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Original Article

Type 2 diabetes patients are more amenable to change following a contextualised diabetes education programme in Malaysia

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ABSTRACT

The aim of the study is to determine the impact of diabetes education on patients' glycaemic control. A prospective 18-month intervention study was conducted at four ambulatory diabetes centres. Poorly controlled type 2 diabetes patients attended an hour of structured diabetes education at their respective diabetes centres. A month post-intervention patients were contacted through telephone and followed up for 18 months. Anthropometric measurements and socio-demographic details were collected during the first visit. HbA1C blood test for each patient was taken at beginning and end of study. Patients' diabetes knowledge showed 80% obtained Excellent or Very Good score. The Telephone Contact (TC) retention rate was 75.52% at 18 months. There was a significant improvement ($p = 0.001$) in patients' glycaemic control with a reduction in HbA1C of $\geq 1\%$ from baseline. Diabetes education intervention contributed positively to significant glycaemic improvement and should be embedded within a structured diabetes care delivery system.

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1. Background

The global prevalence of Type 2 diabetes is 8.3% [1] According to International Diabetes Federation (IDF), Malaysia is one of the top ten diabetes hotspots in the Western Pacific region with a diabetes prevalence of 10.9% [2]. The continual ascent of diabetes prevalence amongst Malaysian adult population age ≥ 30 years from 0.65% in 1960 to 14.9% in 2006 as per reported in the National Health Morbidity and Mortality Survey is a grim indication for the healthcare system [3].

Cognisant of the increase in diabetes prevalence an emphasis was placed on capacity building of healthcare givers especially in the area of diabetes management from as early 3 decades ago. Realising the importance of diabetes education and self-care in diabetes management, a concerted effort was made by Ministry of Health (MOH) Malaysia, affiliated government hospitals and non-governmental organisations to trained nurses and medical assistants to become diabetes educators [4]. Although diabetes

educators in Malaysia are still modest in numbers, the effort is a positive step towards better diabetes management [5].

In addition, the framework of diabetes management care was established in the mid-90s to ensure annual diabetes care screening (ie. diabetes foot care, eye examination and electrocardiogram) became an integral part of diabetes ambulatory clinics [4] as well development and successive revision of the Malaysian Clinical Practice Guidelines (CPG) for Type 2 Diabetes Mellitus [6].

On the contrary, there was a lack of emphasis in the development of a structured diabetes education programme for patients in Malaysia. Compared to United Kingdom (UK) which in 2005 initiated an effort to fund, regulate and ensure quality of diabetes education [7], Malaysia have not carefully considered this education process and how it can be embedded and audited within our healthcare delivery system.

Briefly a structured education programme should include key criteria such as a clear underlying philosophy, a written curriculum, trained educators, a quality assurance system which can be applied to process, content and delivery and importantly an audit process of the programme [7]. Consequently, over the past 15 years many diabetes education programmes were funded, developed, implemented and vigorously evaluated in the United Kingdom [7–11].

In the recent Malaysian DiabCare 2013 audit, 19 tertiary care government hospitals reported very high screening rates especially for urinalysis (97.8%), fundal examinations (93.3%) and foot

Abbreviations: TC, telephone contact; HbA1C, glycated haemoglobin C; MOH, Ministry of Health; MY-DEMO, Malaysian Diabetes Education Module; WC, waist circumference; BMI, body mass index; DKS, diabetes knowledge score.

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examination (97.1%) with an astounding 90% of patients going through all three examinations within the last 12 months [12]. Unfortunately, we have not seen the same rigour for the implementation and evaluation of quality diabetes education. By ensuring a smooth process for diabetes education to patients overall glycaemic control may begin improve and diabetes-related complications reduced.

The authors endeavour to examine the potential gaps from the point of view of delivery, structure and timing of diabetes education in Malaysia. The premise of the study was to deliver a specifically contextualised diabetes education module to poorly controlled type 2 diabetes patients (≥ 8.0 mmol/L) [6] regardless of the chronicity of their disease.

Hence, the aim was to educate all poorly controlled diabetes patients with an education module that was tailor-made for the locality and language of majority of the patients. Since patients were recruited from government-run four ambulatory health care centres, the method and frequency of delivery were tailored to the practicality of a busy centre.

2. Materials and methods

2.1. Clinical settings and inclusion & exclusion criteria

The four health care settings were located in Peninsular Malaysia. The inclusion criteria included patients; (i) who were conversant in *Bahasa Melayu* (ii) with adequate literacy and numeracy (iii) accessible via mobile phone or fixed phone line. Exclusion criteria included (i) pregnancy (ii) malignancy.

2.2. Sample size

Briefly, to estimate appropriate sample size, several systematic reviews were appraised. *Welschen* et al. included six randomised controlled trials on SMBG in non-insulin treated patients in their systematic review [13]. The review showed the overall effect of SMBG on HbA1C was statistically significant, with a reduction of 0.39% in HbA1C compared to control groups. On the basis of a previous randomized control trial a sample size was calculated (with a power of 80% and alpha 0.05, 2-tailed) for a reduction of HbA1C of $1.0\% \pm 1.08\%$ for treatment group and reduction of HbA1C of $0.54\% \pm 1.4\%$ for control group. The sample size required is 118 per group. After taking into consideration attrition rate of 20%, the total number of patient required is 284.

2.3. Recruitment process & modifications

Initially eligible patients were approached and recruited from “one-stop diabetes centres” in 2 ambulatory clinical sites by nurses. The recruited patients ($n=443$) were invited to attend Module I. Approximately a third of patients (28.8%; $n=128$) did not turn up for Module I despite multiple calls.

Consequently, minor modifications were done to address the issue of high attrition rates. Multiple face-to-face (19) briefing sessions (from November 2013 till June 2015) were provided at the 3 clinical sites. Albeit this extra step was resource-intensive, the retention rate improved from 57.19% in 2012 to 81.25% in 2013 and 2015.

2.4. Intervention tools

The development and validation of the diabetes education tool and the questionnaires had been described elsewhere by Ahmad et al. [14]. Succinctly, Malaysian Diabetes Education Module (MY-DEMO) was the first ever contextualised module which was

developed in *Bahasa Melayu* or Malay language. The theoretical framework of the module was based on the Health Belief Model (HBM) and several key components were embedded to enhance patient’s understanding of their own condition within MY DEMO.

2.5. Validation process for diabetes knowledge questionnaires (DKQs) used for telephone contact (TC)

The pool of questions ($n=128$) used for the TC follow up was based on the set of questions validated from authors’ previous work [14]. Concisely, for each TC session between 4 and 5 items tested on general knowledge of diabetes and another 1–2 items tested on self-care practices. The questions were based on the content from the education module. The HBM constructs such as perceived benefit, perceived severity and cues to action were embedded within these TC questions.

2.6. First visit

Anthropometry measurements such as weight, height, waist circumference (WC) and body mass index (BMI) and blood pressure were measured during the first visit. Patients were barefooted and in light clothing when measurements were taken. Height was measured using a portable body meter and weight was measured using digital weighing scale. The height and weight of patients were used to calculate the BMI. The WC was measured using non-elastic tape measure. Blood pressure was measured using automatic blood pressure monitor. The most recent (≤ 3 months) HbA1C result of patients’ were obtained from their medical record. Socio-demographic details such as age, gender, ethnicity, education levels, and duration of disease were also recorded.

2.7. Diabetes education intervention session (MY DEMO)

All patients attended the diabetes education module for approximately 60 min. As mentioned earlier, the education module was contextualised to suit the locality and language of patients. Although it would have been ideal to deliver serial education sessions, such as previous works [7–10,15] the authors deliberated to present a concise 60-min module. The succinct session tailored the needs and availability of space and time, for both patients and busy clinical settings.

In addition, the author (BA) solely delivered all the sessions ($n=23$). Hence, the programme was high fidelity and any variations were minimised. The X-PERT study was also delivered by a single experienced educator to established diabetes patients.⁹ All sessions were delivered over a staggered period of time (3.5 years) from 2012 to 2015 while patients were being recruited.

2.8. Telephone contact (TC) follow-Up

Approximately a month post intervention, each patient was contacted by BA and questioned on several aspects of the diabetes module. Each TC session took approximately 15 min to complete. The patients were asked 6 questions and each question had 3 options (ie. a, b, c). Patients were encouraged to answer all the six questions. Feedback was given at end of TC if patients had answered incorrectly. In total, each patient was asked 168 questions and received a minimum of 28 TC for 18 months.

2.9. End visit

Patients returned to their ambulatory health care clinics to have their final HbA1C blood test at the end of 18 months.

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