Physicians' Knowledge and Attitude Towards Fecal Microbiota Transplant in Iran

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ABSTRACT

BACKGROUND

Fecal microbiota transplant (FMT) is employed to replace the 'unhealthy' microbiota of the patient with the 'healthy' microbiota of a pre-screened healthy donor. Given the growing importance of gut microbiota dysbiosis in the pathogenesis of intestinal or extraintestinal diseases; it is conceivable that FMT becomes integrated in the routine clinical practice. Our objective was to assess the knowledge and attitude of the Iranian physicians towards FMT.

METHODS

We surveyed the participants of Iranian gastroenterology and hepatology 2014 conference.

RESULTS

Overall, 146 (68.5%) were familiar with FMT; of whom 132 (94.28%) were willing to accept FMT if scientifically and ethically approved and 115 (88.46%) were willing to refer their patients for FMT if indicated. In total, 42 (30.7%) had identified stool preparation as the most unappealing aspect of FMT, while 17 (11.6%) reported the therapeutic use of fecal material as the most unappealing and 39 (28.5%) indicated that both are equally unappealing. The doctors who had an overall positive opinion toward FMT reported less negative feelings towards FMT.

CONCLUSION

Iranian physicians are willing to accept FMT as a therapeutic option if it is scientifically justified and ethically approved. Nevertheless, physicians prefer to skip the stool preparation phase; as they are more in favour of synthetic microbiota as opposed to fecal microbiota.

KEYWORDS
Attitude; Awareness; Fecal microbiota transplant; FMT; Gut microbiota; Physician

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INTRODUCTION

The gut microbiota is required for intestinal homeostasis and is functionally active. The host-microbiota symbiosis is maintained in the healthy state. However, any dysbiosis due to either microbiota composition alteration or host genetic susceptibility could result in intestinal or extraintestinal pathogenesis.[1] The mechanism by which the micro-

biota results in disease initiation or progression is under investigation. Nevertheless, it is speculated that restoring the symbiosis could have therapeutic benefits. Fecal microbiota transplant (FMT) is used to replace the 'unhealthy' microbiota of the patient with the 'healthy' microbiota of a pre-screened healthy donor.[2]

Few reports exist on attitude assessment of patients and physicians towards FMT. Patient attitude has generally been positive towards FMT. In a survey of patients and accompanying family members in the USA, people were presented with two cases of Clostridium difficile infection (CDI) and were offered antibiotic with or without FMT (with 90% vs. 65% success rate, respectively). 85% of responders chose to undergo FMT in the scenario where the exact nature of FMT was not described and 81% when FMT was completely explained (not significantly different). Importantly, if the physician recommended FMT, patients were more willing to accept it in a statistically significant manner.[3] In a survey of patients with ulcerative colitis in an outpatient setting in the USA, 46% of patients were willing to undergo FMT. Patients with more severe disease or history of hospitalisation were more willing to choose FMT.[4] Physicians' attitude towards FMT has only been assessed for CDI.[5,6] It is argued that physicians are generally less willing to accept FMT than patients.[7,8] FMT has not yet been established in Iran. Moreover, the attitude of Iranian physicians towards FMT is not known. Since, the gut microbiota is a major contributor to many diseases; it is conceivable that FMT will become part of the integrative therapeutic strategies in the future. Therefore, the objective of this study was to investigate the Iranian physician's knowledge and attitude towards FMT.

MATERIALS AND METHODS

The target population of this study was physicians who attended the Iranian gastroenterology and hepatology conference 2014. A questionnaire was devised to firstly assess the general knowledge of individuals on the importance of gut microbiota in health and disease; and secondly, to estimate the awareness of and attitude towards FMT. Participants were considered familiar with FMT if they self-reported familiarity with the method; who, subsequently, were asked to complete the rest of the questionnaire. To assess the physician's knowledge, we asked general questions on familiarity with the indications; knowledge of the US Food and Drug Administration (FDA) stance; previous encounter with clinical trials of FMT; and knowledge of diseases which might benefit from FMT. The questionnaires were distributed at the beginning of each session and participants were requested to fill in and return the questionnaires during the breaks. Face-to-face interaction during the breaks was also conducted to encourage participants to complete the questionnaires. Categorical variables were compared by $\chi 2$ test. Data analysis was performed with SPSS (version 22; SPSS, Chicago, IL, USA). *P* values of less than 0.05 were considered statistically significant.

RESULTS

Participants' characteristics and their general knowledge of gut microbiota

In total 217 physicians completed the questionnaire; four of which were excluded because the question on familiarity with FMT was left unanswered. Of the remaining 213 physicians who completed the questionnaires, 122 (57.3%) were male including mainly gastroenterologists, internists, and general practitioners. The mean age of participants was 45.50 ± 9.04 and 38.00 ± 7.85 for men and women, respectively. Overall, 200 (93.9%) knew that gut microbiota was required for the normal homeostatic state and 172 (80.8%) knew that gut microbiota contributes to pathogenesis of disease. One hundred eighty three (86.4%) physicians thought it to be possible to therapeutically manipulate the composition of gut microbiota. The participants' demographics are summarised in Table 1.

Participants' knowledge and attitude towards FMT

Overall, 146 (68.5%) were familiar with FMT; of whom 132 (94.28%) were willing to accept FMT

Table 1: Characteristics of participants

Characteristics		Male (n=122)	Female (n=83)
Age, mean±SD		45.50 ± 9.04	38.00 ± 7.85
Specialty, n(%)	Gastroenterologist	66 (59.5)	17 (22.7)
	Internal medicine	35 (31.5)	26 (34.7)
	General practitioner	3 (2.7)	19 (25.3)
	Other	7 (6.3)	13 (17.4)
Work setting, n(%)	University	43 (52.4)	34 (50.7)
	Private	22 (26.8)	17 (23.9)
	Government	17 (20.7)	16 (25.4)
Role of gut microbiota in health, n(%)	Yes	117 (95.9)	77 (92.8)
	No	1 (0.8)	0
	I do not know	4 (3.3)	6 (7.2)
Contribution of gut microbiota to diseases, n(%)	Yes	98 (81.0)	69 (83.1)
	No	12 (9.9)	7 (8.4)
	I do not know	11 (9.1)	7 (8.4)
Possible manipulation of the microbiota, n(%)	Yes	106 (87.6)	72 (87.8)
	No	2 (1.7)	3 (3.7)
	I do not know	13 (10.7)	7 (8.5)

if scientifically and ethically approved and 115 (88.46%) were willing to refer their patients for FMT if indicated. The main reason for not referring the patient despite the overall agreement with the method was the uncertainty about the patient acceptance. Not surprisingly, the doctors who had an overall positive opinion towards FMT were significantly more willing to refer their patients if indicated, compared to those who did not agree with FMT [110 (91.7%) vs. 4 (50%), $p<0.001$].

Of those who were familiar with FMT, 73 (54.1%) reported a negative first attitude towards FMT. Next, we aimed to identify the most unpleasant aspect of FMT for the physicians. In total, 42 (30.7%) had identified stool preparation as the most unappealing aspect of FMT while 17 (11.6%) reported the therapeutic use of fecal material as the most unappealing and 39 (28.5%) indicated that both are equally unappealing. The doctors who had an overall positive opinion towards FMT reported less negative feelings towards FMT compared to those who did not agree with it because of the unpleasant nature of it [66 (52.38%) vs. 4 (80.0%)]. When we offered a choice between fecal and synthetic microbiota, physicians preferred synthetic microbiota to fecal microbiota [51 (34.9%) vs. 30 (20.5%)]. The results are summarised in Table 2 and Table 3.

DISCUSSION

It is argued that physicians are generally less willing to accept FMT than patients.[7] In a survey of American physicians in 2010, only 40% were willing to refer patents for FMT.[8] However, we identified that most of the Iranian physicians are familiar with FMT and generally hold a positive attitude towards it. The majority of the participants said that they accept FMT as a therapeutic modality providing that it is scientifically as well as ethically approved. Moreover, they are willing to refer their patients if indicated. This is in accordance with other reports on physicians' attitude towards FMT. In a report from the USA, gastroenterologists and infectious disease specialists were asked if they would refer CDI patients for FMT. The majority of both groups were willing to refer CDI patients for FMT.[5] The highly positive attitude of Iranian physicians towards FMT can be in part attributed to the growing understanding of the role of gut microbiota in intestinal and extra-intestinal disease among

Table 2: **Knowledge and attitude towards FMT in physicians who are familiar with FMT (n=146)**

Item		GI (n=71)	Internist (n=38)	Other (n=26)
Familiar with FMT indications, n(%)	Yes	61 (85.9)	14 (36.8)	13 (50.0)
	No	10 (14.1)	24 (63.2)	13 (50.0)
Familiar with FDA stance on FMT, n(%)	Yes	15 (21.1)	1 (2.6)	2 (7.7)
	No	56 (78.9)	37 (97.4)	24 (92.3)
Familiar with clinical trials of FMT, n(%)	Yes	26 (37.7)	3 (8.3)	6 (23.1)
	No	43 (62.3)	33 (91.7)	20 (76.9)
The best way of FMT, n(%)	Retention enema	19 (31.1)	4 (12.1)	7 (26.9)
	Colonoscopy	18 (29.5)	6 (18.2)	6 (23.1)
	Nasogastric tube	9 (14.8)	8 (24.2)	2 (7.7)
	Enema or colonoscopy	3 (4.9)	3 (9.1)	1 (3.8)
	I do not know	12 (19.7)	12 (36.4)	10 (38.5)
The first reaction to FMT, n(%)	Unpleasant	20 (30.3)	12 (34.3)	7 (30.4)
	Dirty	3 (4.5)	1 (2.9)	1 (4.3)
	Disgusting	2 (3.0)	5 (14.3)	1 (4.3)
	Unpleasant and disgusting	1 (1.5)	0	0
	All	8 (12.1)	3 (8.6)	3 (13.0)
	None	32 (48.5)	14 (40.0)	11 (47.8)
The most unappealing aspects of FMT, n(%)	Stool preparation	22 (32.8)	8 (23.5)	10 (40.0)
	Therapeutic use	7 (10.4)	7 (20.6)	2 (8.0)
	Both	18 (26.9)	11 (32.4)	6 (24.0)
	None	20 (29.9)	8 (23.5)	7 (28.0)
Preference, n(%)	Fecal microbiota	14 (20.6)	7 (19.4)	8 (32.0)
	Synthetic microbiota	27 (39.7)	10 (27.8)	10 (40.0)
	No difference	12 (17.6)	6 (16.7)	1 (4.0)
	Both	11 (16.2)	7 (19.4)	4 (16.0)
	I do not know	4 (5.9)	6 (16.7)	2 (8.0)
Patient referral for FMT if indicated, n(%)	Agree	59 (89.4)	29 (93.5)	18 (78.3)
	Disagree	7 (10.6)	2 (6.5)	5 (21.7)
Overall opinion regarding FMT, n(%)	Agree	65 (95.6)	34 (94.4)	22 (88.0)
	Disagree	3 (4.4)	2 (5.6)	3 (12.0)

The missing data are omitted for final per cent calculation

gastroenterologists and internists via educational monthly seminars of the Iranian association of gastroenterologists and hepatologists.

Stool preparation was reported to be the most unappealing aspect of FMT for physicians in our study. There are currently commercial companies, which have built a biobank of pre-screened stool material, which are shipped frozen upon request.[9] It is debatable whether the fecal material is a drug or human tissue, and as such not amenable to commercialisation.[10] Nevertheless, it appears that physicians would prefer to skip the stool preparation phase; as they are more in favour of synthetic microbiota as opposed to fecal microbiota. Furthermore, the current guidelines for determination of a healthy donor disregard the importance of assessing the composition of the gut microbiota prior to transplant; which is arguably the reason why FMT trials in diseases other than CDI have had controversial results so far. Determination of the 'normal' status of the gut microbiota is beyond the capability of practicing physicians. In addition, only 8.5% of volunteers were found to be

Table 3: Knowledge and attitude towards FMT in physicians who are familiar with FMT (n=146)

Item		Overall opinion regarding FMT	
		Agree (n=132)	Disagree (n=8)
Familiar with FMT indications, n(%)	Yes	89 (67.4)	3 (37.5)
	No	43 (32.6)	5 (62.5)
Familiar with FDA stance on FMT, n(%)	Yes	16 (12.1)	1 (12.5)
	No	116 (87.9)	7 (87.5)
Familiar with clinical trials of FMT, n(%)	Yes	34 (25.8)	1 (14.3)
	No	98 (74.2)	6 (85.7)
The best way of FMT, n(%)	Retention enema	29 (24.4)	3 (50.0)
	Colonoscopy	28 (23.5)	2 (33.3)
	Nasogastric tube	21 (17.6)	0
	Enema or colonoscopy	7 (5.9)	0
	I do not know	34 (28.6)	1 (16.7)
The first reaction to FMT, n(%)	Unpleasant	40 (31.5)	4 (66.7)
	Dirty	5 (3.9)	0
	Disgusting	7 (5.5)	0
	Unpleasant and disgusting	1 (0.8)	0
	All	14 (11.0)	1 (16.7)
	None	60 (47.2)	1 (16.7)
The most unappealing aspects of FMT, n(%)	Stool preparation	39 (30.7)	2 (25.0)
	Therapeutic use	16 (12.6)	1 (12.5)
	Both	33 (26.0)	5 (62.5)
	None	39 (30.7)	0
Preference, n(%)	Fecal microbiota	28 (21.4)	1 (12.5)
	Synthetic microbiota	49 (37.4)	2 (25.0)
	No difference	17 (13.0)	2 (25.0)
	Both	23 (17.6)	2 (25.0)
	I do not know	14 (10.7)	1 (12.5)
Patient referral for FMT if indicated, n(%)	Agree	110 (91.7)	4 (50.0)
	Disagree	10 (8.3)	4 (50.0)

The missing data are omitted for final per cent calculation

eligible for stool donation.[11] Therefore, it is advisable to establish centralised stool biobanks, which can screen, prepare, and deliver the fecal material to the physicians upon request.

This survey was conducted in a gastroenterology conference. Therefore, the participants are not representative of all internal medicine subspecialties. Nevertheless, this is the first report of physicians' attitude towards FMT in Iran. We identified that the majority of physicians are willing to accept FMT as a therapeutic option if it is scientifically justified and ethically approved.

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CONFLICT OF INTEREST

The authors declare no conflict of interest related to this work.

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