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Characteristics of fasting users among internal medicine patients in Germany

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ABSTRACT

Aim: The aim of this cross-sectional analysis was to identify sociodemographic, and health related predictors for fasting use among patients of a large integrative internal medicine ward.

Methods: A cross-sectional analysis was conducted among patients being referred to a hospital for internal and integrative medicine. Patients' ever-use of fasting for their primary medical complaint and their perceptions of benefit and harm were assessed. The potential predictors of fasting use included sociodemographic characteristics, health behaviour, internal medicine diagnosis, health, satisfaction with health, and health locus of control; and they were analysed using multiple logistic regression analysis.

Results: Of 2144 respondents, 15.8% reported having used fasting, with 61.2% reporting perceived benefits and 3.9% harms due to use. Fasting use was positively associated with higher education, being diagnosed with osteoarthritis or fibromyalgia and regular fast food use, while patients with inflammatory bowel diseases, smokers, alcohol abstinent people and those with a high external social health locus of control were less likely to use fasting. A good health status and high internal locus of control were positively associated with the perception of *fasting* as helpful, while part-time employment, being diagnosed with inflammatory bowel diseases and being alcohol abstinent were negatively associated with perceived helpfulness.

Conclusion: There is significant use of therapeutic fasting by integrative medicine patients in Germany, with high self-reported benefit and low self-reported harms. Use of fasting by

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patients was not related to evidence of efficacy of fasting for their condition, with other factors being more predictive of fasting use.

Introduction

Apart from involuntary fasting due to food unavailability and religious or spiritual reasons for fasting (such as Muslim Ramadan or Christian Lent), fasting has also been used as a therapeutic intervention in a multitude of traditional and ethnomedical systems worldwide [1]. When deprived of food, the human body employs various behavioural, biochemical, physiological, and structural responses to reduce metabolism, which prolongs the period in which energy reserves can cover all metabolic and physiological needs [2]. In therapeutic fasting, a nutritional intake below 500 kcal/day is aimed for as this has been shown to induce strong neuroendocrine and metabolic responses which are hypothesised to improve health [1, 3]. Caloric restriction, alternate-day fasting or other types of intermittent fasting appear to be associated with prevention of some chronic diseases [1, 4-8]. Therapeutic fasting therapy has been shown to alleviate symptom burden in rheumatoid arthritis [9]; reduce the risk of coronary artery disease and diabetes mellitus [10-12]; and has been argued to generally improve mood disorders [13, 14]. Fasting has also been found beneficial in cancer prevention and treatment [5], and experimental research has also produced promising evidence that fasting and/or caloric restriction may delay aging and the onset of age-related and neurodegenerative diseases [15].

Historically, therapeutic fasting was well represented in traditional practice, but its use had fallen out of favour with the move to more pharmacologically-focused therapies in the past 50

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years. However, recent reports suggest the promotion of fasting as a therapeutic intervention has increased and the few studies that have examined such use (from Germany and the United States, albeit each from over 10 years ago) indicate that it is gaining in popularity as a self-care method for prevention and health promotion [16, 17]. However, despite the popularity and potential promise of therapeutic fasting as a preventive measure, little is known about the prevalence of therapeutic fasting use, factors associated with the use of therapeutic fasting, or the characteristics of individuals using therapeutic fasting. In direct response to this research gap, the study presented here aims to identify socio-demographic and health related predictors of therapeutic fasting use among patients in an integrative internal medicine ward for their primary medical complaints.

Material and Methods

Design

This survey was part of an internal quality assurance evaluation at the Department for Internal and Integrative Medicine, Essen, Germany. The hospital offers an integrative treatment for patients diagnosed with chronic diseases of rheumatological, gastrointestinal, pulmonological, and cardiovascular origin, including those with chronic pain syndromes; where evidence-based complementary medical approaches, mind/body medical elements, and physiotherapy are integrated into the conventional medical care [18]. Main diagnosis, age and gender were obtained from hospital records; all other data were gathered via self-rated paper and pencil tests. Questionnaires were distributed at admission and collected in by clinic staff.

Ethics approval

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The survey was conducted in compliance with the Helsinki Declaration. No approval was required from an ethics committee according to German law. All included patients provided written informed consent, and all data were analysed anonymously.

Participants

All patients diagnosed with an internal medicine condition [18] and who were referred to the Department for Internal and Integrative Medicine between January 2001 and January 2004 were invited to complete the survey immediately upon admission. All patients had been diagnosed with an internal medicine condition [18].

Fasting use

The Freiburg Questionnaire on Attitudes on Naturopathy was used to identify any complementary therapies that patients have used for their primary medical complaint before they were referred to the clinic [19]. For the analysis reported in this paper, only the question on fasting use was evaluated: *Have you ever used fasting for your primary medical complaint?* (Response choice: yes, no). Those patients that reported to have used fasting for their primary medical complaint were also questioned about helpfulness: *How helpful was fasting for your primary medical complaint?* (Response choices: helpful, not helpful, harmful). Answers were categorised as helpful (yes, no) and harmful (yes, no). No definition of fasting was provided; it is commonly understood as a voluntary abstinence from food or drink for a period of time.

Potential predictors of fasting use

Sociodemographic characteristics

Linear sociodemographic variables were categorised in order to be able to compute odds ratios between fasting users and non-users. Age (18–29, 30–39, 40–49, 50–64, ≥65 years), gender, education (less than high school, high school graduate), employment (full-time, part-

time, unemployed), and family status (in relationship, not in relationship), were used as possible predictors together with health behaviours including smoking status (current smokers, past smoker, non-smokers), alcohol intake (abstainers, less than twice weekly, at least twice weekly), fast food intake (abstainers, less than twice weekly, at least twice weekly).

Clinical characteristics

The patients' main diagnosis was assessed by the transferring doctor in accordance to ICD-10 [20]. For this analysis, diagnoses were categorised as a) osteoarthritis, b) arthritis, c) fibromyalgia, d) spinal pain, e) headache, f) other pain, g) hypertension, h) ischemic cardiac disease, i) irritable bowel syndrome, j) inflammatory bowel disease, k) lung diseases, l) other, more rare conditions.

General health status was assessed on a 5 point scale and categorised as good, very good or excellent versus poor or fair by the patients subjectively.

Mental health

Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS) [21]. Scores ranging from 8 to 10 were defined as subthreshold anxiety or depression while scores > 10 were defined as threshold anxiety or depression [21].

Satisfaction with health and life in general (FLZ)

Satisfaction with health and life in general were assessed using one 5-point Likert item each from the questionnaire for life satisfaction (FLZ) [22]. The endpoints were 1=very unsatisfied and 5=very satisfied. The higher the score the more satisfied the patient was with health and life in general. Every patient was categorised as having either high (i.e. above median) or low (i.e. below median) satisfaction with health and satisfaction with life in general.

Health locus of control

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Health locus of control was assessed using the GKÜ [23], a 9-item German modified short-form of the multidimensional health locus of control scale, the most commonly used scale to assess health locus of control [24, 25]. Response choices ranged from "strongly disagree" to "strongly agree". The instrument assesses 3 dimensions of health locus of control beliefs (3 items each): internal (high perceived own influence on health status), external-social (health status perceived as controlled by others) and external-fatalistic (health status perceived as depending on luck or destiny). For every patient, each dimension was categorised as either high (i.e. above median) or low (i.e. below median).

Statistical analysis

Chi square tests were used to compare sociodemographic, clinical, and psychological characteristics between patients who ever used *fasting* for their primary medical complaint and those who did not. A p-value of ≤0.05 was considered statistically significant. Independent predictors of *fasting* use were identified using multiple logistic regression analysis. A backward stepwise procedure with a Wald statistic p-value of ≤0.05 was used. In order to be able to compare the individual influence the different variables had on *fasting* use, continuous variables were categorised and adjusted odds ratios with 95% confidence intervals were calculated. Among the potential factors that were entered in the initial regression model, only factors that were associated with *fasting* use at a p-value of ≤0.10 in univariate analysis were selected. Statistical analysis was performed using IBM SPSS ® software (IBM SPSS Statistics for Windows, release 22.0. Armonk, NY: IBM Corp.).

Results

Of the 2804 patients referred to the department during the 3-year study period, 2486 agreed to participate in this survey (88.7% response). Of the respondents, 342 patients (13.8%) did not answer the question on *fasting* use; therefore the analysis was based on the sample of 2144

patients. Out of those patients, 1701 (79.3%) were female, mean age was 52.9±14.1 years. Most patients were diagnosed with chronic pain; the most commonly diagnosed conditions were spinal pain (n=410; 19.1%), headache (n=256; 11.9%), and fibromyalgia (n=246; 11.5%). Five hundred and seventy seven patients (27.5%) were high school graduates; 565 (27.4%) were full-time employed; and 339 (16.4%) were part-time employed. 1250 patients (59.0%) were in a relationship. Regarding health behaviour, 1821 (86.8%) regularly consumed fast food; 351 (16.6%) regularly consumed alcoholic beverages; and 297 (20.5%) currently smoked.

Three hundred and thirty eight patients (15.8%) reported the use of *fasting* for their primary medical complaint. Of those, 207 (61.2%) reported that *fasting* had been helpful; and thirteen (3.9%) reported that *fasting* had been harmful.

Univariate analyses revealed that *fasting* use was higher in females, those younger than 30 years or aged 50-64 years, and those with at least high school education, those suffering from osteoarthritis, fibromyalgia or other pain, or subthreshold depression, those with high health satisfaction, high internal health locus of control and regular fast food consumers. Those being aged 30-39 years, those diagnosed with other pain, inflammatory bowel diseases or other chronic illnesses, those with high external health locus of control, alcohol abstinent and fast food abstinent patients as well as current smokers were less likely to use *fasting* (Table1).

In multiple logistic regression analysis, fasting use was positively associated with high school level education, suffering from osteoarthritis or fibromyalgia and regular fast food use, while patients with inflammatory bowel diseases, smokers, alcohol abstinent people and those with a high external social health locus of control were less likely to use fasting, table 2.

At least good health status and high internal locus of control were positively associated with the perception of *fasting* as helpful, while part-time employment, suffering from inflammatory

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bowel diseases and being alcohol abstinent were negatively associated with perceived helpfulness, table 3.

Discussion

To the author's knowledge, this is the first comprehensive examination of the prevalence and drivers of therapeutic fasting use in a population attending a tertiary care centre. In this survey, 15.8% of patients in an integrative internal medicine ward reported having used therapeutic fasting for their primary medical complaint. The use of therapeutic fasting was positively associated with high school level education, being diagnosed with osteoarthritis or fibromyalgia and regular fast food use, while patients with inflammatory bowel diseases, smokers, alcohol abstinent people and those with a high external social health locus of control were less likely to use therapeutic fasting.

A good health status and high internal locus of control were positively associated with the perception of therapeutic fasting as helpful, while part-time employment, being diagnosed with inflammatory bowel diseases and being alcohol abstinent were all negatively associated with the perception of therapeutic fasting as unhelpful.

Several findings are worthy of further discussion. The first is the relationship (or rather lack thereof) of evidence of therapeutic fasting efficacy with patient use of fasting to treat their primary medical conditions. Patients with fibromyalgia and osteoarthritis for example have been found to be more likely to use therapeutic fasting, even though there is limited evidence of efficacy of fasting in those complaints [26], suggesting factors beyond the clinical evidence base are influencing patient decision-making to use fasting, including attitudes to general health and wellness as opposed to specific clinical outcomes.

It is also known that patients with fibromyalgia are frequent consumers of complementary medicines, and almost every third German fibromyalgia patient has used some kind of dietary regime that is often associated with complementary medicine approach (which may include fasting, an 'elimination' diet or vegetarian diet) [27]. Therefore one of the confounding variables of therapeutic fasting use may be use of complementary approaches to healing, which may include therapeutic fasting as a component. Further research should examine the influence of complementary medicine philosophies on practice of fasting, as this may impact the accessibility and acceptability of therapeutic fasting in various patient groups and settings.

High use of fasting was also uncovered in patients with osteoarthritis, even though the evidence base for the efficacy of therapeutic fasting for osteoarthritis is also relatively underdeveloped [28]. One factor that might link osteoarthritis and fibromyalgia to fasting may be overweight and obesity which are more prevalent in those patients compared to healthy people. For both, overweight and obesity have been identified as risk factors [29-31], and those conditions might contribute to the progression of the disease [31, 32].

Given this association between overweight and fibromyalgia/osteoarthritis, the use of fasting by our participants may not have been to address pain, but also in response to losing weight, which is one of the most popularly promoted therapeutic aims of fasting [33, 34]. A possible link to use of fasting for weight loss might be supported by another finding of the study, which showed that patients with regular fast food consumption were more likely to use fasting, indicating its possible use as a compensatory measure for their particular eating habits. However, it is likely that therapeutic fasting is a compensatory measure for dietary habits alone, as other unhealthful behaviours (such as smoking and alcohol consumption) were negatively associated with therapeutic fasting use.

The lack of relationship between evidence of efficacy in conditions and patient use of fasting was also observed in conditions for which there is emerging evidence of efficacy. According

to our analysis, patients with rheumatoid arthritis were not more likely to use fasting than patients with other conditions. Therapeutic fasting is indicated for rheumatologic conditions though this generally only applies to inflammatory rheumatic diseases like rheumatoid arthritis for which several studies have found beneficial effects [1, 9, 35, 36].

Thirteen participants (3.9%) in our study claimed that fasting had been harmful to their health, however, no detailed data on those cases were available. This figure is slightly higher than an earlier study [37] on inpatients in an integrative medicine ward, which found that 2.3% of patients stopped therapeutic fasting therapy prematurely, mainly because of hunger or irritability. Side effects in that study included two cases of hypernatremia, and one case of increase in uric acid in a patient with gout, but all those resolved quickly with medical treatment. These results also concord with a systematic review of therapeutic fasting, which demonstrated that the therapy was relatively safe but did carry a small but risk of significant harm [33] - and highlights the necessity to use fasting only after careful consideration and under supervision or monitoring in patients with medical history [38]. Our study confirms the need for judicious monitoring, though also highlights the relatively safe nature of therapeutic fasting.

Whereas evidence for efficacy did not seem to correlate with patient use of therapeutic fasting, patients seemed more likely to follow the evidence base when it came to contraindications of therapeutic fasting use. For example, participants with inflammatory bowel diseases were significantly less likely to use fasting. As these participants are at risk of malnutrition and nutritional deficiencies [39, 40] which is associated with an increase of the disease specific mortality risk [41] therapeutic fasting is usually contraindicated in those patients. It should be noted, however, that while there is little empirical evidence for fasting in these conditions, traditional use and anecdotal patient reports indicate this as one of the more common indications for fasting in natural approaches to healthcare. The fact that patient use

of fasting appears not only to be unrelated to what has been shown to be effective in the literature, but also appears discordant from traditional indications, highlights the need for research on the efficacy and safety of fasting for patients' health and well-being to be adequately informed by prevalence of use data.

The disconnect between the scientific and traditional evidence base and use of therapeutic fasting in the study's participants can be suggestive that participants – and perhaps the clinicians informing them – are not adequately informed about the evidence base for therapeutic fasting when implementing it into their treatment plans. However, it may also reflect a broader disconnect between those formulating research questions around therapeutic fasting and those actually using it for treatment. In most cases the evidence base is degraded not by evidence of inefficacy, but by a paucity of evidence more generally. Given the high acceptance and use of therapeutic fasting in a wide variety of conditions in which it has not been rigorously evaluated, it is imperative that patterns of patient use should be a factor considered in the formulation of research questions around evaluation of therapeutic fasting.

The generalizability of this study's results might be limited by the single-centre setting and the department's profile; they might therefore only apply to German internal medicine patients. While the Department for Internal and Integrative Medicine might specifically attract patients who are interested in an integrative medical approach, many patients are referred to the department by their general practitioners, and thus patients may not necessarily have been experiencing complementary medicine prior to their admission to the hospital. Costs are further covered by the German statutory and many private health insurances, providing access to integrative care independent of socioeconomic profile. While our study assessed subjective perceptions of the effectiveness and safety of fasting, specific fasting methods and frequency of fasting, and perceived benefits or risks were not investigated in more detail. In order to identify how benefits and harms may be related to fasting, and how they may apply to other

patients, it is crucial to understand what fasting regimen patients used. The knowledge of the specific type of fasting together with frequency and duration however is necessary to gain a deeper understanding of why certain individuals may have perceived benefits while other have not, and how the specifics of fasting are related to any reported harms. Lastly response and recall bias might further limit the validity of results. Despite these limitations, the current study may extend previous findings on fasting use in other populations.

Conclusion

This study found that there is significant use of therapeutic fasting by patients attending an integrative internal medicine ward, with high levels of perceived benefit and low incidence of self-reported harms. Use of therapeutic fasting by patients does not appear to be related to known evidence of efficacy of fasting for their condition – or even traditional use indications – with other health utilisation, behavioural, demographic and socio-cultural factors being more predictive of fasting use. Findings of this study suggest that more detailed research attention regarding the clinical benefits, use and potential risks of therapeutic fasting are warranted.

DECLARATIONS

Authors' contributions

Designing the study: RL, HC, JL, GD, AM. Carrying out the study: JL, GD, AM. Analysing the data: RL, HC, TO. Drafting the manuscript: RL, HC, JW. Critically revising and approving the final manuscript: All authors.

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Table 1: Sociodemographic, clinical, and psychological characteristics of patients who used fasting for their primary medical complaint (fasting use) and those who did not (fasting non-use).

Characteristics	Fasting use (n=338) %	Fasting non-use (n=1806) %	p-value
Age group			
Less than 30	1.8	6.6	<0.001
30 to 39	10.1	14.3	0.038
40 to 49	21.3	19.4	0.413
50 to 64	46.2	37.9	0.005
65 or greater	20.7	21.9	0.667
Gender			
Female	83.4	78.6	0.048
Education			
High school graduate	34.2	26.2	0.003
Employment			
Full-time	27.6	27.3	0.946
Part-time	16.9	16.3	0.807
In relationship	58.8	59.0	0.952
Main diagnosis			
Osteoarthritis	11.8	8.6	0.065
Arthritis	7.4	6.4	0.475
Fibromyalgia	18.0	10.2	<0.001
Spinal pain	17.2	19.5	0.366
Headache	12.7	11.8	0.648
Other pain	8.0	11.2	0.084
Hypertension	4.4	3.1	0.244
Ischemic cardiac disease	1.2	1.1	0.743

Irritable bowel syndrome	3.6	3.1	0.614
Inflammatory bowel disease	1.5	5.6	0.001
Lung diseases	4.4	5.2	0.685
Others	9.8	14.1	0.036
Health status			
Good, very good or excellent	16.2	16.9	0.811
Mental health			
Subthreshold anxiety	27.2	25.4	0.494
Threshold anxiety	32.9	35.8	0.317
Subthreshold depression	28.1	23.4	0.070
Threshold depression	20.1	22.3	0.388
Satisfaction			
High health satisfaction	77.4	70.4	0.008
High life satisfaction	84.2	83.7	0.872
Health locus of control			
High internal	65.5	56.8	0.004
High external-social	60.5	68.8	0.003
High external-fatalistic	56.1	64.1	0.006
Health behaviour			
Alcohol			
Abstinent	33.3	42.4	0.002
Regular use	15.0	16.9	0.423
Fast food			
Abstinent	2.1	4.7	0.037
Regular use	90.9	86.1	0.017
Smoking status			
Current smoker	12.3	21.9	0.001
Past Smoker	37.0	31.5	0.117

Table 2: Independent predictors of fasting for the patient's primary medical complaints: Results from

multivariate logistic regression analysis.

Predictor variables	p-values	Adjusted odds ratios	95% CI
High school graduate	0.007	1.60	1.14-2.26
Osteoarthritis	0.032	1.70	1.05-2.77
Fibromyalgia	0.002	1.98	1.28-3.05
Inflammatory bowel disease	0.016	0.09	0.01-0.64
High external-social health locus of control	0.005	0.63	0.46-0.87
Current smoker	0.004	0.52	0.33-0.81
Alcohol, abstinent	0.046	0.72	0.52-0.99
Regular Fast Food use	0.029	1.88	1.07-3.31

Table 3: Independent predictors for perceived helpfulness of fasting for the patient's primary medical complaints: Results from multivariate logistic regression analysis.

Predictor variables	p-values	Adjusted odds ratios	95% CI
Part-time employment	0.009	0.34	0.15-0.77
Inflammatory bowel disease	0.012	0.003	0.002-0.48
Good, very good or excellent health status	0.033	4.02	1.12-14.48
High internal health locus of control	0.037	2.03	1.04-3.95
Alcohol, abstinent	0.004	0.38	0.20-0.73