire pregnancy.

Physical comfort

Patients valued adequate pain medication during oocyte retrieval. Furthermore, clinic accommodation was important to patients. They preferred waiting rooms and consultation rooms to be exclusively used by infertile (not obstetric) patients. '*During our last clinic visit, we saw an enormous amount of pregnant ladies . . . And that is quite painful if you are there for other reasons. It was really confronting*' (N,FG4). Furthermore, patients wanted accommodation to offer privacy, comfort and a homely environment and to be spacious, peaceful and well maintained. Patients preferred receiving all care in the same hospital.

Human factors

The human factors of patient-centred infertility care can be described by the following four dimensions, listed according to patient's priority: 'attitude of and relationship with staff ', 'communication', 'patient involvement and privacy' and 'emotional support' (Supplementary data, Appendix SI).

Attitude of and relationship with staff

Patients attached importance to the attitude of every staff member. Certain attitudes were always appreciated (e.g. being friendly). '*they are always as friendly as ever. I haven't met any unfriendly person, not anyone in a bad mood . . . and it makes me hold on*' (B,FG2). Some attitudes were experienced positively by some and negatively by others (e.g. enthusiasm). Other attitudes were always considered negative (e.g. being disrespectful). Patients valued the quality of their relationship with staff and described inappropriate staff behaviour and appropriate staff appearance.

Communication

Communication with fertility clinic staff was very important to patients. Patients felt staff should take time, and provide opportunities to ask questions. Communication skills of staff were important (e.g. introducing themselves). 'Bad news conversations' required specific skills (e.g. allowing time to cope). Some patients reported unprofessional communication (e.g. inducing fear). Patients appreciated staff communicating about what to expect during treatment, including a time schedule. Furthermore, communication needed to be to the point and reliable. Patients did not agree on the (dis)advantage of honesty. All communication needed to be understandable: '*To me it's very important how they communicate, whether they speak normal Dutch or just abracadabra which nobody is waiting for*' (N,FG4). Communication with and explanations from nurses was particularly appreciated.

Patient involvement and privacy

Patients emphasized the importance of their autonomy and appreciated informed shared decision-making. '*They allowed me to decide on whether to continue timed intercourse or to start with IUI. It was my own decision, which I really appreciated*' (N,FG6). Staff needed to be open to patient's input and critical reflections. Concrete wishes for openness were on access to personal health records and recognition of errors. Patients valued personalized care. Patients wanted to be addressed as a couple and appreciated staff actively involving their partner. Respect for their privacy mattered to patients, especially at sensitive moments (e.g. semen collection) and regarding confidentiality of written data. Patients did not want to be confronted with data on other patients. Furthermore, patients wished that only a limited number of staff members (and trainees) were present during consultation.

Emotional support

Patients expected to receive emotional support especially from doctors and nurses during their daily care. This support included providing information, paying attention to emotional wellbeing and discussing emotional topics. Patients wanted live support group sessions and valued online contact with other patients. Additionally, patients appreciated support offered by specialized staff (e.g. psychologists) accessible at emotional emergency: '*At a certain moment something inside me broke, so I went to see the social worker or even the psychologist at the hospital, just to get things lined up and regain courage. It really helped a lot*' (N,FG7). Furthermore, patients specified when they particularly required emotional support (e.g. the weeks before the pregnancy test).

Interaction

There was a two-way interaction between all dimensions related to system factors on the one hand, and all dimensions related to human factors on the other. Two different forms of interaction were identified: compensation and reinforcement.

Table II Participants' ranking for importance of the dimensions of patient-centred fertility care.

Ranking	Dimension of patient centred fertility care	Total score allocated per dimension by 103 patients of 14 FGs, n (%)
1	Information provision	284.5 (19.3%)
2	Attitude of and relationship with staff	246.0 (16.7%)
3	Competence of clinic and staff	180.5 (12.3%)
4	Communication	160.0 (10.9%)
5	Patient involvement and privacy	159.5 (10.8%)
6	Coordination and integration of care	125.5 (8.5%)
7	Accessibility of care	105.5 (7.2%)
8	Continuity and transition of care	103.0 (7.0%)
9	Emotional support	90.5 (6.1%)
10	Physical comfort	18.0 (1.3%)
Total score allocated		1473 (100%)

Compensation

Weaknesses concerning system factors (e.g. poor accommodation) were compensated with strengths on the human level (e.g. friendly and empathic staff). An example: '*I think the staff is extra-ordinary friendly and empathic . . . In my opinion that makes partly up for the accommodation*' (B,FG6).

Compensation was also reported the other way around. Weaknesses concerning human factors of care were compensated with strengths on the system level.

Reinforcement of a weakness or strength

Strengths (or weaknesses) related to system factors resulted in strengths (or weaknesses) related to human factors. Reinforcement was also reported the other way around.

Weaknesses (or strengths) concerning human factors (e.g. no time taken for discussion) resulted in weaknesses (or strengths) related to system factors (e.g. lack of personalized information). An example: '*Every second is timed. Some things are said while they are already standing up . . . That is frustrating sometimes, because friends or family often ask after a consultation "what does that mean? Can't you prevent that?" and I cannot answer those questions*' (B,FG4).

Patient's priority

The three dimensions that received patient's highest priority (each with 12.5–19% of the total allocated scores) are: 'information', 'attitude of and relationship with staff' and 'competence of clinic and staff' (Table II). The dimensions 'emotional support' and 'physical comfort' received the least scores.

Discussion

The debate on the exact term and content of the concept patient-centred infertility care has been ongoing (Pennings and Ombelet, 2007; Van Empel *et al.*, 2008; Dancet *et al.*, 2010), but was not

based on direct input from infertility patients. An electronic database search, focussing on journal articles only, in October 2008 (Dancet *et al.*, 2010), identified only 11 qualitative studies written in English on the patients' perspective on care (Milne, 1988; Blenner, 1990, 1992; Lentner and Glazer, 1991; Halman *et al.*, 1993; Schmidt, 1998; Malin *et al.*, 2001; Peddie *et al.*, 2005; Culley *et al.*, 2006; Redshaw *et al.*, 2007; Porter and Bhattacharya, 2008). Only seven of these studies had examined the patients' perspective on care as their primary aim and these studies each describe only a few dimensions of patient-centred fertility care (Dancet *et al.*, 2010). These interesting studies contributed to the initial 10 dimension framework used for our qualitative analysis. The current study contributes to the literature by: (i) conceptualizing 'patient-centred infertility care' through directly listening to patients and describing in detail what patients want per dimension, (ii) providing an interaction model that gives a deep understanding of the complexity of patient-centred infertility care and (iii) providing a scientific basis for how to improve the patient-centredness of care.

This qualitative study validates the suggestion of our previous review (Dancet *et al.*, 2010) to add the dimensions 'fertility clinic staff's attitude' and the 'clinic's and staff's technical skills' for infertility care to the eight dimension framework of PCC for medical and surgical patients (Gerteis *et al.*, 1993). Additionally, certain dimensions were rephrased and/or adapted to better describe patient's perspective.

Complimentary to our previous review (Dancet *et al.*, 2010), the current qualitative study provides more details and leads to new interesting findings. For example, although patients valued the presence of psychologists in fertility clinics, they primarily expected emotional support from doctors and nurses. This supports placing the cure model (associated with physicians) and the care model (associated with nurses) on a continuum instead of being separate objectives (Baumann *et al.*, 1998). The dimensions of PCC have also been described in the general healthcare literature and literature on ambulatory care. Offering patients 'opportunities to participate in care and decision-making' was, like in our concept, a component of PCC in all the previous work. Also 'partnership and respect in the patient-provider relationship' and 'information provision' were repeatedly (in five and four studies, respectively) discussed in the other PCC studies (Laine and Davidoff, 1996; Mead and Bower, 2000; Little *et al.*, 2001; Epstein *et al.*, 2005; Berwick, 2009; Institute for family-centered care, 2009; Silow-Carrol *et al.*, 2006). We presently describe an interaction model for patient-centred infertility care, which extends former models like the one described by Mead and Bower (2000) that covered only the ability to provide PCC (Mead and Bower, 2000) and not the different interactions within patient-centred care.

Through listening to patients, we learned that fertility clinics currently do not sufficiently meet patient's needs. The interaction model provides useful insights for those striving to improve the patient-centredness of their fertility clinic. First, the coding tree provides clinics with a detailed description of what patients want (e.g. 12 specific aspects of general information). Secondly, the interaction model, together with insight from safety literature, helps us to understand why a lack of patient-centredness occurs and how patient-centredness of infertility care can be improved by two approaches. The 'system approach' starts from the premise that errors have their origin in system factors (organizational processes) and can be prevented by changing the conditions under which staff work

(Reason, 1995). For example, changing the time schedule for consultations can tackle long waiting times in waiting rooms. The 'person approach' focuses on unsafe acts that occur due to human factors, such as inattention, and specifies that errors can be prevented by focusing on the staff (Reason, 1995, 2000). For instance, staff education can tackle problems with patients experiencing a lack of empathy from staff. Thirdly, due to the interaction process an improvement project designed to directly tackle one weakness can indirectly stop the reinforcement of another. Additionally, new strengths can reinforce other strengths and compensate for other weaknesses. Fourthly, Table II helps us to prioritize the aims of quality improvement projects.

Efforts were made to guarantee the three aspects of trustworthiness of our qualitative data (Graneheim and Lundman, 2004). First, credibility of data analysis was enhanced by sample diversity, investigator and space triangulation (Polit and Beck, 2004), careful selection of meaningful units, and contextualization of the data. Exemplifying quotations enhanced the credibility of data presentation. Secondly, dependability was improved by using an interview guide and topic list and by regular discussions during data collection and analysis. Thirdly, transferability of the data was improved by describing the context, participants, data collection, analysis and data saturation, and by providing interview quotations.

This study is based on 14 FGs (i.e. the unit of analysis), enabling us to incorporate the perspectives of 103 patients. In reproductive medicine, few qualitative studies questioned over 100 individuals. One interviewed 130 individuals (Nachtigall et al., 2009), another conducted 20 FGs with 176 individuals (Kalfoglou et al., 2008). The number of our FGs was based on our goal to achieve data saturation (Sandelowski, 1995).

A potential limitation of this study is that the FGs were conducted and analysed by two different research teams (Belgium, The Netherlands). Homogeneous data collection was, however, ensured by using the same questions and topic lists and by researchers attending FGs in neighbouring countries. To ensure a homogeneous analysis, both teams started the analysis with the same framework and had regular discussions.

Multi-country qualitative studies are quite exceptional. The complexity of this study was controllable because one language (Dutch) was used by patients and investigators. The results from two Dutch-speaking countries could be combined into one study because the cultures in the two countries are comparable. This decision was supported by the strikingly comparable coding trees of both countries. Group differences were not evaluated, as this is not the aim of qualitative research. Patients with a higher education were overrepresented in the sample, as they seemed more motivated to participate voluntarily. Nevertheless, the sample did include patients from all kinds of education.

It would be interesting to examine if patient-centred infertility care is a universal concept and whether patients from other (European) countries put importance to the same dimensions. An instrument to monitor quantitatively the patient-centredness of infertility care among patients from the Netherlands has recently been developed and validated (Van Empel et al., 2010b). It would be interesting to develop and validate such an instrument, based on an international multilingual qualitative study, which can be used internationally. The instrument would allow international benchmarking and cross-country comparison of the patients' perspectives on infertility care. In addition, more research on interventions to improve the patient-centredness of infertility care is needed.

Conclusion

This study describes the 10 dimensions of the concept 'patient-centred infertility care' in detail and provides an insight into the concepts' complexity with the aid of an interaction model, discriminating between system and human factors. Fertility clinics are encouraged to improve the patient-centredness of their care by taking into account the detailed description of these dimensions, and by paying attention to both system and human factors and their interaction.

Authors' roles

All the authors made substantial contribution to this study, drafted and critically revised the manuscript, and approved the final version to be published.

Supplementary data

Supplementary data are available at http://humrep.oxfordjournals.org/.

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