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Physician experiences when discussing the need for additional oral medication with type 2 diabetes patients: Insights from the cross-national IntroDia® study

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ABSTRACT

Aims: Physician-patient communication when discussing the need for additional oral medication for type 2 diabetes (add-on) may affect the self-care of people with this condition. We aimed to investigate physicians' recalled experiences of the add-on consultation. **Methods:** We conducted a cross-sectional survey of physicians treating people with type 2 diabetes in 26 countries, as part of a large cross-national study of physician-patient communication during early treatment of type 2 diabetes (IntroDia®). The survey battery included novel questions about physician experiences at add-on and the Jefferson Scale of Physician Empathy.

Results: Of 9247 eligible physicians, 6753 responded (73.0% response rate). Most (82%) agreed that physician-patient discussions at add-on strongly influence patients' disease acceptance and treatment adherence. Half the physicians reported ≥ 1 challenge in most or all add-on conversations, with a significant inverse relationship between frequency of challenges and Jefferson Scale of Physician Empathy score (standardised β coefficient: -0.313 ; $p < 0.001$). Physicians estimated that only around half their patients with type 2 diabetes follow their self-care advice. Exploratory factor analysis of physician beliefs about

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why their patients did not follow recommendations yielded two distinct dimensions: psychosocial barriers (e.g. depressed mood) and personal failings of the patient (e.g. not enough willpower) ($r = 0.37$, $p < 0.001$).

Conclusions: Physicians' empathy and beliefs about their patients may play a significant role in their success with the add-on conversation and, consequently, promotion of patient engagement and self-care. Although the study was limited by its retrospective, cross-sectional nature, the findings from IntroDia® may inform efforts to improve diabetes care.

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1. Introduction

The last two decades have seen advances in the treatment of diabetes, notably the development of a large armamentarium of glucose-lowering drugs [1]. Despite this, a substantial proportion of people with type 2 diabetes do not achieve glycaemic control [2]. In the United States, for example, data from the National Health and Nutrition Examination Survey indicate that only approximately 50% of adults with diabetes achieve HbA1c $< 7.0\%$ (< 53 mmol/mol) [3,4]. The PANORAMA study of nine major European countries found that only 63% of people with type 2 diabetes achieve HbA1c of $< 7.0\%$ [5], while most studies of people with diabetes in low- and middle-income Asian and Middle Eastern countries have found mean HbA1c levels to be $\geq 8\%$ (≥ 64 mmol/mol) [6]. Inadequate achievement of glycaemic control is often because of suboptimal self-care behaviours [2,3]; low adherence to medication, for example, can result in the effectiveness of glucose-lowering drugs in clinical practice being much lower than the efficacy achieved in randomized studies [7]. However, effective communication between physicians and patients may increase the likelihood of the latter implementing self-care activities and taking medication as prescribed [8–12]. Physician-patient communication may be especially influential during initial treatment of type 2 diabetes, as achieving early glycaemic control reduces the long-term risk of microvascular, and possibly macrovascular, complications [13,14].

Type 2 diabetes is mostly self-managed and people with the condition face substantial psychological and behavioural challenges, such as distress caused by living with diabetes and the burden of performing self-care activities, and commonly experience anxiety and depression [15–17]. How people with type 2 diabetes adapt to the condition behaviourally and psychologically may be influenced by the manner in which physicians communicate and provide self-care advice [18–21]. However, physicians themselves face potential challenges from the type 2 diabetes pandemic. Physicians frequently encounter people with diabetes who have psychosocial problems affecting their self-care, but often lack sufficient resources – including consultation time – to assist with these issues [16,22]. Physicians may also lack confidence in identifying and evaluating psychological problems and in supporting patients who suffer from these issues [16,22].

Furthermore, physicians may believe that many people with type 2 diabetes are reluctant to discuss their own self-care because of fear of judgement, guilt and shame, an issue

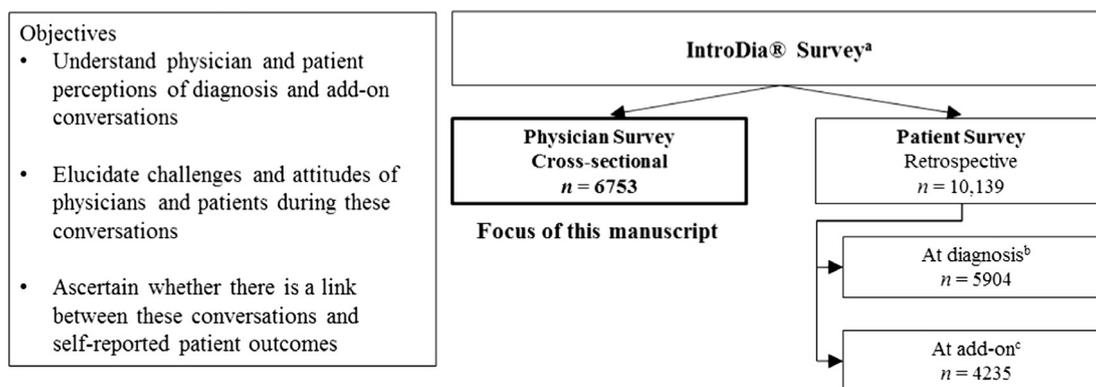
for which physicians might feel they have few strategies to address [23]. Challenges such as these can contribute to physicians feeling frustrated, inadequate and overwhelmed when dealing with people with type 2 diabetes [16,22]. Physician empathy – the ability of the physician to understand their patient's perspective and act on it – is considered to be an important component of physician-patient communication, and, interestingly, has been associated with improved patient outcomes in type 2 diabetes [24,25].

Despite the potential importance of physician-patient communication during early treatment of type 2 diabetes, this dialogue has not been rigorously investigated, with the studies described above either small and qualitative in nature or not focused specifically on early treatment of the condition [16–21]. We therefore undertook a large cross-national, quantitative study (IntroDia®) to investigate conversations between physicians and people with type 2 diabetes during early treatment. We focused on two potentially critical moments of physician-patient communication: diagnosis and when discussing the need for additional oral medication for type 2 diabetes (add-on). We previously reported physicians' responses to questions about their interaction with patients at diagnosis [26] and, conversely, the view of the diagnosis conversation from the perspective of people with type 2 diabetes [27]. Here, we aimed to extend these findings by investigating corresponding data from IntroDia® for physician experiences with patients at add-on. The companion manuscript in this issue presents the experiences of people with type 2 diabetes at add-on. The findings described here are based solely on physician responses to the IntroDia® structured questionnaire.

2. Materials and methods

2.1. Study design

As previously described [26], this was a cross-sectional survey of physicians treating people with type 2 diabetes designed by a multidisciplinary international advisory board (SD, AA, WHP, AB, SE, MC) as part of the larger cross-national IntroDia® study, which also comprised an independent survey of people with type 2 diabetes (Fig. 1) [27]. The objectives of the physician survey included the following: (1) to determine if physicians believe that early conversations with their type 2 diabetes patients have important influences on patient self-care; (2) to understand physicians' attitudes toward their patients and type 2 diabetes management; and (3) to investi-



^aDeveloped in consultation with a global advisory board and the International Diabetes Federation to include novel measures and the Jefferson Scale of Physician Empathy; data collected in Argentina, Australia, Austria, Brazil, Bulgaria, Canada, China, Denmark, France, Germany, India, Indonesia, Israel, Japan, South Korea, Mexico, the Netherlands, Norway, the Philippines, Russia, Saudi Arabia, South Africa, Spain, the United Arab Emirates, the United Kingdom (UK), and the United States of America (USA)

^bDiagnosis conversations: conversations taking place at diagnosis of Type 2 diabetes or within six months; patients receiving therapeutic lifestyle modification or one oral antidiabetes medication

^cAdd-on conversations: conversations taking place at the first time additional oral antidiabetes medication is discussed

Fig. 1 – Design of the IntroDia® survey. Modified with permission from Capehorn et al. Challenges faced by physicians when discussing the type 2 diabetes diagnosis with patients: insights from a cross-national study (IntroDia®). *Diabetic Medicine* 2017;4:1100–1107. John Wiley & Sons, Inc. ©2017 Diabetes UK [26].

gate potential challenges faced by physicians during early interactions with their type 2 diabetes patients.

Two specific points in early treatment were investigated: diagnosis of type 2 diabetes and add-on; the latter was defined as the consultation when the physician told the patient they needed to take either another oral glucose-lowering drug in addition to the first such medication or a different pill combining two glucose-lowering medications. The data reported here are from the add-on component of the physician survey, and are derived from self-reports gathered between November 2013 and February 2014.

GfK, an international market research organisation, translated the survey battery, conducted fieldwork and prepared data files. The survey was approved by an independent institutional review board (Aspire IRB), and followed national and international guidelines for the conduct of non-interventional studies. The survey also complied with guidelines from the European Society for Opinion and Marketing Research, the European Pharmaceutical Market Research Association and the Council of American Survey Research Organizations (CASRO) for the conduct of market research and pharmaceutical market research.

2.2. Participants

The survey was conducted in 26 countries across Africa, Asia, Europe, Latin America, the Middle East, North America and Oceania (Fig. 1). Physicians had to meet all of the following criteria in order to participate: (1) aged 25–65 years with 3–35 years of experience as a practising physician; (2) a certified general practitioner (GP)/primary-care practitioner (PCP)/family practitioner (FP) except in China (certified endocrinologist or diabetologist), Russia (certified endocrinologist or diabetologist) and Brazil (certified GP/PCP/FP, diabetes specialist or cardiologist); (3) treating at least seven (GPs, PCPs, FPs) or 15

(endocrinologists, diabetologists, cardiologists) people with type 2 diabetes in a typical month; and (4) actively involved in initiating treatment for type 2 diabetes on at least six occasions per year. A minimum sample size of 40 participants per country was targeted. Online panels were used to identify potential participants, who were emailed a web link to a secure server where they completed a screening questionnaire. If all of the above criteria were met, participants were then forwarded to the main survey battery.

2.3. Measures

The survey battery encompassed novel questions developed specifically for IntroDia® and a validated instrument. The novel questions included an item to assess physician beliefs about the importance of the conversation with patients at add-on, answered on a five-point Likert-type scale (Fig. 2), and an instrument designed to measure physicians' challenges at add-on that comprised 12 items answered on a five-point Likert-type scale (Fig. 3). Another novel instrument was designed to assess physician beliefs about why non-adherent patients did not follow physicians' recommendations for self-care; this contained 12 items answered on a four-point Likert-type scale (Supplementary Fig. 1). The IntroDia® advisory board developed these questions and instruments based on initial hypotheses about the physician-patient interaction at add-on. These hypotheses and proto-questions were investigated during discussions with physicians in focus groups ($n = 39$ from Germany, Japan, Mexico and the US: 36 PCPs, 3 specialists) and online bulletin boards ($n = 30$ from Germany, Mexico and the US: all PCPs). Based on these discussions, the novel measures were refined and finalised by the advisory board.

The survey battery also included the Jefferson Scale of Physician Empathy (©Jefferson Medical College; All rights

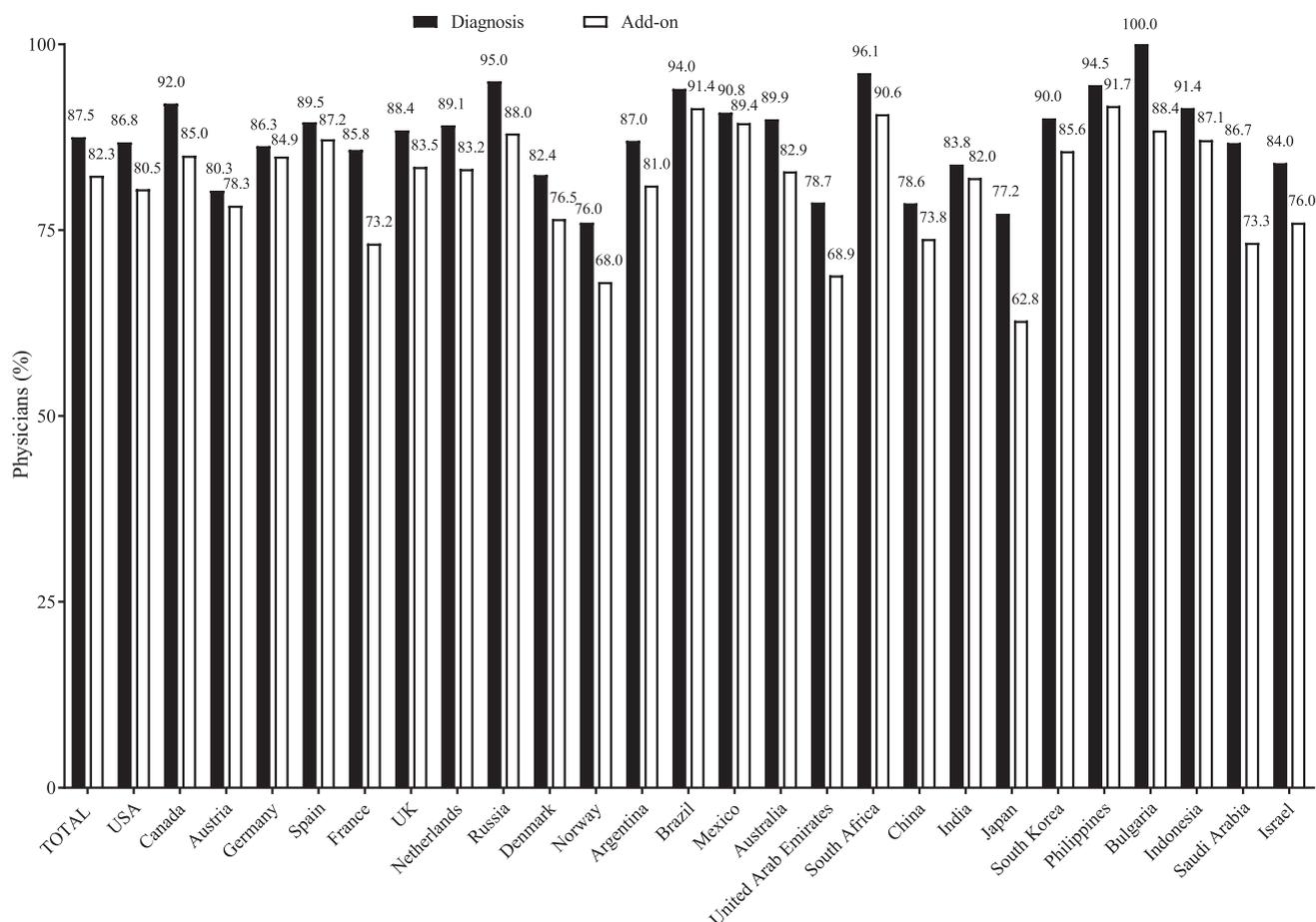


Fig. 2 – Physician beliefs about the importance of the conversation with patients at add-on or diagnosis of type 2 diabetes for disease acceptance and treatment adherence by patients. Physicians were asked the following question: How much do you agree or disagree with the following statement? ‘What happens during the type 2 diabetes diagnosis/add-on conversation, whether it is done well or poorly, can have a big impact on how well people accept and adhere to diabetes treatment down the road. Answers were on a single-choice 5-point scale: 1 (I completely disagree), 2 (I slightly disagree), 3 (I neither agree nor disagree), 4 (I slightly agree) or 5 (I completely agree). Data shown here describe the percentage of physicians in each country who agreed (slightly or completely) regarding the diagnosis conversation (in black, from Capehorn et al. [26]) and regarding the add-on conversation (in white).

reserved), a self-report instrument for measuring empathy within the context of healthcare professionals’ care for patients [28]. The Jefferson Scale of Physician Empathy consists of 20 items answered on a seven-point Likert-type scale, and has been widely validated [25].

The survey battery was reviewed, approved and tested in English. Where needed for each participating country, the battery was translated into local languages, with back-translation and harmonisation undertaken to ensure validity with the English-language version using a process very similar to that of the World Health Organization [29]. Pilot-testing of the survey battery was conducted with physicians prior to commencement of fieldwork.

2.4. Statistical analyses

Descriptive statistics were used to summarise physician responses. An exploratory factor analysis was conducted on physicians’ beliefs about why non-adherent patients did not

follow their recommendations for self-care, in order to investigate potential underlying relationships between these beliefs (latent variables). To investigate whether physician beliefs could be grouped, Principal Components Analysis with Promax (oblique) rotation was performed; the Kaiser-Guttman rule and Cattell’s scree plot were used to determine the number of factors to retain prior to rotation. Cronbach’s coefficient alpha (α) was used to determine the internal consistency of the items within each factor. Pearson’s product-moment correlation coefficient (r) was used to evaluate the degree of linear dependence between factors.

To test for potential associations between challenges experienced by physicians and their demographic and clinical practice characteristics (the latter shown in Table 1, including Jefferson Scale of Physician Empathy scores), multiple regression was performed. In this model, the independent variables were gender, age, number of patients seen per month, number of patients with type 2 diabetes seen per month, and Jefferson Scale of Physician Empathy score, while the dependent

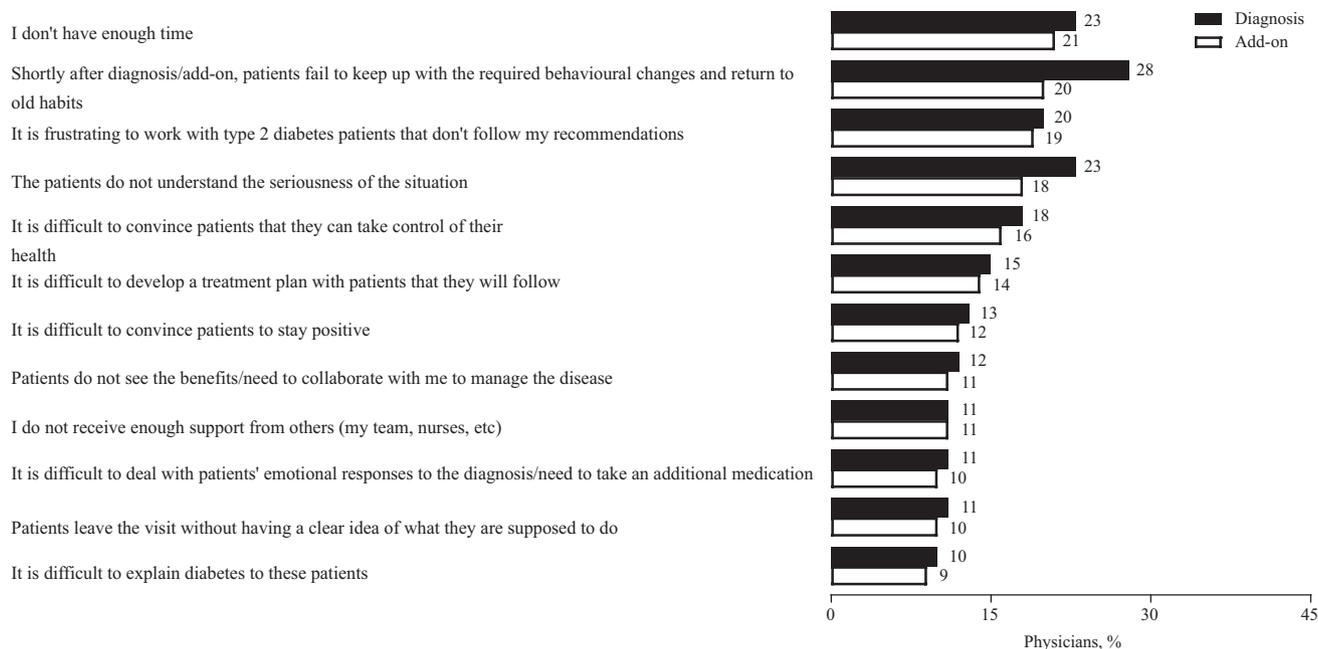


Fig. 3 – Proportion of physicians reporting challenges in most or all conversations with patients at diagnosis of type 2 diabetes or add-on. Physicians were asked to indicate how often they encountered the challenges described by the statements below, using a single-choice 5-point scale: 1 (never), 2 (in a few conversations), 3 (in some conversations), 4 (in most conversations) or 5 (in all conversations). Data shown here are for physicians answering 4 or 5. Data for diagnosis conversations are taken from Capehorn et al. [26].

variable was challenge score (mean across contributing items, calculated for individual respondents).

Inferential tests for statistical significance ($\alpha = 0.05$) were performed without adjustment for multiple testing. Analyses were performed using the following packages: IBM SPSS Statistics 22 (Chicago, IL, USA); IBM SPSS Amos 22.0.0 (Build 1384); SAS/STAT software (Version 9.4 or greater; SAS Institute Inc., Cary, NC, USA); and R version 3.2.3.

3. Results

As previously reported [26], 6753 physicians completed the survey battery from the 9247 physicians eligible after screening, 92% of whom were primary-care providers (Table 1). Thus, the CASRO-defined response rate was 73.0% overall (75.5% for primary-care providers; 69.5% for specialists). The median number of add-on conversations per physician per year was 75, compared with 48 diagnosis conversations.

Most physicians (82%) agreed that the conversation between the physician and patient at add-on has a large impact on the patient's disease acceptance and adherence to treatment, which was similar to the proportion who felt the conversation at diagnosis was important in those regards (88%) [26]. This finding was relatively consistent across countries, although in a few countries the diagnosis conversation was considered substantially more important (France, Japan, Bulgaria, Saudi Arabia) (Fig. 2).

Physicians were asked to estimate what proportion of their patients expressed questions and concerns during the add-on conversation, categorised as 0–50% of patients, 51–76% and

76–100%. Few (13%) reported that nearly all of their patients (76–100%) had questions/concerns at add-on compared with 32% of the physicians at diagnosis. However, a similar number of physicians reported that 51–75% of their patients had questions/concerns at add-on and diagnosis (26% and 33%, respectively). In contrast, the majority of physicians (61%) reported that only 0–50% of patients had questions/concerns at add-on, compared with 35% of physicians for diagnosis. Overall, therefore, physicians estimated that fewer people with type 2 diabetes express questions and concerns during add-on conversations than in diagnosis conversations.

Physicians reported encountering challenges during add-on conversations almost as often as in diagnosis conversations, with 50% reporting at least one challenge in most or all conversations, compared with 60% at diagnosis [26]. The challenges most commonly reported to occur in most or all add-on conversations were “I don't have enough time” (21%), “shortly after add-on, patients fail to keep up with the required behavioural changes and return to old habits” (20%), “it is frustrating to work with type 2 diabetes patients that don't follow my recommendations” (19%) (Fig. 3). The mean challenge score at add-on was 2.5 on a scale ranging from 1 (challenge never experienced) to 5 (challenge experienced in all conversations), while the mean Jefferson Scale of Physician Empathy score was 103.3 (minimum possible score: 20; maximum possible score: 140). Multiple regression revealed a significant inverse relationship between challenge score and Jefferson Scale of Physician Empathy score, with a standardised β coefficient of -0.313 ($p < 0.001$).

Physicians estimated that no more than half of their patients with type 2 diabetes actually follow their self-care

Table 1 – Physician demographic and clinical practice characteristics [26].

	Physicians surveyed (n = 6753)
Primary-care provider or specialist, n (%)	
Primary-care provider	6188 (91.6)
General practitioner	3301 (48.9)
Internist working in primary care	1233 (18.3)
Family practitioner	1150 (17.0)
Primary-care practitioner	504 (7.5)
Specialist	565 (8.4)
Endocrinologist	459 (6.8)
Cardiologist	56 (0.8)
Diabetologist	50 (0.7)
Age, median (range)	46 (25–65)
Sex, n (%)	
Male	4440 (65.7)
Female	2313 (34.3)
Practice setting, n (%)	
Office	4274 (63.3)
Hospital	1142 (16.9)
Office and hospital	1337 (19.8)
Number of patients seen per month, median (range)	480 (20–3000)
Number of patients with type 2 diabetes seen per month, median (range)	75 (7–1600)
Number of diagnosis conversations per year, median (range)	48 (6–999)
Number of add-on conversations per year, median (range)	75 (6–999)
Region and country, n (%)	
Africa	
South Africa	128 (1.9)
Asia	
China	252 (3.7)
India	600 (8.9)
Indonesia	140 (2.1)
Japan	145 (2.1)
South Korea	201 (3.0)
The Philippines	109 (1.6)
Europe	
Austria	157 (2.3)
Bulgaria	43 (0.6)
Denmark	51 (0.8)
France	500 (7.4)
Germany	531 (7.9)
Netherlands	101 (1.5)
Norway	50 (0.7)
Russia	200 (3.0)
Spain	522 (7.7)
UK	502 (7.4)
Latin America	
Argentina	100 (1.5)
Brazil	116 (1.7)
Mexico	519 (7.7)
Middle East	
Israel	50 (0.7)
Saudi Arabia	60 (0.9)
United Arab Emirates	61 (0.9)
North America (excluding Mexico)	
Canada	301 (4.5)
United States	1057 (15.7)
Oceania	
Australia	257 (3.8)

advice, with more patients believed to adhere to advice on taking medication (50%) than to self-monitoring of blood glucose (44%), making dietary changes (38%), increasing exercise (30%) or regular foot care (28%). Patients' lack of self-discipline

and lack of willpower were the reasons most commonly endorsed by physicians (83% and 81% of physicians, respectively) as moderately or very important contributors to low adherence (Supplementary Fig. 1). The contributors that were

least frequently endorsed as moderately or very important included “regimen is too complex or difficult” (45% of physicians), “not intelligent enough” (44%) and “overly restrictive health insurance coverage” (44%).

Physician beliefs about why non-adherent individuals did not follow their recommendations for self-care were further investigated using exploratory factor analysis, with factors extracted by Principal Component Analysis. Two factors were retained using the Kaiser-Guttman rule and assessing Cattell’s screen plot of the eigenvalues associated with each extracted factor. Table 2 shows the items and factor loadings. Correlation between the two factors was moderate ($r = 0.37$, $p < 0.001$), indicating that they represented distinct types of physician-attributed reason for patients’ low adherence to their recommendations. Based on the items contained within each factor, they were labelled as “Psychosocial Barriers” (seven items; Cronbach’s $\alpha = 0.84$) and “Personal Failings” (three items, Cronbach’s $\alpha = 0.68$). The Psychosocial Barriers factor included financial and psychological issues such as “depressed mood”, “regimen is too complex or difficult” and “overly restrictive health insurance coverage”, while the Personal Failings factor contained items such as “not enough willpower” and “not enough self discipline”. The mean contributor score was significantly higher for Personal Failings than for Psychosocial Barriers (Supplementary Fig. 2).

4. Discussion

4.1. Conclusions

Communication between physicians and their patients with type 2 diabetes can influence the patient’s self-care, adherence to medication and, consequently, glycaemic control [8–11]. During early treatment of type 2 diabetes, in particular, the manner in which the physician delivers the diagnosis and provides self-care advice may have a long-term effect on the patient’s psychosocial stress, attitudes to the condition, and self-care behaviour [18,19,21]. However, most research into physician-patient communication in type 2 diabetes has focused on patient experiences and less is known about the perspectives of physicians, particularly during early treatment of the condition. The results from the IntroDia® physician survey reported here illuminate physicians’ experiences of the conversations with their patients when they first discuss the need for an additional oral glucose-lowering medication (add-on) – a potentially key moment in physician-patient communication during early treatment of type 2 diabetes.

The findings indicate that the conversation between physician and patient at add-on is – from the physician’s perspective – as important and influential as the conversation at diagnosis [26] for engaging the patient in self-care, and is equally challenging for the physician. Interestingly, the frequency of challenges reported by physicians was inversely associated with their Jefferson Scale of Physician Empathy score, suggesting that physician empathy is linked to a lower challenge burden. Why this might be the case cannot be determined definitively from this analysis. However, possible explanations include a unidirectional relationship from

empathy to perceived challenges (i.e. higher empathy results in physicians feeling less challenged by add-on conversations) or in the reverse direction (i.e. physicians who have had to deal with more challenging patients at add-on have consequently developed lower empathy) or a bidirectional relationship comprising both influences.

Physician empathy, as measured by the Jefferson Scale of Physician Empathy, is defined as “a predominantly cognitive attribute that involves an understanding of the patient’s experiences, concerns, and perspectives, combined with a capacity to communicate this understanding and an intention to help” [25]. It is considered one of the most important aspects of the physician-patient relationship, in general [30,31], and is associated with greater patient satisfaction, treatment adherence and better clinical outcomes, as well as lower patient anxiety and distress [32]. In people with diabetes, physician empathy is also associated with improvements in glycaemic control and low-density lipoprotein cholesterol levels [25] and with improved clinical outcomes [24]. Conversely, among physicians themselves, empathy is associated with lower burnout, higher well-being, and higher ratings of clinical competence [33,34]. Importantly, physician empathy can be modified by education, as its prominent attributes are cognition and understanding; in contrast, the related construct of sympathy is composed mainly of affect and emotion and, consequently, is not easily changed [31,35–37].

Notably, the physicians who completed the IntroDia® survey indicated that they believe the majority of their patients with type 2 diabetes do not follow their advice on taking medication and other types of self-care. The reasons given for this perceived low adherence fell into one of two categories: either psychosocial issues hindering the patient, or perceived personal failings of the patient – with physicians attributing low adherence more to the latter factor than the former. Such beliefs – whether true or not – may influence the quality of physician-patient communication during early treatment of type 2 diabetes and, consequently, could impact patient self-care and outcomes. Interestingly, in a previous large cross-national survey of physicians and patients with type 2 diabetes, physicians reported lower levels of patient adherence to their self-care recommendations than the patients themselves reported [16]. Furthermore, a small, qualitative, longitudinal study of interactions between healthcare professionals and people newly diagnosed with diabetes in New Zealand revealed that initial consultations were often dominated by biomedical explanations lacking a patient-centered perspective, and that despite a perception of time pressure, healthcare professionals spent substantial time repeating information of uncertain relevance to patient need [38].

4.2. Limitations and strengths

The study reported here had notable strengths, including the use of data from a large sample of physicians worldwide; indeed, IntroDia® is one of the largest surveys to date of physicians treating people with type 2 diabetes. However, there are several important limitations to the analysis. First, as a retrospective study, physicians may not have recalled

Table 2 – Exploratory factor analysis of physicians' beliefs about why their patients do not follow self-care advice.

Factor	Physician-attributed contributor to low patient adherence to physician self-care recommendations ^a	Factor loadings	
		Factor 1	Factor 2
Psychosocial barriers	Depressed mood	0.744	-0.143
	Personality problems	0.733	-0.134
	Not enough family support	0.724	-0.094
	Problems with personal finances	0.711	-0.272
	Too much life stress	0.687	-0.095
	Overly restrictive health insurance coverage	0.629	-0.342
Personal failings	Regimen is too complex or difficult	0.603	-0.185
	Not enough willpower	0.423	0.722
	Not enough self-discipline	0.517	0.581
	Not worried or scared enough about long-term complications	0.468	0.541

^a Items are listed in descending order of magnitude of factor loadings within each extracted factor. The higher factor loading for each item is in bold. Two items were not included in the factors because of either high loading on both factors ("Have not learned enough about diabetes and diabetes self-care") or low loading on both factors ("Not intelligent enough").

interactions with their patients accurately. Second, it is unclear how representative the sample is of the broader physician population. Third, the IntroDia® questionnaire may not have captured every relevant issue in all countries surveyed; such unmeasured variables may introduce confounding bias beyond what has been accounted for with measured variables. Finally, the cross-sectional nature of the study means that it is not possible to infer causality from observed associations.

4.3. Summary

In conclusion, these findings from the IntroDia® study suggest that physicians believe the conversation with their type 2 diabetes patients at add-on is as important as the diagnosis conversation, and they find it just as challenging. Notably, physician empathy, or lack thereof, may play a significant role in determining how challenging the add-on conversation is for physicians, which could impact patient engagement and long-term self care. The insights from these findings, together with those from the patient survey in IntroDia® – which investigated the experiences of people with type 2 diabetes during early conversations with their physicians [27] – highlight the importance of strategies or programmes to support physicians and their patients during early treatment of type 2 diabetes, assist behavioural changes by people with this condition, and improve the quality and outcome of diabetes care.

Conflict of interest

SD has been a consultant for Abbott, AstraZeneca/Bristol-Myers Squibb, Boehringer Ingelheim, Eli Lilly, Johnson & Johnson, Novo Nordisk and Sanofi, and has been a paid speaker for OmniaMed and SB Communications. AA has been a consultant for AstraZeneca and Boehringer Ingelheim. WHP has been a consultant for Abbott, Boehringer Ingelheim, Dexcom, Eli Lilly, Novo Nordisk, Roche Pharmaceuticals and Sanofi. AB has been a consultant for Abbott, Boehringer Ingelheim, Lifescan Canada and Sanofi on programs for the International Diabetes Federation. SE has been a consultant and paid speaker for Boehringer Ingelheim and Eli Lilly. VG, FN, JL and JE are employees of Boehringer Ingelheim. MC is a shareholder in RIO Weight Management Ltd, has received research funding from Cambridge Weight Plan, Lighter Life and Novo Nordisk, and has been a consultant and/or paid speaker for Boehringer Ingelheim, Eli Lilly, Janssen, Merck Sharp & Dohme and Novo Nordisk.

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design and survey planning, conducted the survey, prepared data and conducted initial statistical analyses. The authors also thank Marcus Schwemmle, Thomas Perkins and Anette Wolfrath of GfK for additional assistance with data analyses, supported financially by Boehringer Ingelheim and Eli Lilly. Data in this manuscript have been presented in posters at the 75th Scientific Sessions of the American Diabetes Association, June 5–9, 2015, Boston, MA, USA (abstracts 893-P and 857-P). Medical writing assistance, supported financially by Boehringer Ingelheim, was provided by Giles Brooke, PhD, CMPP, of Envision Scientific Solutions, during the preparation of this manuscript.

Author contributions

SD, WHP, AB, SE, FN, JL, JE and MC were involved in the design of the survey, and VG provided the statistical analysis. All authors contributed to the interpretation of the data, and gave input on, reviewed, and approved the final manuscript.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.diabres.2019.01.012>.

REFERENCES

- [1] Edelman SV, Polonsky WH. Type 2 diabetes in the real world: the elusive nature of glycemic control. *Diabetes Care* 2017;40:1425–32.
- [2] Hoerger TJ, Segel JE, Gregg EW, Saaddine JB. Is glycemic control improving in U.S. adults? *Diabetes Care* 2008;31:81–6.
- [3] Ali MK, Bullard KM, Saaddine JB, Cowie CC, Imperatore G, Gregg EW. Achievement of goals in U.S. diabetes care, 1999–2010. *N Engl J Med* 2013;368:1613–24.
- [4] Carls G, Huynh J, Tuttle E, Yee J, Edelman SV. Achievement of glycated hemoglobin goals in the US remains unchanged through 2014. *Diabetes Ther* 2017;8:863–73.
- [5] de Pablos-Velasco P, Parhofer KG, Bradley C, Eschwege E, Gonder-Frederick L, Maheux P, et al. Current level of glycaemic control and its associated factors in patients with type 2 diabetes across Europe: data from the PANORAMA study. *Clin Endocrinol (Oxf)* 2014;80:47–56.
- [6] Shivashankar R, Kirk K, Kim WC, Rouse C, Tandon N, Narayan KM, et al. Quality of diabetes care in low- and middle-income Asian and Middle Eastern countries (1993–2012): 20-year systematic review. *Diabetes Res Clin Pract* 2015;107:203–23.
- [7] Carls GS, Tuttle E, Tan RD, Huynh J, Yee J, Edelman SV, et al. Understanding the gap between efficacy in randomized controlled trials and effectiveness in real-world use of GLP-1 RA and DPP-4 therapies in patients with type 2 diabetes. *Diabetes Care* 2017;40:1469–78.
- [8] Heisler M, Bouknight RR, Hayward RA, Smith DM, Kerr EA. The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. *J Gen Intern Med* 2002;17:243–52.
- [9] Piette JD, Schillinger D, Potter MB, Heisler M. Dimensions of patient-provider communication and diabetes self-care in an ethnically diverse population. *J Gen Intern Med* 2003;18:624–33.
- [10] Aikens JE, Bingham R, Piette JD. Patient-provider communication and self-care behavior among type 2 diabetes patients. *Diabetes Educ* 2005;31:681–90.
- [11] Bundesmann R, Kaplowitz SA. Provider communication and patient participation in diabetes self-care. *Patient Educ Couns* 2011;85:143–7.
- [12] Heisler M, Vijan S, Anderson RM, Ubel PA, Bernstein SJ, Hofer TP. When do patients and their physicians agree on diabetes treatment goals and strategies, and what difference does it make? *J Gen Intern Med* 2003;18:893–902.
- [13] Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). UK Prospective Diabetes Study (UKPDS) Group. *Lancet*. 1998;352:837–53.
- [14] Holman RR, Paul SK, Bethel MA, Matthews DR, Neil HA. 10-year follow-up of intensive glucose control in type 2 diabetes. *N Engl J Med* 2008;359:1577–89.
- [15] Jones A, Vallis M, Pouwer F. If it does not significantly change HbA1c levels why should we waste time on it? A plea for the prioritization of psychological well-being in people with diabetes. *Diabet Med* 2015;32:155–63.
- [16] Peyrot M, Rubin RR, Lauritzen T, Snoek FJ, Matthews DR, Skovlund SE. Psychosocial problems and barriers to improved diabetes management: results of the Cross-National Diabetes Attitudes, Wishes and Needs (DAWN) Study. *Diabet Med* 2005;22:1379–85.
- [17] Nicolucci A, Kovacs Burns K, Holt RI, Comaschi M, Hermanns N, Ishii H, et al. Diabetes Attitudes, Wishes and Needs second study (DAWN2): cross-national benchmarking of diabetes-related psychosocial outcomes for people with diabetes. *Diabet Med* 2013;30:767–77.
- [18] Parry O, Peel E, Douglas M, Lawton J. Patients in waiting: a qualitative study of type 2 diabetes patients' perceptions of diagnosis. *Fam Pract* 2004;21:131–6.
- [19] Peel E, Parry O, Douglas M, Lawton J. Diagnosis of type 2 diabetes: a qualitative analysis of patients' emotional reactions and views about information provision. *Patient Educ Couns* 2004;53:269–75.
- [20] Lawson VL, Bundy C, Harvey JN. The development of personal models of diabetes in the first 2 years after diagnosis: a prospective longitudinal study. *Diabet Med* 2008;25:482–90.
- [21] Polonsky WH, Fisher L, Guzman S, Sieber WJ, Philis-Tsimikas A, Edelman SV. Are patients' initial experiences at the diagnosis of type 2 diabetes associated with attitudes and self-management over time? *Diabetes Educ* 2010;36:828–34.
- [22] Beverly EA, Hultgren BA, Brooks KM, Ritholz MD, Abrahamson MJ, Weinger K. Understanding physicians' challenges when treating type 2 diabetic patients' social and emotional difficulties: a qualitative study. *Diabetes Care* 2011;34:1086–8.
- [23] Ritholz MD, Beverly EA, Brooks KM, Abrahamson MJ, Weinger K. Barriers and facilitators to self-care communication during medical appointments in the United States for adults with type 2 diabetes. *Chronic Illn* 2014;10:303–13.
- [24] Del Canale S, Louis DZ, Maio V, Wang X, Rossi G, Hojat M, et al. The relationship between physician empathy and disease complications: an empirical study of primary care physicians and their diabetic patients in Parma, Italy. *Acad Med* 2012;87:1243–9.
- [25] Hojat M, Louis DZ, Markham FW, Wender R, Rabinowitz C, Gonnella JS. Physicians' empathy and clinical outcomes for diabetic patients. *Acad Med* 2011;86:359–64.
- [26] Capehorn M, Polonsky WH, Edelman S, Belton A, Down S, Gartnerman V, et al. Challenges faced by physicians when discussing the type 2 diabetes diagnosis with patients:

- insights from a cross-national study (IntroDia(R)). *Diabet Med* 2017;34:1100–7.
- [27] Polonsky WH, Capehorn M, Belton A, Down S, Alzaid A, Gamerman V, et al. Physician-patient communication at diagnosis of type 2 diabetes and its links to patient outcomes: New results from the global IntroDia(R) study. *Diabetes Res Clin Pract* 2017;127:265–74.
- [28] Hojat M, Mangione S, Nasca TJ, Cohen MJM, Gonnella JS, Erdmann JB, et al. The Jefferson Scale of Physician Empathy: development and preliminary psychometric data. *Educ Psychol Meas* 2001;61:349–65.
- [29] World Health Organization. Process of translation and adaptation of instruments. Available at: http://www.who.int/substance_abuse/research_tools/translation/en/ [accessed 24 March 2017].
- [30] Hojat M, Erdmann JB, Gonnella JS. Personality assessments and outcomes in medical education and the practice of medicine: AMEE Guide No. 79. *Med Teach* 2013;35:e1267–301.
- [31] Kelm Z, Womer J, Walter JK, Feudtner C. Interventions to cultivate physician empathy: a systematic review. *BMC Med Educ* 2014;14:219.
- [32] Derksen F, Bensing J, Lagro-Janssen A. Effectiveness of empathy in general practice: a systematic review. *Br J Gen Pract* 2013;63:e76–84.
- [33] Hojat M, Gonnella JS, Mangione S, Nasca TJ, Veloski JJ, Erdmann JB, et al. Empathy in medical students as related to academic performance, clinical competence and gender. *Med Educ* 2002;36:522–7.
- [34] Thomas MR, Dyrbye LN, Huntington JL, Lawson KL, Novotny PJ, Sloan JA, et al. How do distress and well-being relate to medical student empathy? A multicenter study. *J Gen Intern Med* 2007;22:177–83.
- [35] Hojat M, LaNoue M. Exploration and confirmation of the latent variable structure of the Jefferson scale of empathy. *Int J Med Educ* 2014;5:73–81.
- [36] Bonvicini KA, Perlin MJ, Bylund CL, Carroll G, Rouse RA, Goldstein MG. Impact of communication training on physician expression of empathy in patient encounters. *Patient Educ Couns* 2009;75:3–10.
- [37] Hojat M. Ten approaches for enhancing empathy in health and human services cultures. *J Health Hum Serv Adm* 2009;31:412–50.
- [38] Dowell A, Stubbe M, Macdonald L, Tester R, Gray L, Vernal S, et al. A longitudinal study of interactions between health professionals and people with newly diagnosed diabetes. *Ann Fam Med* 2018;16:37–44.