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## A qualitative study exploring patients' experiences regarding insulin pump use

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### ABSTRACT

**Background:** Diabetes is a threat to peoples' lives around the world, particularly in the Middle East. Medicine misuse and poor glycaemic control are prevalent among patients with type 2 diabetes, especially insulin-dependent patients (Alsairafi et al., 2016). With advances in medical technology, insulin pumps became a treatment option for patients with type 1 diabetes and those with insulin-dependent type 2 diabetes. However, use of these devices is still lacking in Kuwait, particularly in patients with type 2 diabetes. Information on how patients manage these devices and their efficacy and safety from the perspectives of patients is also lacking (Alsaleh et al., 2016).

**Objective:** To examine the views and experiences of adults with type 2 diabetes regarding the use of insulin pumps compared to their previous insulin delivery methods, in terms of glycaemic control, quality of life, preference, convenience and adherence to doses.

**Setting:** The main five secondary-care hospitals in Kuwait: Mobarak Al-Kabeer, Al Amiri, Al Adan, Al Farwaniya and Al Jahra.

**Method:** All adults with type 2 diabetes who used an insulin pump were invited to participate. Data were collected through semi-structured interviews. Data analysis was performed using MAXQDA-11.

**Results:** A total of eight patients were interviewed. Interviews with patients revealed that using an insulin pump improved patients' glycaemic control and quality of life as a consequence of improved satisfaction and adherence to doses.

**Conclusion:** From the perspective of adults with type 2 diabetes, there are lots of benefits of using insulin pumps over other insulin delivery methods, mainly seen by the improvement of quality of life and patients' adherence to doses. Policy-makers and healthcare professionals (HCPs) must be aware of such benefits and should support the wider implementation of this technology in the country by including patients with type 2 diabetes. Results of this study will help to inform healthcare provision and guideline modifications and to provide guidance for new patients using this therapy.

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### 1. Introduction

Type 2 diabetes accounts for around 90 per cent of all diabetes cases. It mostly affects adults and is associated with obesity, hyperlipidaemia and hypertension (Alhyas et al., 2011). The prevalence of type 2 diabetes has dramatically increased over the past decades and it is the most prevalent type of diabetes in Middle Eastern countries (IDF, 2013). A study in Kuwait concluded that type 2 diabetes is becoming an urgent health problem that expands to children and adolescents (Moussa et al., 2008). During the last five years, 13 per cent of patients with type 2 diabetes had an onset

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age of less than 10 years and 42 per cent had an onset age of 10–20 years. Family history, body mass index (BMI) and sex are established risk factors for developing type 2 diabetes (Channanath et al., 2013). For example, the higher the BMI, the lower the diabetes onset age. For the third class obesity category, diabetes onset age is lower by 8.2 years than that for normal BMI category. The increase of type 2 diabetes among children in Kuwait could be linked to the increase in childhood obesity. Increased obesity among children is attributed to a combination of genetic and life-style factors such as decreased physical activity and increased consumption of fast food (Elkum et al., 2015). Achieving glycaemic control is important to reduce the risk of micro- and macro-vascular complications (Inzucchi et al., 2015). Nevertheless, the majority of insulin-dependent patients have difficulties achieving the recommended glycaemic targets of glycated haemoglobin A1c (HbA1c) levels of less than seven per cent (Al-Khawaldeh et al., 2012). Studies have shown that annual treatment costs for patients using insulin are higher compared to those using oral hypoglycaemic agents only (Al-Maskari et al., 2010).

Adherence is defined as “the extent to which a person’s health behaviour corresponds with agreed recommendations from a healthcare provider” (WHO, 2003). Despite its importance in the management of type 2 diabetes, it is often neglected by patients (Bailey and Kodack, 2011). Researchers worldwide have reported many contributors to non-adherence in type 2 diabetes, including fear of side effects, frustration due to failure to achieve control, and cost of treatment (Vermeire et al., 2003; Aflakseir, 2012; Alsairafi et al., 2016). The World Health Organisation (WHO) identifies some other factors that affect patients’ adherence to treatment, such as complexity of the treatment regimen, lack of immediate benefit of therapy, and social stigma attached to the use of some medications and devices (WHO, 2003). Adherence to insulin continues to be a challenge for optimum diabetes management (Cramer, 2004; Lee et al., 2006). International non-adherence rates to insulin reach 40 per cent among patients with type 2 diabetes (Wallia and Molitch, 2014). In the Middle East, insulin is still considered the last resort for patients with type 2 diabetes due to fear of injections and weight gain (Lakkis et al., 2013).

There is little known about interventions that improve adherence to insulin regimens (Doggrell and Chan, 2015). It has been suggested that simplifying the insulin delivery method can overcome barriers to insulin use. Insulin pumps have been introduced as an alternative insulin delivery method to help patients cope with the disease and management tasks (Shaghoul and Shah, 2009). Many improvements have been made since the introduction of the first pump 35 years ago (Alsaleh et al., 2010; Salem, 2010). Technological advances over the years have turned insulin pumps into a practical alternative to multiple daily injections (MDIs), since pager-sized pumps (e.g. OneTouch and MiniMed Paradigm) have taken the place of the brick-sized old ones (Alsaleh et al., 2010; Lepore and Tommaselli, 2015).

Insulin pumps have been shown to be cost-effective in patients with poorly controlled type 2 diabetes despite therapy optimisation (Roze et al., 2016). Furthermore, the physiological continuous delivery of insulin via a pump provides better glycaemic control with less insulin usage and thus fewer side effects (less weight gain and hypoglycaemic events), which subsequently improves patients’ quality of life and wellbeing (Lepore and Tommaselli, 2015). Studies examining the use of these devices in the management of patients with type 2 diabetes are scarce. This is because their use in several countries is mostly recommended for patients with type 1 diabetes, supported by the extensive evidence on their effectiveness particularly for this type (Barnard and Dixon, 2010; Wolff-McDonagh et al., 2010; Didangelos and Iliadis, 2011; Reznik et al., 2014). The National Diabetes Information Service Insulin Pump Audit reported 35 patients with type 2 diabetes using

insulin pumps in England in 2009 versus 5667 patients with type 1 diabetes. In Turkey, 99.5 per cent of pump users have type 1 diabetes. In the Middle East, the use of insulin pumps in adults has not been widely investigated. Only four studies were found in this context (Wainstein et al., 2005; Merheb et al., 2008; Reznik et al., 2014; Alsaleh et al., 2016), of which two studies were conducted among patients with type 1 diabetes (Merheb et al., 2008; Alsaleh et al., 2016). The other two studies are randomised controlled trials (RCTs) examining the efficacy of using insulin pumps.

Insulin pumps were first introduced in Kuwait in 2006, and are provided free for patients by the Ministry of Health (MOH). Due to a lack of evidence on the effectiveness of insulin pumps for type 2 diabetes, the guidelines for insulin pumps coverage have been strictly for type 1 diabetes to date (Al-Wotayan, 2011). Accordingly, patients with type 1 diabetes who fail MDIs and express a willingness to commit to the management tasks associated with the therapy are considered eligible to start insulin pump therapy. However, in some practices, adults with type 2 diabetes who had been uncontrolled with MDIs for a period of time and were willing to comply with the pump-related tasks were provided with insulin pumps. Nevertheless, patients using insulin pumps in the country are still very few. The average number of patients who use such therapy in the main five hospitals in Kuwait is 150 (including both types of diabetes). Qualitative studies exploring adults’ perspectives regarding the use of insulin pumps are lacking in Kuwait (Alsaleh et al., 2016).

The aim of this study is to examine the views and experiences of adults with type 2 diabetes concerning the use of insulin pumps and to compare these with the use of other delivery methods such as injections and pens in terms of glycaemic control, general wellbeing, satisfaction and adherence. There was a particular concern to include patients with type 2 diabetes because, as mentioned above, this is the most prevalent type in the region, and it has been noted from a preliminary fieldwork that around 80 per cent of patients with type 2 diabetes in Kuwait are managing their disease with insulin (Alsairafi, 2016). Therefore, it was pivotal to explore how this group of patients manage their disease and what problems they encounter. In addition, there is a lack of studies exploring the use of pump therapy particularly for this type. In Kuwait, there is only one study that reported the use of insulin pump in adults (Alsaleh et al., 2016). However, that study included patients with type 1 diabetes from one hospital (one health region) only, and it depended on a questionnaire to collect data. There are few studies which have examined how insulin pumps affect patients’ lives, particularly adults (Ritholz et al., 2007). Therefore, this study also aimed to investigate the impact of insulin pumps on the lives of patients and their family members. Results from this study can be used as an evidence-based guidance for new patients who wish to use this therapy and will help to inform healthcare provision of insulin pump therapy in the country and guideline modifications.

## 2. Ethical approval

The study was approved by the Standing Committee for Coordination of Health and Medical Research, MOH, State of Kuwait. Informed consent was obtained from all participants prior to participation. Data collection was conducted over seven months (from March 2014 to September 2014).

## 3. Materials and method

### 3.1. Study design

Cross-sectional semi-structured interviews were conducted. The face-to-face interviews allowed exploration of patients’ views

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