

What does Klinefelter syndrome mean for men with azoospermia in Japan?

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ARTICLE INFO	ABSTRACT
Article type: Original article	Background & aim: The aim of this study was to explore the men's perceptions of being diagnosed with Klinefelter syndrome.
Article History: Received: 11-Nov-2016 Accepted: 26-Dec-2017	Methods: This qualitative study was conducted on five azoospermic men diagnosed with Klinefelter syndrome referring to two special infertility treatment clinics for males in Japan. The participants were selected through purposive sampling technique. The data were collected by semi-structured interviews within April 2013 to March 2015 and analyzed using a thematic analysis approach.
Key words: Azoospermia, Infertility, Klinefelter syndrome, Healthcare Workers	Results: The analysis of the data resulted in the emergence of four themes, including 'I cannot understand my diagnosis', 'the cause of my azoospermia was identified', 'I do not have any other healthcare problems besides Klinefelter syndrome', and 'Klinefelter syndrome means that I am more likely to have viable sperm'. Through these themes, we found that azoospermic men considered their diagnosis of the chromosomal disorder as good news; and as a reason for their infertility which might not affect their lives. Furthermore, they believed that having Klinefelter syndrome means that they are more likely to have their own child. Conclusion: The men diagnosed with Klinefelter syndrome had various feelings about their diagnosis. They were hopeful about the outcome of undergoing micro dissection testicular sperm extraction (Micro-TESE). These findings are useful for healthcare workers and could raise their awareness; as they understand that those men with Klinefelter diagnosis have higher expectations regarding micro-TESE.

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Introduction

Male infertility is an extremely serious issue in Japan. Azoospermia accounts for 18% of the male infertility cases in this country (1) and is present in 20% of the cases. The azoospermic men wish to know why they are sterile; therefore, they commonly undergo numerous examinations to determine the cause of their infertility (2, 3). There are a few studies investigating the impression of the males in Japan when diagnosed with azoospermia (4, 5).

According to the chromosomal analysis, around 17% of the azoospermic men are also diagnosed with Klinefelter syndrome, which is a chromosomal abnormality (6,

7). Klinefelter syndrome is one of the most common genetic causes of male infertility (6). Sterility due to Klinefelter syndrome is shown to depend on the azoospermic factor (8).

This syndrome causes some health problems, such as decreased bone mass, declined cognitive ability, and increased risk of diseases like diabetes. However, most of the men are diagnosed with this condition in their adulthood due to the lack of obvious symptoms (9). There are a number of studies investigating the infertile men with Klinefelter syndrome outside Japan (10, 11). The diagnosis of Klinefelter syndrome in the adulthood may have

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considerable impacts on the afflicted patient. However, only a few studies have examined the psychological experiences and impressions of men upon receiving this diagnosis.

The conceptualization of such is important for the health care providers engaged in assisted reproductive technology. With this background in mind, the present study aimed to clarify the impressions of men when diagnosed with Klinefelter syndrome.

Methods

This qualitative study was conducted on five azoospermic men diagnosed with Klinefelter syndrome during fertility examinations. The study population was recruited from two special infertility treatment clinics for men in Japan through purposive sampling technique. The data were collected from April 2013 to March 2015.

For the sampling purpose, the participants were orally informed about the study objectives while they were waiting for their medical examination. They provided their written consent at the time of the next examination; in this regard, all participants provided consent to participate. Their consent was re-sought in the second meeting in order to allow them to deliberate on their decision to participate.

The inclusion criteria were: 1) diagnosis with non-obstructive azoospermia, 2) diagnosis with Klinefelter syndrome, 4) unawareness of one's diagnosis before the initiation of their infertility treatment, and 5) married status. We recruited five men aged 28-39 years with Klinefelter syndrome. Their age of marriage ranged within 18-62 months, and the duration of their infertility was 17-62 months.

All participants were interviewed for 55-105 min by the researcher who is a

nurse and a qualified sterile counselor. The interview guide included the following questions: 'how did you feel when you were diagnosed with Klinefelter syndrome?' and 'why do you want to have your own child?'

The data were collected using semi-structured interviews at the clinics, which were recorded using a digital recorder. We used an interview guide, and following each interview, the recorded data were transcribed and analyzed using thematic analysis. The thematic analysis approach was used to identify the patterns of meaning in the dataset (12). The thematic analysis approach is a six-phase process, including familiarizing with the data, coding, searching for a theme, reviewing the theme, defining and naming, and writing up.

We read the transcripts to get a detailed understanding of the content and become familiar with it. Subsequently, the texts were searched and reviewed for obtaining themes. During the process of defining and naming the themes, they were repeatedly discussed to be confirmed. To maintain the methodological rigor, the data were collected by a specialized nurse for data credibility. The data were analyzed by a qualitative research specialist to ensure the trustworthiness of the study. Ethical approval was obtained from the Ethics Committee of Graduate School of Medicine at Tohoku University, Tohoku, Japan (No. 2012-1-600).

Results

The demographic data of the five participants are tabulated in Table 1. The data coding resulted in the extraction of four themes. These themes included 'I cannot understand my diagnosis', 'the cause of my azoospermia was identified', 'I do not have any other health problems besides Klinefelter syndrome', and 'Klinefelter syndrome means that I am more likely to have a viable sperm'.

Table 1. Demographic information of the participants

AZF: azoospermic factor, MD-TESE: microdissection testicular sperm extraction

Theme (4)	Codes (17)
I cannot understand my diagnosis.	I do not know what the meaning of Klinefelter syndrome is. It is unbelievable that I have a congenital disease. What is Klinefelter syndrome?
The cause of my azoospermia was identified.	My useless place was found. I have been released from the pressure of infertility and my wife. The reason why I could not have a child was the problem with my chromosome.
I do not have any other health problems besides Klinefelter syndrome.	I do not often think that I have Klinefelter syndrome. Having Klinefelter syndrome has not created any problem in my daily life. There is nothing to be bothered in my life even if I have Klinefelter syndrome.
Klinefelter syndrome means that I am more likely to have viable sperm.	If my Klinefelter syndrome does not have any problem, the probability of having children is half. If my Klinefelter syndrome has some problem, I would never have a child. Since I have Klinefelter syndrome, I have a higher possibility of finding sperms than others. If there is a possibility of having a child, I can also endure a sore treatment. I will not recover from a congenital disease; therefore, why do not you take infertility treatment at a specialized hospital? When I heard that the people with Klinefelter syndrome have sperm at the establishment of 60%, I had big hopes for my future. I thought that I could undergo surgery if there was a 60% chance of taking sperm. Men with 47 chromosomes azoospermia have a 10% higher probability that sperm can be harvested than those with 46 chromosomes.

Table 2. Themes and codes extracted from the data

Table 2 illustrates all themes and codes obtained from the data.

Theme 1: 'I cannot understand my diagnosis.'

The participants initially did not understand the meaning of their diagnosis nor did they recognize the name of their condition, partly because they had never experienced any symptoms. The lack of inconvenience or other difficulties in the participants' lives made the diagnosis difficult to comprehend. This had led them to assume that they might still be able to have children naturally as they had no other health-related problems. In this regard, one of the participants commented:

"When I first heard that I have Klinefelter syndrome, I thought, 'What is

about Klinefelter syndrome from the doctor, and I went back home and searched about it on the Internet. I read the notes repeatedly, but I did not understand it. I continued to read and finally understood that it was a congenital disease. I cannot believe it at all...but I do not think that I have a disease. I think it is still possible to have a child naturally.'" (Case B)

Theme 2: 'The cause of my azoospermia was identified.'

The participants reported to struggle with the question, "why do I have azoospermia?" since diagnosis with azoospermia. For these participants, the diagnosis of Klinefelter syndrome provided a definitive answer to this question. Some subjects were relieved to know

	Age (years)	Occupation	Wife's age (years)	Chromosomal exam	AZF	Duration of infertility (months)	Infertility treatment
Case A	28	Driver	21	47,XXY	(-)	18	MD-TESE
Case B	31	Independent business person	26	47,XXY	(-)	62	MD-TESE
Case C	39	Pharmacist	37	47,XXY	(-)	34	MD-TESE
Case D	39	Care worker	35	47,XXY	(+)	31	MD-TESE
Case E	39	Public worker	31	47,XXY	(+)	52	MD-TESE

that? Is it the name of a disease?' I heard

the cause of their infertility; accordingly, two

participants indicated this as follows:

"(I) think that this chromosomal abnormality is responsible for this entire problem! I have an additional X chromosome." (Case D)

"My wife looked up Klinefelter syndrome on the Internet, and told me that there are many types of azoospermia, and Klinefelter syndrome is just one. Therefore, I understood why I have azoospermia." (Case A)

Theme 3: 'I do not have any other health problems besides Klinefelter Syndrome.'

The participants had grown up, been married, and been living without any problems. They had spent their lives without any problems or inconveniences, except for their infertility. When they were told that they had Klinefelter syndrome, they considered that the diagnosis would not cause much trouble in their lives as they had not experienced any problems before. Some participants were concerned that if they had sons, they would pass down their condition to their sons. However, they mentioned that they did not find it particularly concerning as this condition did not cause much trouble in their lives. In this regard, one of the participants mentioned:

"I was surprised to find out, but I was told that there would be no influence on my life. I do not think that my diagnosis is a serious problem, my wife does. I simply feel that it is not serious. However, she has become very depressed. It is not her fault that we cannot have a child." (Case C)

Theme 4: 'Klinefelter syndrome means I'm more likely to have a viable sperm.'

Upon diagnosis, some participants were informed by their doctors that 60% of the Klinefelter syndrome patients have viable sperms in their own testes, making them less likely to be completely azoospermic, compared to the men with other forms of infertility. Therefore, these participants were more relieved with this information than being shocked by the fact that they had a chromosomal abnormality. In other words, they saw some chances that they could have their own child. In this respect, one of the participants made the following remark:

"The doctor said, 'Your chromosome is abnormal, but 60% of such men still have their own sperm, which is sufficient to have a child.' I was hopeful when I heard it. Great! I had a feeling of relief. I may have viable sperms and might be able to have a child!" (Case A)

Discussion

The present study was an attempt to clarify the men's impressions of receiving the diagnosis of Klinefelter syndrome. To this end, five participants with Klinefelter syndrome were interviewed. The analysis of the data revealed four themes in this regard, including 'I cannot understand my diagnosis', 'the cause of my azoospermia was identified', 'I do not have any other health problems besides Klinefelter Syndrome', and 'Klinefelter syndrome means that I am more likely to have viable sperms'. Theme 4 was the most specific impression in this study.

The participants in this study were diagnosed with azoospermia and desired to have their own child by undergoing microdissection testicular sperm extraction (MD-TESE), although this therapeutic approach is a physically invasive and potentially harmful reproductive treatment. The participants were relieved to be diagnosed with a chromosomal disorder rather than a reproductive one. This reaction is very specific to the people who are azoospermic due to Klinefelter syndrome rather than other causes.

The participants and their families were generally shocked by the diagnosis of Klinefelter syndrome (13, 14), which is typically associated with disorders, such as growth disorder and intellectual disability (15). However, the participants understood that their diagnosis explained their infertility. Therefore, it appears they were unaware of the chromosomal abnormality and surprised with the discovery as they had normal lives.

After diagnosis with Klinefelter syndrome, the participants assumed that this condition was not life-threatening because they did not notice any symptoms. Furthermore, the majority of the participants were unaware of Klinefelter syndrome as it was only diagnosed while being examined for sterility (16); in this regard, themes 1-3 support this issue.

The testicles of men with Klinefelter syndrome are 20% more likely to contain viable sperms, compared to those of the men with azoospermia due to other causes (17). Accordingly, the diagnosis of Klinefelter syndrome offers hope to azoospermic men wishing to father their own child. This was indicated in theme 4 (i.e., Klinefelter syndrome means that I am more likely to have viable sperm). This may be an important explanation for why several participants opted to undergo MD-TESE.

Some men with azoospermia are in denial about their reproductive capability and become uncertain of their status as a man. This may be due to an underlying belief that conceiving a child with one's own sperm is considered masculine (3). Men with azoospermia may be relieved to find that they have Klinefelter syndrome because they assumed that they may have viable sperms with this chromosomal problem, and therefore be able to have a child.

We believe that the participants chose to use assisted reproductive technology because they had Klinefelter syndrome rather than other types of infertility. This finding indicates the need for the development of support strategies for assisted reproduction among the men with Klinefelter syndrome. This idea may encourage these patients to undergo MD-TESE and have a high expectation to have their own child. However, they are highly discouraged when they are unable to achieve their expected results. This study aimed to understand the impressions of these men.

Despite the implications of this study, the participants were limited to adults with azoospermia, diagnosed with Klinefelter syndrome during their reproductive therapy. Therefore, these results cannot be generalized to all Klinefelter syndrome patients. Consequently, further studies are needed to investigate this issue using a larger sample size.

Conclusion

As the findings indicated, the men diagnosed with Klinefelter syndrome had various feelings about their diagnosis. They were hopeful about regaining their fertility capability by undergoing TESE. The identification of the views and impressions of

these patients can be helpful for the healthcare workers with regard to the fact that they have higher expectations regarding MD-TESE.

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Conflicts of interest

The authors of the present study have declared no conflicts of interest regarding the publication of this study.

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