Globalization, immigration and diabetes self-management: an empirical study amongst immigrants with type 2 diabetes mellitus in Ireland

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Summary

Background: We have previously reported that immigrants in Ireland have poorer glycemic control compared with a matched population of Irish patients. This may be associated with poor diabetes self-care and low health literacy.

Aim: To compare the diabetes self-care profile of non-Irish-national patients i.e. immigrant patients (IM) and Irish patients (IR) attending a hospital diabetes clinic and to evaluate differences in health literacy between the two cohorts.

Methods: We studied the differences in diabetes self-management between 52 randomly selected non-Irish-national patients with type 2 diabetes and 48 randomly selected Irish/Caucasian patients. Rapid Estimate of Adult Literacy in Medicine (REALM) was used to assess health literacy.

Results: IM had poorer glycemic control than IR (HbA1c 8.0 ± 1.9 vs. $6.9 \pm 1.4\%$, $P < 0.005$). A significant proportion of IM forget to monitor their daily blood glucose (42.1% vs. 12.5%, $P < 0.05$). Family support is more important amongst IM in performing daily blood glucose monitoring (75% vs. 47.7%, $P < 0.05$), taking medications (81.7% vs. 42.2%, $P = 0.01$) and following an appropriate meal plan (87.6% vs. 62.2%, $P < 0.05$). Fifty-three percent can only understand simple or familiar questions about their diabetes care; 65.9% can only provide information on simple or familiar topics about their diabetes. Health literacy was found to be lower in the IM groups when assessed using REALM (52.7 vs. 61.4, $P = 0.01$).

Conclusion: Those providing diabetes education and care need to be aware of differing patient expectations regarding family involvement in the care of their diabetes and the possible contribution of language problems and lower health literacy to a limited understanding of diabetes self-care.

Introduction

Whilst medicine might be considered as a globalized endeavour, the movement of peoples, whether for economic, social or political reasons, creates a constantly changing framework in which healthcare providers must operate and strive to keep the population, both indigenous and immigrant, healthy. Communication is a significant, but not easily quantifiable component in this process. In clinical encounters, Mladovsky notes that miscommunication and dissatisfaction due to cultural differences and expectations can lead to suboptimal care.[1] It is estimated that between 2002 and 2006, the Irish population grew by 8.2% and that net migration accounted for ~60% of this growth.[2] Considering both the current and forecasted contribution of migrant workers to the Irish economy, there is a clear economic, social and, not least, a moral argument for keeping this population healthy.

The 2006 UN declaration (61/25) on diabetes points to the need to understand the environmental

and societal factors underlying the diabetes pandemic and calls for scientific evaluation of individual lifestyle choices and changes in the living environment beyond the control of the individual. The choices made by individuals to buy into a particular lifestyle are driven by a range of social, cultural and personal factors. For immigrants, the extent to which they buy into the host culture may be motivated by individual choice, social pressure to adapt, conform or integrate or by financial and economic considerations. Hsu *et al.* also suggest on the basis of their investigation of diabetes self-management among Chinese immigrants in America that '[m]ore recent immigrants tend to prioritize social adaptation and economic survival over health related needs'.[3]

In our recent study of Caucasian and non-Caucasian patients with type 2 diabetes mellitus (T2DM) attending the Diabetes Day Centre of an acute Dublin hospital, we reported that the non-Caucasian patients had significantly worse initial and ongoing glycemic control than the Irish patients: moreover, the degree of HbA1c improvement from the initial visit to follow-up was significantly less within the non-Caucasian cohort.[4] We concluded that a number of factors including ethnicity and racial differences, as well as differences in clinical phenotype may have contributed to the results. The findings mirror other comparative studies of immigrant and native populations. In a longitudinal study of South Asian and European patients with T2DM attending an outpatient diabetes clinic in Glasgow, Mukhopadhyay *et al.* noted a significantly greater deterioration in the HbA1c of the South Asian patients over 5 years when compared with the European patients.[5]

Whilst 'culture'—understood in the sense of ethnicity, genetics and sub-phenotype—is often explored as a variable in terms of its influence on diabetes self-management, other possible explanatory factors identified by research include social and environmental factors, personal characteristics,[6,7] literacy[8] and language barriers.[3] It is also acknowledged that the majority of diabetes care is done by the patients themselves, with minimal input by the healthcare professionals between visits.[9] Whilst there has been a shift over the past years toward a shared decision-making approach to diabetes care, the success of a patient-centred approach may be influenced by important underlying cultural assumptions about the doctor–patient relationship.[10,11]

The research presented in this article builds on Thabit *et al.*'s findings[4] and constitutes a pilot study which explores diabetes self-management amongst a sample of immigrant and Irish patients with T2DM. The research seeks to investigate why immigrant patients would appear to have poorer initial and ongoing glycemic control than their Irish counterparts and, in this way, to identify how interventions might be tailored more effectively to the needs of different patient groups.

Methods

Fifty-two randomly selected non-Irish-national patients with T2DM, who emigrated to Ireland within the last 10 years, were recruited from the same diabetes outpatient service, from which the original data were collected.[4] Figure 1 shows the geographical distribution of the non-Irish national patients. They were compared with 48 randomly selected Irish/Caucasian patients attending the same outpatient service. Patients with known cognitive impairment or who were not self-caring were excluded from the study, as were patients who were illiterate or those in need of an interpreter. Information on ethnicity was collected from the service's database and confirmed by the patient's medical chart. Information on the educational level achieved by both cohorts was also collected and is illustrated in Figure 2.

Patients attending the outpatient service are referred by their primary care providers. All patients, irrespective of ethnic or social background, have access to the same range of services in the clinic within the same timeframe to help them manage their diabetes. The service is staffed by diabetologists, diabetes nurse specialists, dieticians and podiatrists.

A self-assessment questionnaire adapted from the 'Diabetes Care Profile'[12] was used to study the differences in diabetes self-management in both cohorts of subjects. The 'Diabetes Care Profile' has been validated to assess the social and psychological factors related to diabetes care.[12] We assessed the patients' self-care practices, attitudes and beliefs towards diabetes and difficulties with diabetes self-care and asked them to assess their ability to understand and communicate with healthcare providers on aspects of their diabetes care in English using the criteria distilled from the Common European Framework of Reference for Languages.[13] The immigrant patients were presented with questions which were designed to appraise their proficiency in English in the context of this particular healthcare setting, whilst the Irish patients were asked to respond to questions about the quality of communication with diabetes service providers. Demographic information was also collected. Subjects were asked to complete the questionnaire
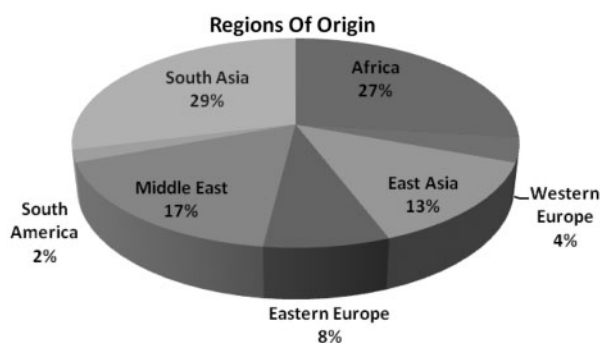
Figure 1. Geographical distribution of immigrant patients. Values are presented as percentages.
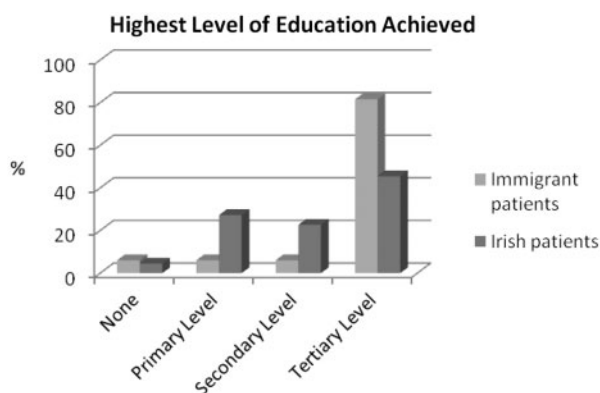
Figure 2. Education level achieved between the two cohorts. Values are presented as percentages.

in English before or after a consultation and without the help of friends or family members.

An additional validated questionnaire assessing health literacy, known as the REALM (Rapid Estimate of Adult Literacy in Medicine) was given to 51 subjects [Irish patients (IR) = 31 and immigrant patients (IM) = 20] during the same consultation. The REALM is a screening instrument, which has been correlated with other standardized tests,[14] to assess a subject's ability to read common medical words and lay terms for body parts and illnesses.

Plasma glucose was measured using a glucose oxidase method (bio Merieux kit/Hitachi Modular) and glycosylated haemoglobin (HbA1c) using a Hi-Auto A1c analyser (Menarini HA 8140). Plasma total cholesterol and triglycerides were measured using enzymatic methods (Human Liquicolor kits/Hitachi Modular). Plasma high-density lipoprotein (HDL) cholesterol and low-density lipoprotein (LDL) cholesterol were measured directly with enzymatic methods (Randox direct Kits/Hitachi Modular). Height and weight were recorded with light clothing and without shoes at clinic visits by diabetes nurse specialists. Blood pressure was determined as the

mean of two separate measurements in the sitting position.

Statistical analyses

Data were expressed as mean ± standard error of mean. The significance of the differences of the mean grouped variables of the scale used in the diabetes self-management questionnaire was tested using the χ^2-test. The number of patients from each ethnic group within the immigrant patient sample was expressed as a percentage and the difference of means between the groups was compared. Data pertaining to treatment modalities were expressed as percentages. The significance of the mean difference of clinical laboratory values and of REALM scores was tested by independent samples t-test. A 2-tailed model was used and a $P < 0.05$ was considered to be statistically significant.

Results

Patient characteristics are outlined in Table 1. The IM group was younger compared with the IR group (45.8 ± 11.8 vs. 60.1 ± 11.0 years, $P < 0.005$). There were no significant differences in the duration of diabetes between the two groups (4.7 ± 3.7 vs. 6.3 ± 5.6 years, $P = 0.12$). The IR group had significantly higher body mass index (32.0 ± 6.4 vs. 27.2 ± 4.5 kg/m^2, $P = 0.02$) and systolic blood pressure (136.2 ± 19.9 vs. 122.9 ± 13.3 mm/Hg, $P = 0.001$). Despite being younger and having similar duration of diabetes, the IM group had significantly worse glycemic control as compared with the IR group (8.0 ± 1.9 vs. 6.9 ± 1.4%, $P < 0.005$).

A significant number of IM patients stated in the self-management questionnaire that they forget to perform their daily self-monitoring blood glucose (SMBG) as compared with the IR patients (42.1% vs. 12.5%, $P < 0.05$). Interestingly, a higher proportion of the IM group also stated that they rely more upon their family members to ensure that they perform daily SMBG (75% vs. 47.7%, $P < 0.05$). The questionnaire also revealed that family support plays a stronger role for the majority of IM patients in taking their medications (81.7% vs. 42.2%, $P = 0.01$) and complying with a proper dietary plan (87.6% vs. 62.2%, $P = 0.046$) as compared with IR patients. A significantly greater number of IM patients had never attended a dietician before (18.4% vs. 2.1%, $P = 0.009$), but those who did found the advice useful for their diabetes care.

In terms of employment, we found no significant difference in the proportion of IM and IR patients who were in employment (82.7% vs. 83.4%). Moreover, when we looked at levels of income

Table 1 Baseline characteristics

	IM ($n = 52$)	IR ($n = 48$)	*P*-value
Age (years)	45.8 ± 11.8	60.1 ± 11.0	<0.005
Duration of diabetes (years)	4.7 ± 3.7	6.3 ± 5.6	0.12
HbA1c (%)	8.0 ± 1.9	6.9 ± 1.4	<0.005
BMI (kg/m^2)	27.2 ± 4.5	32.0 ± 6.4	0.02
Systolic blood pressure (mm/Hg)	122.9 ± 13.3	136.2 ± 19.9	0.001
Diastolic blood pressure (mm/Hg)	72.2 ± 9.8	73.7 ± 10.1	0.49
Total cholesterol (mmol/l)	4.2 ± 1.1	4.6 ± 4.2	0.48
LDL-C (mmol/l)	2.2 ± 0.9	1.9 ± 0.8	0.17
HDL-C (mmol/l)	1.2 ± 0.4	1.3 ± 0.5	0.18
Triglycerides (mmol/l)	1.7 ± 1.2	1.6 ± 1.0	0.44

Values are presented as mean $\pm$ SD.

between these two cohorts, we found that there was a similar proportion of IM and IR patients both in the lower income group and the higher income group (53.7% vs. 46.4% and 46.3% vs. 53.6%, respectively, $P = 0.37$). There was no significant difference observed in the level of glycemic control between patients in the lower income group and the higher income group (7.6% vs. 7.4%, $P = 0.69$) for the whole cohort.

A greater proportion of IM patients had received tertiary level education than IR patients (Figure 2). In terms of English language education, although 87% of IM patients stated that they had received formal English language education, 63% had received this education at primary school level only, compared with 37% at secondary and tertiary level. When asked whether they could understand questions in English related to their diabetes care, the majority (53%) stated that they could only understand simple or familiar questions. Likewise, the majority (65.9%) stated that they could only provide information about their diabetes on simple or familiar topics. The ability to understand simple sentences and to communicate on simple or routine matters corresponds to the Waystage Level of the Common European Framework of Reference for Languages, i.e. the subject can use the language at an elementary level (Table 2). In contrast, when asked about the quality of communication, 83% of IR patients stated that they fully understood the information given by their healthcare providers about their diabetes. Some 75% of IR also stated that they fully understood questions asked by their healthcare professionals about diabetes care.

Furthermore, when we assessed health literacy in a subset of the sample (IR = 31, IM = 20) using the REALM, the IM group had a significantly lower score than the IR group (52.7 vs. 61.4, $P = 0.01$). The REALM score was also found to be inversely

correlated with glycemic control, as measured by HbA1c ($r = -0.35$, $P = 0.018$). The negative impact of poor health literacy on glycemic control has implications for the way in which information on diabetes management is provided to patients.

Discussion

Previous studies present different perspectives on the possible impact of structural and material factors, in particular, socio-economic factors such as income and its influence on access to specialist diabetes care[15] and on glycemic control.[16–18] Research in the Basque country has demonstrated a link between poorer glycemic control in patients with T2DM and their socio-economic status in spite of the fact that patients from low socio-economic bands use primary care services more.[17] Other research, including Rabi *et al.*'s study in a Canadian Diabetes Education Centre which explored *inter alia* the impact of income on diabetes outcomes, has not found a significant association between income level and glycemic control.[16] Our study reveals that there is no difference in the average income levels across the IM and IR groups at the lower and higher ends of the scale, suggesting that access to the outpatient diabetes service in which our data were collected is not determined by income level. This is supported by a recent study amongst asylum seekers in Ireland which showed that they were more likely to be referred to outpatient services than their Irish counterparts for various medical conditions.[19] Moreover, our results reflect those of Rabi *et al.* insofar as they indicate that the level of income was not a determinant of glycemic control.[16] These findings minimize the possibility that inequality of healthcare access and delivery

Table 2 The Common European Framework of Reference for Languages

Level	Descriptors
A1 (breakthrough)	Can understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type. Can introduce him/herself and others and can ask and answer questions about personal details such as where he/she lives, people he/she knows and things he/she has. Can interact in a simple way provided the other person talks slowly and clearly and is prepared to help.
A2 (waystage)	Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment). Can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. Can describe in simple terms aspects of his/her background, immediate environment and matters in areas of immediate need.
B1 (threshold)	Can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc. Can deal with most situations likely to arise whilst travelling in an area where the language is spoken. Can produce simple connected text on topics which are familiar or of personal interest. Can describe experiences and events, dreams, hopes and ambitions and briefly give reasons and explanations for opinions and plans.
B2 (vantage)	Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialization. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.
C1 (effective operational proficiency)	Can understand a wide range of demanding, longer texts, and recognize implicit meaning. Can express him/herself fluently and spontaneously without much obvious searching for expressions. Can use language flexibly and effectively for social, academic and professional purposes. Can produce clear, well-structured, detailed text on complex subjects, showing controlled use of organizational patterns, connectors and cohesive devices.
C2 (mastery)	Can understand with ease virtually everything heard or read. Can summarize information from different spoken and written sources, reconstructing arguments and accounts in a coherent presentation. Can express him/herself spontaneously, very fluently and precisely, differentiating finer shades of meaning even in more complex situations.

between the IM and IR patients are contributory factors in our findings.

Our findings indicate a clear divergence within the IM sample between patients' self-assessed level of understanding and their actual glycemic monitoring and control. Research conducted amongst South Asian communities in Nottingham and Coventry revealed a lower level of knowledge about diabetes within these populations[20,21]: yet, interestingly, whilst culturally tailored health education of South Asian patients[22] resulted in an increase in knowledge of diabetes, it did not lead to an improvement in glycemic control, indicating that a gap remains between knowledge and its implementation.[20] This discontinuity suggests that diabetes interventions, rather than emphasizing knowledge, might focus more effectively on understanding and, where appropriate, changing patient attitudes and motivation as a means of achieving better metabolic control.[23]

Fisher *et al.* compared the characteristics of the family setting and its relationship with self-care behaviour amongst Hispanic and European Americans with T2DM and found different emphases between the two groups based on their healthcare beliefs as mediated by culture and ethnicity.[6] Suurmond and Seeleman have also observed a preferred family centred model of decision making within certain ethnic groups.[24] Our study provides support for these findings: in the self-management questionnaire IM patients placed greater emphasis than IR patients on family support in helping them

comply with their treatment: in particular, with glucose monitoring, diet and medication. That the family setting is the least widely investigated factor in diabetes management, not least in adult patients with Type 2 DM, is, therefore, a surprising omission.[6] It requires further research with a view to providing interventions in diabetes management, which are more sensitive to different loci of decision making.[10]

Surprisingly, we found attendance amongst IM patients at the dietician-led clinics to be significantly low, in spite of the same process of referral for dietary input for both IM and IR patients. As all patients attending our services would have received a dietetic appointment as part of their on-going care, our study could not ascertain the primary reason for their non-attendance at this service. More generally, Finucane et al. present evidence of 'disappointingly low' attendance rates at dietetic clinics in the same diabetes outpatient clinic where we collected our data. They cite a number of reasons identified by research for non-attendance at dietetic clinics, including misunderstanding of the system of scheduling, the emotional state of the patients, long-waiting times and clerical mistakes. Further research is necessary in order to ascertain if any of these factors has a particularly strong impact on our IM sample or, indeed, if there are other factors influencing attendance, not least, cultural factors, including the more prominent role of the family in helping IM patients to manage their diet and/or the perception that the advice provided by the dietician might be relevant for the majority population, but not the ethnic minority. It is also useful in this context to consider Fagerli et al.'s finding in their study of Pakistani immigrants with T2DM in Norway that, in spite of evidence to the contrary, some of the interviewed patients claimed initially that they had not received dietary advice, simply because they perceived the advice not to have been relevant.[25] In spite of the finding from our study that those IM patients who did attend the dietetic service found the input useful, it was not possible to assess whether this had any significantly positive impact on their glycemic control, due to the limited numbers of patients available.

Whilst physician-directed compliance-oriented care has been dismissed as an ineffective approach to the treatment of diabetes,[9] differing cultural assumptions about autonomy,[24] authority[10] and self-efficacy[26] as well as socio-economic and psychological considerations associated with the immigration experience[27,28] can also influence the willingness of the patient (and, indeed, the provider) to engage in shared decision making. The fact that shared decision making characterises the patient as an autonomous decision maker[24] means that such an approach is unlikely to resonate amongst patients from cultures which value hierarchical relationships and deference to authority. Whereas cross-cultural and intercultural communication literature offers extensive evidence of how cultural values such as individualism/collectivism and power distance shape decision-making preferences in other institutional settings, most notably, organizations, the cultural variable as it relates to shared decision making in medical contexts has not received research attention.[10]

The success of shared decision making is also predicated on the patient being able to participate with the healthcare provider in a discussion about treatment options, including asking questions and expressing treatment preferences.[24] For the provider, it involves the communication of technical information and the elicitation of the patient's preferences, so as to assist the patient in making an informed decision. Where the patient has only limited oral and aural proficiency in English, as demonstrated by the findings of the current study, there are clearly significant barriers to the possible implementation and success of a shared decision-making approach, which need to be recognized in the design of appropriate interventions.

Poor levels of health literacy can impact negatively on the patient's ability to interpret blood glucose levels, understand educational materials, read labels on medication, understand new concepts and, importantly, not just affect understanding but also recall.[29] Poorer knowledge of diabetes is also associated with lower levels of literacy,[30] although we have previously noted the possible discontinuity between knowledge and implementation. Our study revealed lower levels of health literacy amongst a sub-sample of the IM patients. The fact that the majority of the IM patients in our study had completed a higher level of education than their IM counterparts, might have lead us to expect higher levels of health literacy in this group.[16,28] This may well be the case when they are operating in their first language (L1). However, the lack of formal English-language education beyond primary level and, with this, a lack of any formal exposure to the specialist medical register in the foreign language, could result in lower levels of health literacy in the foreign language (L2). Fagerli et al.'s study of the experiences of Pakistani immigrants with T2DM in Norway illustrated that even patients with a sound command of Norwegian experienced comprehension difficulties when providers used particular terms as they were not familiar with the underlying concepts.[25] Equally, health knowledge and perceptions about managing diabetes may be

conceptualized differently in ethnic minorities compared with the majority population. Problems with processing more complex written and oral information in the L2, including use of specialist terminology, are exacerbated when the patient may not even have the necessary strategic competence in the L2 to deal with comprehension difficulties as they arise. Strategies such as the 'Interactive Communication Loop' have resulted in improved glycemic control amongst patients with low health literacy in their L1.[29] By asking the patient to restate information or instructions, the provider can assess patient recall and understanding and evaluate the patient's perceptions about information or changes in treatment. Such a strategy could also be usefully implemented by providers when communicating with immigrant patients who have limited L2 competence and/or low levels of health literacy in the L2.

The current study has a number of limitations. The sample size for the self-management questionnaire and the health literacy survey is relatively small. The former is being addressed in terms of ongoing data collection. We are also aware of the potential gap between reported and actual behaviour, i.e. reported behavioural modifications in terms of diabetes management without any corresponding transfer into practice as measured by glycemic control. However, there is a more fundamental problem with the REALM instrument as a test of literacy in the L2: the test is designed for native speakers of a language rather than for speakers using an L2 and does not capture adequately whether the patient understands the word which he or she has pronounced. Further studies of literacy should at the very least use an additional instrument such as the s-TOFHLA[31] in order to address this shortcoming. Notwithstanding these limitations, the findings generated by this preliminary study have provided a basis for further targeted research in the IM cohort with the aim of exploring the underlying cultural beliefs together with relevant structural and material factors which determine attitudes and motivation to self-care amongst our IM subjects. Such aims are better achieved through an emic approach with the integration of qualitative research instruments.

Conclusion

The preliminary evidence presented by our study highlights the potential impact of cultural and linguistic diversity and of the complex biographies of individual patients, including differing levels of health literacy and education, on diabetes self-management. Particular issues that providers need to evaluate when determining the appropriate intervention for IM include the possible influence of different culturally bound conceptions of their illness and its management, differing expectations in terms of family involvement in managing their diabetes and the possible limitations placed on patient-centred care due to difficulties experienced by IM in speaking and understanding English. On a more basic level, the provider needs to be aware of the possible need to employ strategies during the consultation to maximize the opportunities for patient recall and understanding: this is especially important where the patient does not have English as their first language. Awareness of the existence of such diversity provides a first, but small step toward achieving the aim of keeping this population healthy.

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