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Review

Hypoglycaemia and brief interventions in the emergency department – A systematic review

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ABSTRACT

Objective: For people with diabetes, severe hypoglycaemia is the most common reason for emergency service usage and emergency department (ED) presentations. Brief interventions (BI) are a recognised intervention strategy in the ED for other conditions but to date, they have not been applied to those with hypoglycemia. This review aims to identify components and outcomes of BI for people with diabetes mellitus to inform the development of BI in the ED.

Method: A systematic review of randomized controlled trials was undertaken in MEDLINE, CINAHL, PsychINFO and EMBASE. Studies that examined brief interventions for people with diabetes were considered. Eligible studies were critically appraised and included in a narrative synthesis.

Results: A total of 2475 citations were identified, 171 full papers were reviewed and four articles were included for review. The components 'advice' and 'assistance' from the five A Framework were the most frequently used BI components. Statistically significant improvements were achieved in psychological, functional, and satisfaction outcomes. However, clinical outcomes were not improved and economic outcomes like costs of BI were not evaluated.

Conclusions: The literature review demonstrated a lack of evidence related to BI in diabetes within the emergency setting despite the ED being an ideal environment. Future research needs to be conducted to investigate the effectiveness of BI for patients with diabetes.

1. Introduction

Episodes of hypoglycaemia defined as a glucose level of 3.9 mmol/L or lower [1], are usually independently managed by the patient or their family members and friends [2]. However, despite this approach, severe hypoglycaemia is the commonest reason for people with diabetes to require emergency medical assistance [2]. A recently published US study estimated 97,648 annual emergency department (ED) visits for insulin-related hypoglycaemia and related hypo errors between 2007 and 2011 and nearly one third of these patients were hospitalised [3]. A similar study in England reported 101,475 hospital admissions between 2005 to 2014 for hypoglycaemia in 79,172 people with diabetes which equated to 87% of ED attendances. A quarter of all admissions resulted in a hospital stay of less than 24 h, and a third of the admissions resulted in hospital stays of five days or longer [4]. Farmer and colleagues estimated the annual cost of emergency calls for severe hypoglycaemia in England to be as high as £13.6 million [5].

Patients with severe hypoglycaemia presenting to the ED are usually medical emergencies and must be treated by healthcare professionals accordingly [2,6] and ED nurses are key persons involved in the treatment and management of these patients. The primary goal is the rapid evaluation and stabilization of patients' blood glucose level. A secondary goal is making the patient being aware of their hypoglycaemia and the need for urgent follow-up and review with a primary care provider [7].

For patients to be able to reduce the risk of further episodes and to improve the emergency management of hypoglycaemia, patient education, including diabetes self-management education (DSME) and diabetes self-management support (DSMS), is seen as vital [2]. Michie and colleagues [8] suggest that behaviour change occurs when people modify one or more of the following:

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capability, opportunity, and motivation relating to the behaviour. Therefore, an ED encounter caused by a severe hypoglycaemic event, can provide the motivation as well as the opportunity for patients and their family members to access DSME or DSMS. The ED's environment offers a significant opportunity for educational interventions [9]. Although ED healthcare professionals are often under time pressure, and resources are chronically limited, brief interventions (BI) are an encouraged strategy in this setting [9,10] especially, relating to the above mentioned secondary goal.

BI is a generic term consisting of an often opportunistic, time-limited interactive encounter between a patient and a healthcare professional focusing on behaviour change [11]. These short, problem-specific approaches have become an effective treatment method in patients with substance abuse problems, diet and, physical activity [12–15]. BI have also become a widely available public health tool in various settings including EDs, as they can reduce high risk behaviour resulting in a reduction of ED visits and hospital admissions [13,15,16]. However, BI is not clearly defined and reported in the literature as brief advice, brief intervention, brief counselling, short-term counselling, minimal intervention, motivational interviewing or adapted motivational interviewing [13,14]. In 2014, the National Institute for Health and Care Excellence (NICE) guidance on individual behaviour change has defined different levels of interventions; very brief, brief and extended interventions (see Table 1 for the definitions) [17].

In summary, the evidence indicates that ED is an effective and appropriate setting for the delivery of BI in specific patient situations [10,18,19]. Our scoping review revealed no evidence relating to BI for people with diabetes presenting in ED. It therefore remains unclear how BI impacts on people with diabetes mellitus in this or other settings. Therefore, the aim of this review is to investigate and describe the characteristics and effects of BI for people with diabetes focusing on intervention components, outcomes, and target behaviours to inform the development of BI for people with diabetes in the ED experiencing hypoglycaemic episodes.

2. Method

2.1. Design

A systematic review of randomized controlled trials (RCTs) was carried out to meet the review aim. An inclusion and exclusion protocol was developed and PICOS applied [20]. These pre-set inclusion criteria included: *Population:* adult patients with diabetes mellitus type 1 and 2. *Intervention:* very BI and BI as defined by the NICE guidelines [17] (Table 1) as only these would be suitable in a ED setting, the clinical encounter has to be opportunistic and can have 1–2 follow ups; *Comparison:* studies comparing BI against usual care/standard care; *Outcome:* any benefits for patients related to their diabetes, including psychological and physical benefits. The Preferred Reporting Items for Systematic Reviews and meta-analysis (PRISMA) statement was followed for the conduct and reporting of this review [21].

2.2. Search strategy

A two-step search strategy combining an electronic search with a search in the reference lists of the studies found was carried out in August 2016 covering the time from 2000 to that date using MEDLINE(R), CINAHL, PsycINFO and EMBASE databases. The subject headings combined with Boolean search terms and free text keywords are outlined in Table 2. Results were limited to human participants, articles with abstracts, and publications in English and German. Secondly, the reference lists of the selected studies were reviewed to identify eligible articles not retrieved by computer searches.

2.3. Study selection

Study selection was done by the first author (AKS) focusing on the inclusion criteria. Firstly, titles and abstracts were screened for eligibility; secondly, potential studies meeting the inclusion criteria were reviewed in full text. EndNote was used to manage the bibliographic records. Subsequently, the second author (GL) undertook an independent study selection. Thereafter, differences in study selection were discussed between AKS and GL until consensus was reached.

2.4. Quality appraisal

Internal validity of the included studies was determined using the Cochrane Collaboration tool for assessing high, low or uncertain risk of bias [22].

2.5. Data extraction

Data extraction was conducted by AKS using an extraction template. For each study following information was extracted: study characteristics, setting, participant characteristics, brief intervention components including the five A framework (assess, advise, agree, assist, arrange follow-up) which has been established to be a fundamental component of BI within behavioural counselling [23–25], intervention categories as classified by Sturt and colleagues [26] and intervention content as defined by the NICE guidelines [17]. Further, primary and secondary outcomes as classified by Kleinpell [27] containing clinical (care-related), psychosocial, functional, fiscal, and satisfaction outcomes as well as their effectiveness in regard to the brief intervention were gathered.

Table 1
Levels of behaviour change interventions [17].

Very brief intervention: A very brief intervention can take from 30 s to a couple of minutes. It is mainly about giving people information or directing them where to go for further help. It may also include other activities such as raising awareness of risks, or providing encouragement and support for change. It follows an 'ask, advise, assist' structure.
Brief intervention: A brief intervention involves oral discussion, negotiation or encouragement, with or without written or other support or follow-up. It may also involve a referral for further interventions, directing people to other options, or more intensive support. Brief interventions can be delivered by anyone who is trained in the necessary skills and knowledge. These interventions are often carried out when the opportunity arises, typically taking no more than a few minutes for basic advice.
Extended brief intervention: An extended brief intervention is similar in content to a brief intervention but usually lasts more than 30 min and consists of an individually-focused discussion. It can involve a single session or multiple brief sessions.