

## Medical doctors' perceptions on probiotics: Lack of efficacy data hampers innovation



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### ABSTRACT

**Rationale:** The probiotic innovation cycle appears to be hampered and while important barriers have been postulated, the influence of medical doctors (MD) on probiotic innovation remains largely unaddressed.

**Objective:** The present study aims to complement current views on probiotic innovation barriers by reviewing the perceptions of MD on probiotics.

**Methods:** A pilot tested survey was sent to 1676 general practitioners and 741 medical specialists in the Netherlands to address current perceptions.

**Results:** The responses of 208 general practitioners and 207 medical specialists were included in the data-analysis. Half of MD (51%) advised probiotics in their practice, primarily for AAD (74%) and IBS (51%). Lack of evidence was the primary reason for MD not to advise probiotics (53%). Significantly less non-advisers perceived probiotics to be safe (62% vs 82%) and efficacious (24% vs. 64%) compared to advisers, where they primarily used conventional media (radio, television and newspapers) as their source of information (73% vs. 39%). Probiotic efficacy data is the preferred type of future information for all MD (72%).

**Conclusion:** In order to improve the perceptions of MD on probiotics and to advance innovations in this field, more large-scale randomized controlled trials are required that demonstrate probiotic efficacy in adherence with strict Good Clinical Practice guidelines

### 1. Introduction

Dysbacteriosis of the human intestinal microbiome is associated with an increased risk for gastrointestinal disorders including inflammatory bowel disease (IBD), ulcerative colitis, celiac disease and irritable bowel syndrome (IBS) [4,18]. It was postulated over a century ago that host-friendly microorganisms found in yogurt and cultured dairy products could alter the intestinal microbiome, proposedly promoting health [16]. This theory flourished in the medical community for some years but the commercialization and social acceptance of these bacteria, which are known today as probiotics, truly emerged in the 1990s. Numerous clinical studies, with various probiotic species, have been conducted since and it appears that probiotics may confer diverse health benefits on the consumer. For instance, the consumption of certain probiotic strains may benefit patients with antibiotic associated diarrhoea (AAD), IBD and necrotizing enterocolitis (NEC) [7,19]. Probiotics are furthermore generally considered safe for consumption across all age groups [3,11,21–23]. The probiotic industry is therefore expanding rapidly and new probiotic products are constantly being

developed [9]. However, relatively few probiotic strains are available commercially and probiotics are rarely in routine use in clinical practice. Moreover, all health claims relating to the benefits of probiotic bacteria are rejected by the European Food and Safety Authority (EFSA).

Van den Nieuwboer and colleagues [24] therefore assessed the barriers and opportunities that influence probiotic innovation from initial concept to customer needs ultimately being met by the final product. Their valorisation model highlights the barriers that hamper probiotic innovation during fundamental scientific research, business development, market introduction and societal need articulation. Difficulty demonstrating clinical efficacy, competition with probiotic products without evidence base and the regulatory approval processes are said to be main innovation barriers [24]. However, the impact medical (health care) communities may have on probiotic innovation remains largely unaddressed, while their role could be pivotal. Many patients seek medical- and nutritional advice from their physician and the doctor-patient relationship may drive consumer acceptance and influence public opinion [13]. Some studies report that over 80% of

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medical doctors (MD) perceive probiotics to be safe and would advise them for gastrointestinal disorders [14], which suggests that MD may foster the innovation of probiotic products. Results are however inconsistent and European countries appear to be underrepresented in current literature [14,17,25].

The present study therefore aims to complement the current view on probiotic innovation barriers, by reviewing the impact of medical communities on probiotic innovation. To this end, the perceptions of MD on probiotics are reviewed and its implications for the innovation of probiotic products are discussed.

## 2. Methodology

### 2.1. Data collection

An online questionnaire was developed to review the attitudes of Dutch MD towards probiotics. The questionnaire was created using the SurveyMonkey® software and comprised 15 closed- and 4 open questions. Demographics, frequency of nutritional- and probiotic advice, indications for advice, perceived familiarity with probiotics, attitudes towards probiotics and current and preferred information sources were addressed. The survey questions were piloted with five MD whose feedback was incorporated into the questionnaire before being sent to participants.

### 2.2. Study population

The online survey invites were sent to 1676 General Practitioners (GP) and 741 Medical Specialists (MS) (gastroenterologists (GAST), elderly care physicians (ECP) and paediatricians (PAED)) who were working in the Netherlands. The databases of the National Academic Research and Collaborations Information System (NARCIS), BSL-Springer, SCEM and Zorgkaart Nederland were used to construct a contact information list. Additionally, a paper version of the survey was filled out by 60 GP at the General Practitioner Fair (Huisartsbeurs) on the 2nd of April 2016 in Utrecht, The Netherlands.

### 2.3. Statistical analysis

The data were collected in a Microsoft Excel (2010) spreadsheet (Microsoft, San Francisco, CA, USA). Statistical analyses were performed using R Statistical Software (Foundation for Statistical Computing, Vienna, Austria). Two-tailed Fisher's exact tests were used to analyse differences between groups. A *p*-value of < 0.05 was considered to be statistically significant. Open survey questions were analysed through open coding techniques.

## 3. Results

### 3.1. Survey respondents' characteristics

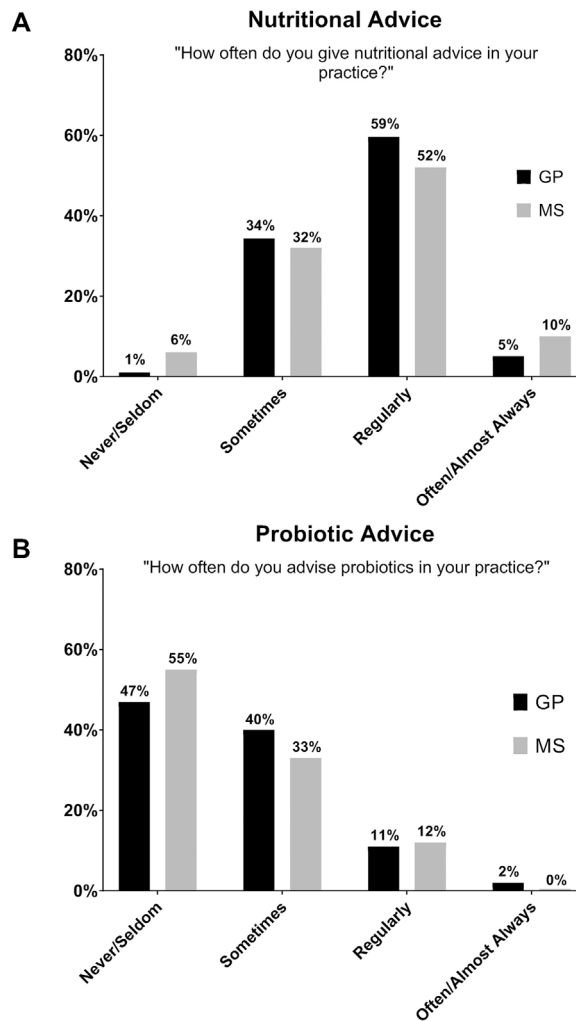
A total of 514 respondents completed the online survey between April 2nd and May 30th, 2016. 99 respondents did not meet the inclusion criteria and were excluded from data-analysis as they were either still in training (*n* = 48), did not complete the survey (*n* = 26) or were from other specializations than the intended study population (*n* = 25). Hence, 415 survey responses of Dutch MD were included in the data-analysis of the present study; 208 GP and 207 MS (117 ECP, 24 GAST and 66 PAED). Each Dutch province was represented by at least 5 MD (average = 35). The demographics of survey participants are presented in Table 1.

### 3.2. Nutritional and probiotic advice

Nutritional advice was provided to patients by 94% of MS and 99% of GP at least sometimes, regularly or often (Fig. 1A). Probiotic advice

**Table 1**  
Survey Participant Characteristics.

	N (%)
Specialization	
General Practitioners	208 (50%)
Medical Specialists:	207 (50%)
Gastroenterologists	24
Elderly Care Physicians	117
Paediatricians	66
Age	
≤ 30 years	12 (3%)
31–50 years	208 (50%)
51–64 years	175 (42%)
≥ 65 years	20 (5%)
Years of practice	
≤ 10 years	93 (23%)
11–20 years	134 (32%)
21–30 years	114 (27%)
≥ 31 years	74 (18%)
Sex	
Male	187 (45%)
Female	228 (55%)



**Fig. 1.** Half of medical doctors advise probiotics in their practice. A) GP and MS were asked how often they provide nutritional advice to patients in their practices. No statistical differences were found between the nutritional advice frequency of GP and MS (Fisher's exact, *p* > 0.05). B) GP and MS were asked how often they advise probiotics to patients in their practices. No statistical differences were found between the probiotic advice frequency of GP and MS (Fisher's exact, *p* > 0.05).

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