Original Article

The Impact of Individual Factors on Health Information-Seeking Behavior of Infertile Couples Undergoing Assisted Reproductive Technologies: Longo Model

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Abstract

Background: This study investigated the impact of individual factors on the Health information-seeking behavior (HISB) of infertile couples undergoing Assisted Reproductive Technologies (ART).

Materials and Methods: This applied study was done using the descriptive-analytical method. The population of the study remains to be infertile couples undergoing ART referred to a public Infertility Center and a private one in Bandar Abbas (capital of Hormozgan province, Southern Iran) in the summer of 2020. Using simple random sampling, 168 people were selected. The data collection tool was a questionnaire extracted from Longo HISB Model, used after validation and reliability. Data were analyzed by SPSS software using descriptive and inferential tests.

Results: The results showed that individual factors (gender, education, income, age, and cause of infertility) affect the HISB of infertile couples. Based on the analysis of variance, there was a significant difference between infertile couples concerning Passive Information Receipt ($F = 2.688$ and $P = 0.048$) so the couples with a male cause used Passive Information Receipt more.

Conclusions: Considering the results, it is necessary for the country's health system to take appropriate measures to provide an appropriate situation for better decision-making for infertile couples and improve the chances of fertility by reducing the existing inequalities to Active Information Receipt and quality health information.

Keywords: Health, information-seeking behavior, infertility

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Introduction

Infertility is defined as not being able to conceive after at least 1 year of unprotected intercourse and without using contraceptive methods.[1] Having been a global issue, infertility has been taking an increasing trend in recent years in most parts of the world.[2] According to the latest report of the World Health Organization, globally 15% of couples are infertile.[3] Being eager to become parents, the couples seek primary treatments for infertility including drug therapy and surgery.[4] Not getting the desired results, they usually turn to Assisted Reproductive Therapies/

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Technologies (ART) including the therapies leading to artificial insemination.[5]

Health information-seeking behavior (HISB) represents the purposeful behavior of individuals to obtain facts and satisfy health information needs. It also indicates how they search, find, and use information related to health conditions through various channels.[6] Moreover, research shows that individual factors including Social and Demographic characteristics, and psychological variables influence HISB.[7,8] They play a significant role in addressing inequalities in accessing, searching, and processing health information, and also taking informed actions.[9] Various quantitative and qualitative studies addressed the health information-seeking of infertile couples under treatment. The areas of the research include information needs and counseling needs,[10,11] online and face-to-face information search,[1,12] information channels,[13-16] the attitude of infertile couples toward health information-seeking,[17] goals and motivations for searching medical information in online resources,[18,19] and the psychological aspects of infertility for acquiring information.[20] The results of research on HISB show that the individual (personal) factors/characteristics of the couples undergoing artificial insemination about the dimensions of HISB as a separate topic have been inadequately investigated. Hence, the knowledge gap in the field necessitates performing this independent study.

In health information behavior research, individual characteristics are addressed in two dimensions: (1) Social and Demographic characteristics (age, gender, income, education, job status, etc.), and (2) Psychological variables such as personality traits and expectations of Individuals, goals, beliefs, values, attitudes, emotions, skills, and/or the resources which can be explored.[8] Addressing the social and demographic characteristics, studies investigate the effects of moderators on HISB in different models and theories.[13-15,21]

However, the present study uses the Longo model to evaluate the dimensions of HISB.[22] The most important features of this model compared to other health information-seeking models include the active and passive receipt of information and the impact of information on patients.[23] This model includes various themes including information receipt (active and passive), information sources, information impact, perception, interpersonal interaction, and information-searching behavior.[22] Studies used this model in different subjects including the HISB of diabetic patients,[23,24] cancer patients,[6] and students.[25,26] Given the above, this study is primarily to find the impact of individual factors (personal characteristics) on the themes of the HISB of infertile couples undergoing ART.

The infertility rate in Iran is reported to be 20.2%. In other words, one out of every five Iranian couples experience infertility.[27] One of the provinces of the country with a high rate of infertility is Hormozgan in the south of the country. This province is one of the least privileged provinces in Iran in terms of healthcare facilities. Moreover, there used to be no infertility centers in the province before 2018.[28] Therefore, identifying the health information behavior of infertile couples undergoing treatment in this geographic area could be used as scientific evidence for the decision-making concerning the health and treatment of infertile couples undergoing ART treatment. The findings might also have global implications for research in the HISB of infertile couples undergoing ART treatment. Moreover, since further development of infertility health and clinical interventions requires the participation of stakeholders (infertile couples under treatment), the results of this study could also be important for the stakeholders of the reproductive health community to participate in the process of HISB and to fill important gaps.

Materials and Methods

Study design

This descriptive-analytical study is an applied work in terms of purpose. Data were collected using a questionnaire developed based on the Longo Health Information Behavior Model. There were 24 items addressing the impact of individual characteristics on HISB.[22]

The questionnaire included two main parts: Demographic information including age, gender, income, education level, and cause of infertility; and HISB themes including (I) *Information Receipt* (6 items: 3 for Active Information Receipt and 3 for Passive Information Receipt), (II) *Information Resources* (17 items: 6 for Obtaining Information from People, 7 for Obtaining Information from Traditional Media, and 4 items about Obtaining Information from New Media), (III) *Impact of Health Information on Patients* (4 items about the Impact of Information on the Treatment Process and 3 items for Stress), and (IV) *Perception, Interpersonal Interactions, and Seeking Information Behavior* (16 items: 5 about Perception in Search of Information, 6 about Behavior in Search of Information, and 5 about Interpersonal Interaction in Search of Information). The responses were measured on a five-choice Likert scale ranging from 4 (very high) to 0 (not at all).

The validity of the questionnaire was confirmed by five experts in information science, and five gynecologists and infertility specialists (CVR's Value: 0.83). To determine the clarity of the items, the questionnaire was distributed among 30 members of the target community. Then, each item was reviewed from the viewpoint of clarity and understandability. Next, the necessary corrections were made. Finally, the face validity of the items was calculated as 81.1 using the Impact of items formula.

To calculate the reliability of the questionnaire, we used the questionnaire's themes. Therefore, Cronbach's alpha for "Information Receipt," "Information Resources," "Impact of Health Information on Patients," and "Interpersonal Interaction in Search of Information" were 0.874, 0.836, 0.881, and 0.798, respectively.

Sampling strategy and sample size

The study population consisted of 149 infertile couples with primary infertility (298 cases) referring to two infertility

centers in Hormozgan province in the summer of 2020: Center-A, 204 couples referred to a public center affiliated to Hormozgan University of Medical Sciences (HUMS), and Center-B, 94 couples were referred to a private center affiliated with Umm-e-Leila hospital. According to Cochran's table (95% CI, SD 0.5, and margin of error of 5%), using a random sampling method, 168 people (Center A: 114 cases (74 couples), and Center B: 54 cases (27 couples)) were selected. In other words, 60% of the cases were chosen from the public infertility treatment (Center A, more referrals) and 40% from the private infertility treatment (Center B, less referrals). Attempts were made to have samples with maximum diversity (in terms of gender, age, level of education, income level, and cause of infertility).

Statistical analysis

Data analysis was performed using the SPSS statistics software package version 23. The normality of the data was assessed using the Kolmogorov–Smirnov test. Data were analyzed at two levels of descriptive statistics (frequency distribution, mean and standard deviation) and inferential statistics (Pearson and Spearman correlation test, independent t-test, and multivariate analysis of variance). The significance level was considered $P \leq 0.05$.

Ethical considerations

This research was approved by the ethics committee of HUMS and the assigned code was IR.HUMS.REC.2019.017. Moreover, the principles of ethics in research including informed written consent, anonymity, confidentiality, and the right of participants to leave the research were considered. The title and objectives of the study were clearly explained at the beginning of the questionnaire.

Results

In this study, the mean age of women was 32.7 ± 3.7 years old while men aged 35 ± 6.5 years on average. Males with academic degrees (27.3%) outnumbered females (20.6%). Other participants had a high-school diploma or lower education. Most of the men (64.3%) had low incomes. The primary cause of infertility with regard to gender was observed in females (41.2%). Only 23.6% of males were the cause of infertility [Table 1].

Table 1: Demographic characteristics of study participants (*n*=168)

Variable	*n* (%)
Sex	
Male	84 (50)
Female	84 (50)
Age, y	
25-30	46 (27.33)
30-35	94 (55.95)
35-40	23 (13.86)
≥40	5 (2.86)
Estimated monthly household income (very low and low income, medium income, good income)	
<20.000.000 Iranian Rials	108 (64.3)
20.000.000-29.999.999 Iranian Rials	23 (14.6)
30.000.000-39.999.999 Iranian Rials	21 (12.3)
≥ 40.000.000 Iranian Rials	15 (8.8)
Level of education	
Lower than diploma	73 (43.46)
Diploma	18 (10.71)
Associate	54 (32.15)
Bachelor	14 (8.33)
Master	9 (5.35)
Cause of infertility (self-described)	
Male	40 (23.6)
Female	69 (41.2)
Joint	43 (25.7)
Unknown	16 (9.5)

HISB was examined in four themes (10 components). Comparing the components of HISB with regard to gender, an independent t-Test revealed a significant difference between men and women in the component of "Behavior in Search of Information" ($P < 0.001$). The average score of women for this component was higher [Table 2].

Regarding education, using the Pearson correlation coefficient, we found a direct significant relationship for most of the HISB's components except for "Perception in Search of Information" ($P < 0.531$, r = 0.06). Moreover, the analysis of the HISB's components regarding monthly income revealed a significant direct relationship for all the components except "Behavior in Search of Information" ($P < 0.780$, r = 0.04), and "Perception in Search of Information" ($P < 0.341$, r = 0.05) [Table 3].

Regarding age, using the Pearson correlation coefficient, the results indicated a significant reverse relationship for most of the HISB's components except for "Impact of Information on the Treatment Process" ($P < 0.137$, r = 0.09), "Perception in Search of Information" ($P < 0.451$, r = 0.05), and "Stress" (R < 0.759, r = 0.13) [Table 3].

The results of the multivariate analysis of variance (MANOVA) showed that the significance level of one of the tests (Roy's largest root) was less than 0.05 [Table 4]. Therefore, there was a significant difference between couples with various causes of infertility from the viewpoint of at least one of the dependent components of HISB.

To be more precise, a one-way analysis of variance in the MANOVA context was carried out on the dependent component. This analysis showed the couples maintained a significant difference in the "Passive Information Receipt" component ($P = 0.048$, F = 2.688). No other significant differences were detected in the components. To further understand the difference, an investigation of the average of the mentioned component in different groups of couples with the cause of infertility showed that men were inclined toward "Passive Information Receipt" more [Table 5].

Table 2: The relationship of gender with HISB of infertile couples undergoing treatment

Themes of HISB	Components of HISB	Female		Male		*P*
		Mean	SD	Mean	SD	
Receipt of Information	Active Information Receipt	42.13	12.87	38.82	13.80	0.891
	Passive Information Receipt	41.06	13.98	39.55	14.83	0.923
Information Resources	Obtaining Information from People	25.91	10.11	21.46	9.71	0.653
	Obtaining Information from Traditional Media	7.93	12.27	5.06	10.77	0.271
	Obtaining Information from New Media	19.89	14.87	19.06	14.53	0.557
Impact of Information on Patients	Impact of Information on Treatment Process	76.91	11.74	74.63	9.13	0.712
	Stress	69.23	18.52	66.18	17.93	0.739
Perception, Interpersonal Interactions, and Seeking Information Behavior	Behavior in Search of Information	58.10	11.81	50.13	9.66	<0.001
	Perception in Search of Information	58.33	12.92	55.71	11.66	0.925
	Interpersonal Interaction in Search of Information	49.52	12.90	47.10	10.53	0.089

Table 3: The relationship between level of education, income and age with the HISB

Themes of HISB	Components of HISB	Education Level		Income		Age	
		r	*P*	*r*	*P*	*r*	*P*
Receipt of Information	Active information receipt	0.26	0.001<	0.21	0.001<	−0.27	<0.001
	Passive information receipt	0.31	0.001<	0.25	0.001<	−0.16	<0.001
Information resources	Obtaining information from people	0.20	0.001<	0.13	0.017	−0.12	0.005
	Obtaining information from traditional media	0.27	0.001<	0.16	0.001<	−0.27	<0.001
	Obtaining information from new media	0.26	0.001<	0.26	0.001<	−0.22	<0.001
Impact of information on patients	Impact of information on treatment process	0.21	0.001<	0.17	0.004	0.09	0.137
	Stress	0.13	0.013	0.09	0.011	0.13	759/0
Behavior, perception, and interpersonal interaction in search of information	Behavior in search of information	0.12	0.015	0.04	0. 780	−0.24	0.015
	Perception in search of information	0.06	0.351	0.05	0.341	0.05	0.451
	Interpersonal interaction in search of information	0.19	0.001<	0.24	0.001<	−0.19	0.001<

*Correlation at the level of <0.05 is significant

Table 4: Summary of multivariate analysis of variance between causes of infertility and HISB

Effect	Value	*F*	*P*
Intercept Groups			
Pillai's Trace	0.250	1.429	0.068
Wilks' Lambada	0.767	1.437	0.065
Hotelling's Trace	0.282	1.444	0.063
Roy's Largest Root	0.168	2.639	0.005

Discussion

This study uses the Longo model as its conceptual framework to investigate the individual factors influencing the HISB of infertile couples undergoing ART. The results confirmed that individual factors including gender, education, income, age, and cause of infertility were influential on their HISB. The mean of all the HISB components in women was higher than in men. In fact, women were more likely to take responsibility for reproductive health information-seeking because they naturally and socially believe in pregnancy and motherhood as gender-specific roles.[13] Hence, women seek health information related to infertility treatment more actively. Several earlier studies reported that women compared to men had more information about reproductive health. This may explain why they search, receive, and use health information more.[10,11,17] Previous studies also confirmed the assumptions that women were more likely to seek information and improve fertility chances via online resources.[16,23]

We also showed that the HISB of infertile couples was inversely affected by the level of education and income. Couples with a higher level of education and income showed higher demand for searching and receipt of information from various information sources. Since studies about social categories reported similar findings in different parts of the world, it could be concluded that this is a global health issue.[9,29] Moreover, many studies reported an inclined situation in HISB. That is, people from lower classes of society (in terms of education and income) are less active in seeking information, although they need more information compared to those in higher classes.[17,24,26,30] A study in Saudi Arabia found that infertile couples with a low level of education were less likely to accept ART.[31] Satir and Kavlak (2017) reported that infertile women with a higher level of education demonstrated a higher level of ability and skill for receipt and search for fertility information from online resources. They also made correct and informed decisions in critical and stressful situations.[19] Another influencing factor for information-seeking addressed in earlier studies is income.[26] People with a lower level of economic status are less

Table 5: One-way analysis of variance for investigation of the averages

Source	Themes of HISB	Dependent variables of HISB	Type III Sum of Squares	df	Mean Square	*F*	Sig.
Cause of infertility	Receipt of information	Active information receipt	18.399	3	6.133	0.737	0.532
		Passive information receipt	68.339	3	22.780	2.688	0.048
	Information Resources	Obtaining information from people	10.756	3	3.585	0.598	0.618
		Obtaining information from traditional media	50.433	3	16.811	2.104	0.102
		Obtaining information from new media	35.931	3	11.977	0.999	0.395
	The effect of information on the patient	Impact of information on treatment process	8.425	3	2.808	0.473	0.702
		Stress	38.582	3	12.861	2.077	0.072
	Interpersonal behavior, understanding and interaction in search of information	Behavior in search of information	23.556	3	7.852	1.747	0.159
		Perception in search of information	13.993	3	4.664	0.799	0.496
		Interpersonal interaction in search of information	19.554	3	6.518	1.502	0.216

*Correlation at the level of <0.05 is significant

likely to seek information.[7,9,22,32] Moreover, an experimental study reported HISB in lower-income people was significantly less than in people with a higher level of income.[15] However, most of the cases in our study were from a lower level in terms of income. They reported inappropriate economic status that can justify the results of our study.

Age also affected the components of HISB. A study from the United States reported that younger people were four times more likely to actively seek health information from web-based resources compared to middle-aged ones.[33] Deeks *et al*.[14] also reported that HISB decreases with age. Moreover, some studies reported that infertile people are less likely to try to participate in the process of treatment with age.[5,34] This may justify why the chances of fertility reduce when people grow older. However, some other studies ignoring age stated the participation of infertile couples in choosing the treatment method as the most important objective and motivation for seeking information in online resources.[9,35] Findings of some studies showed that counseling methods (group counseling, cognitive behavioral therapy, group psychotherapy) and applied techniques in changing thoughts, attitudes, and beliefs as a complement to infertility treatments can play an important role in reducing stress, frustration, improve the couple's mental health, and participate in treatment.[36,37]

The cause of infertility was also a determining individual factor in HISB. Infertility with male cause showed a significant difference with the component of "Passive Information Receipt." This can be explained by the fact that male infertility evokes an attack on male emotions[34] which in turn affects active or passive information receipt.[38] Therefore, HISB is led to passive information receipt in infertility with male cause. Miner *et al*.[18] (2019) reported that infertile men were less inclined to talk, discuss, and receive information about their disease compared to men with cancer. Another study also stated that men did not have a positive attitude toward seeking and receiving health information.[17,19,34]

Unlike Longo's model for HISB in which "Active Information Receipt" from information resources increases patients' knowledge and awareness about the disease from which they are suffering; and in turn, it causes effective participation of the patient in the treatment,[22] this study revealed no significant correlation between other components of HISB regarding the cause of infertility. This could be important in HISB due to two main reasons: (1) the cause of infertility and (2) the perceived risk of losing the chance of fertility.

One of the limitations of the present study was the location of the research. This study was carried out in Hormozgan which is known as one of the least privileged provinces of the country in terms of access to medical services and interventions for reproductive health. Hence, performing a similar study in other settings would allow the comparison of other studies with the findings of the present work. Another limitation of the research is the small sample size. Doing research with a larger sample size is likely to yield more accurate results.

Conclusion

This study reported the relationship between individual factors affecting HISB of infertile couples undergoing ART for the first time. Although women were more active in seeking health information than men, HISB was also influenced by the couples' level of education, income, and age. Male infertility also affected men's "Passive Information Receipt." Therefore, the findings of this study highlight the special attention to be paid to individual factors by reproductive health centers and associations to solve the issues in the HISB. Moreover, this study indicates the need to provide the necessary context for "Active Information Receipt" to seek, understand, and use the information to facilitate health-promoting behaviors.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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