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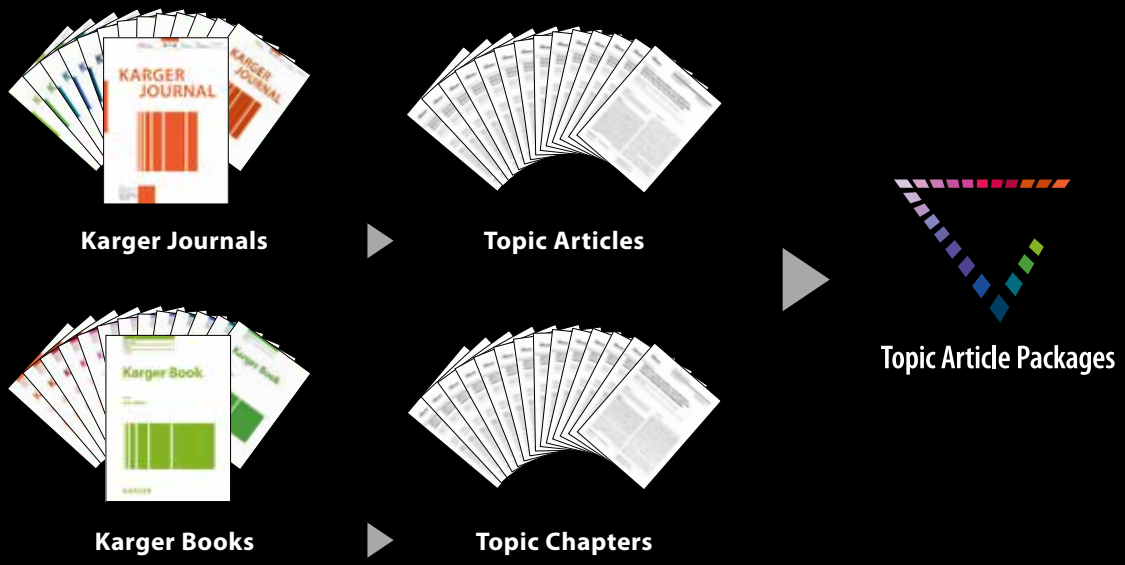

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Annals of Nutrition and Metabolism is a leading international peer-reviewed journal for sharing information on human nutrition, metabolism and related fields, covering the broad and multidisciplinary nature of science in nutrition and metabolism. The journal focuses on human nutrition and metabolism and related areas, including experimental studies and basic science that can inform human nutrition science. We welcome manuscripts describing observational and intervention studies as well as basic science reports on the topics of foods, diets and dietary supplements, nutrigenomics and genetics related to metabolism, on energy metabolism, macro- and micronutrients including vitamins and minerals, biofunctional compounds, dietetics, obesity, clinical nutrition, social sciences and health economy as related to nutrition and metabolism and nutrition policy. Laboratory-based science may include descriptions of relevant experimental models. In addition to Original Papers, the journal will publish Review Articles on topical subjects, Systematic Reviews, short Commentaries and Viewpoint articles that may address current controversies, short Meeting Reports, Letters to the Editor, and Announcements/Society News. The journal will also publish Supplements with proceedings from internationally relevant conferences on nutrition and metabolism.

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sufficient amount of fluids offered. Residents experienced other barriers, which further prevented them from drinking, including lack of preference compliance, inadequate assistance and drinking vessels not meeting their needs. Level of assistance, location of the resident and family support, determined the amount of fluids offered and subsequently consumed by the residents. These findings were supported by resident interviews, who suggested that despite their desire to drink, hydration care was inadequate. Interventions to improve hydration practice were developed with staff and included: staff training, increasing the number of drink opportunities (Protected Drink Times and Drink Before Breakfast), improving preference compliance (exploring preferences and Drink Menu), communication tool for staff to provide for needs and preferences (Refreshment Needs Guides), and the introduction of new drinking equipment. During the testing phase, most interventions resulted in residents consuming more fluids. Sustaining interventions was difficult. Barriers to sustaining these interventions included poor leadership at senior and operational level, staff not complying with protocols, making choices for residents, high levels of staff turnover and potential costs to the care home. Fluid intakes at the end of the study increased to 1119 ml (±717 ml).

Conclusions: This study demonstrated that residents consumed fluids below the minimum recommended 1500 ml [6] because of inadequate hydration care they received. Providing appropriate assistance, increasing the number of opportunities to obtain drinks and improving preference compliance results in increased fluid intakes in care home residents. Sustaining these improvements is challenging, barriers identified during the intervention phase highlight an importance of leadership in improving care in this setting.

Disclaimer: This study presents independent research partially commissioned by the National Institute for Health Research (NIHR) under the Collaborations for Leadership in Applied Health Research and Care (CLAHRC) programme North West London. The views expressed in this publication are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health. A Bak received travel expenses and registration fee from Danone Nutricia Research to attend the 2017 Hydration for Health Scientific Conference.

Key Messages:

- Residents in care homes consumed fluids below the minimum recommended 1500 ml.
- Limited opportunities to obtain drinks and therefore insufficient amounts of fluids served, resulted in poor intakes.
- Structured hydration activities and drinks menu increased fluid intakes of the residents.
- Strong leadership, organisational support and teamwork are essential for implementing and sustaining such improvement.

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3

Fluid Intake Habits During Physical Activity in Type 1 Diabetes Individuals

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Keywords: Type 1 diabetes mellitus, exercise, hydration, hyperglycemia, training.

Background: Type 1 diabetes mellitus (T1DM) is a chronic disease characterized by pancreatic inability to secrete sufficient insulin for normal blood glucose regulation [1]. It is supposed that hyperglycemia may influence hydration status in diabetic patients, since it could alter fluids reabsorption in the kidneys [2]. Glycosuria (i.e., the abnormal presence of glucose in urine) can substantially increase water loss through osmotic diuresis [3], increasing the risk of dehydration if fluid losses are not adequately compensated. Additionally, in T1DM patients poor blood glucose control may induce a renal resistance to vasopressin, decreasing renal ability to retain water during exercise [4].

Objective: The present study aimed to describe hydration habits during exercise in a random sample of T1DM physically active individuals using a validated survey, and to compare those results with a well-matched sample of healthy individuals.

Methods: A descriptive study was designed to investigate hydration habits in T1DM and control individuals using an online modified version of a survey that was previously used to assess hydration habits in healthy athletes [5]. This modified version included questions regarding anthropometrical data, diabetes characteristics (e.g., therapy, reported glycemia before/after exercise), sport characteristics (e.g., type of sport, training volume and intensity), and hydration habits (e.g., preferred beverage, fluid intake, coach encouragement to drink). Independent t-tests were conducted between groups for fluid intake.

Results: 45 individuals (33 ± 8 y, M: 20 F: 25) with insulin-dependent diabetes mellitus (T1DM), and 45 healthy controls (CON; 32 ± 10 y, M: 20 F: 25) voluntarily participated and completed the online survey. Of interest, 32 T1DM participants (71.1%) reported to begin their exercise with a blood glucose concentration between 3.9 and 10.0 mMol, while 13 individuals with T1DM (28.9%) usually reported to start their training with glucose concentration between 10.0 and 16.7 mMol. Blood glucose concentration at the end of the training was reported to be below 3.9 mMol

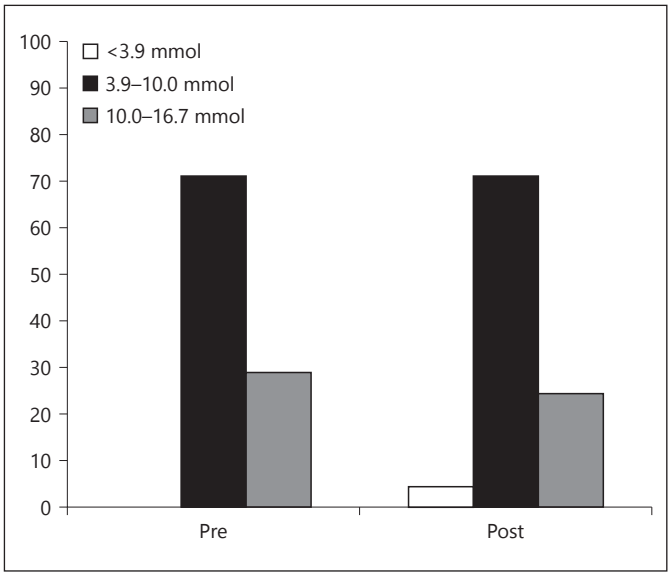

Fig. 1. Reported blood glucose during training. Frequency distribution of the reported blood glucose concentration at the beginning (Pre) and at the end (Post) of the training in T1DM individuals (for Abstract no 3).

in 2 individuals (4.4%), between 3.9 and 10.0 mMol in 32 individuals (71.1%), and between 10.0 and 16.7 mMol in 11 individuals (24.4%). The preferred beverages were water (73.3%) and sport drinks (24.4%). Other participants reported drinking different beverages such as fruit juice or tea. Fluid volume consumed during training by T1DM individuals was 0.60 ± 0.47 $L \cdot h^{-1}$, significantly greater ($p < 0.05$) than in CON that was reported to be 0.37 ± 0.28 $L \cdot h^{-1}$.

Conclusions: From the present study, it is possible to speculate that T1DM individuals are capable of spontaneously consuming the volume of fluids suggested in the most recent international guidelines for healthy athletes [6]. Nevertheless, further studies are needed to determine if the generally recommended fluid amounts are appropriate for T1DM through a precise fluid requirement evaluation.

Disclosure Statement: A. Buoite Stella received travel expenses and registration fee from Danone Nutricia Research to attend the 2017 Hydration for Health Scientific Conference.

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4

The Effect of Hydration Status on Glycaemic Control and Appetite Regulation

Harriet A. Carroll[1], *Iain Templeman*[1], *Yung-Chih Chen*[1], *Robert Edinburgh*[1], *Elaine K. Burch*[1], *Jake T. Jewitt*[1], *Georgie Povey*[1], *Timothy D. Robinson*[1], *William L. Dooley*[1], *Peter Rogers*[2], *Charlotte Buckley*[2], *Olle Melander*[3], *Widet Gallo*[3], *Dylan Thompson*[1], *Lewis J. James*[4], *Laura Johnson*[5], *James A. Betts*[1]

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Keywords: Hydration, Glycaemia, Copeptin, Arginine vasopressin, Cell volume, Metabolism, Appetite, *Ad libitum* energy intake.

Background: Cell volume and arginine vasopressin are implicated in glycaemic control and are influenced by hydration status [1, 2]. During hypohydration, a deterioration in glycaemic control has been demonstrated in type 1 [3] and type 2 diabetic patients [4]. Our pilot data replicated such findings in healthy adults [5]. Little is known about whether hydration status *per se* alters appetite.

Objective: We therefore aimed to assess whether glycaemia and appetite are affected by hydration status in healthy adults.

Methods: In this randomised crossover trial, healthy participants (8 men, 8 women) underwent an oral glucose tolerance test (OGTT) and multiple appetite tasks in a hypohydrated and euhydrated state. After successfully matching lifestyle factors three days pre-trial, participants had a fasted pre-trial blood sample, followed by dehydration in a 45 ± 1.5°C heat tent for 1-hour followed by fluid restriction (HYPO) or replacement (RE). The following day, an OGTT was conducted with regular blood samples and metabolic rate measures for 120 min. Subsequently, a desire-to-consume task was completed followed by an *ad libitum* pasta-meal with a pre-prandial and multiple postprandial visual analogue scales and blood samples for 60 min. Peripheral quantitative computer tomography (pQCT) thigh scans were taken pre-trial and on the trial-day to assess changes in muscle area as a proxy for cell volume. Analysis involved repeated measures ANOVA for trial and time trends during the OGTT and meal test, t-tests comparing pre-trial and trial-day values, and linear regression to assess desire-to-consume according to nutrient-content of foods.