

I, Fatima Yakoub Moosa, declare that this research report is my own work. It is being submitted for the degree of Master of Medicine in the branch of Paediatrics in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

16 April 2012

This work is dedicated to my parents,

Yakoub Moosa and Zarina Moosa

who taught me the value of faith and perseverance

and to the rest of my family

who stood by me unconditionally.

Presentations arising from this study

Moosa FY, Segal D. Assessing math literacy skills in type 1 diabetic children and their caregivers.

Poster presentation: 45th Annual Society for Endocrinology, Metabolism and Diabetes of South Africa (SEMDSA) Conference, Durban, 10-13 April 2010. Won the prize for: ‘Best Clinical Poster Presentation’.

Abstract 1

Background: Health numeracy is an important component of diabetes care. Caregiver numeracy also impacts on diabetes outcomes.

Hypothesis: Type 1 diabetic children with low numeracy will have poorer diabetes control (higher HbA1c levels).

Aim: Assess the level of basic and diabetes-related numeracy in our type 1 diabetic children and their caregivers and to correlate this with diabetes control.

Methods: A cross-sectional, questionnaire-based study was conducted in 53 type 1 diabetic children and 37 primary caregivers attending the CHBAH and CMJAH, between March and September 2009. Patient records were also accessed.

The questionnaire was divided into 2 sections. Section 1 testing basic numeracy and section 2, testing diabetes-related numeracy. Data included the scores of the 2 sections, actual and 'functional' grades (grade level achieved on testing), HbA1c values and demographic data. Comparative analyses were used to assess the means of the percentage scores of both sections and actual versus 'functional' grades. Pearson correlation co-efficient ascertained the relationship between the test scores in each section with metabolic control.

Results: The mean age of the children was 12.92 ± 2.96 years and the mean HbA1c level was $12.84 \pm 3.04\%$. There were significant differences in the mean percentage scores for each section, ($p < 0.001$ and < 0.0001 , children and caregivers respectively), with both groups performing better in section 1. Both groups performed equally poorly on the tasks of rounding, formulae and data interpretation. Significant correlation ($r = 0.345$, $p = 0.014$) was also found between the means of the actual grades and their 'functional' grades, with the 'functional' grade mean being lower in both groups. In addition, a significant negative correlation ($r = -0.32$, $p = 0.029$) was found between the HbA1c levels and the section 2 scores.

Conclusion: Both groups performed poorly in diabetes-related numeracy and performed below their actual grade potential. A significant relationship was also found between HbA1c levels and the diabetes-related numeracy scores, with participants who performed poorly having higher HbA1c levels.

Recommendations: Interventional programmes need to incorporate numeracy assessment and training as a core component of diabetes education. Future research is however needed to determine the impact of such numeracy-focused interventions on diabetes outcome and metabolic control.

Abstract 2

Background: Health numeracy is important in diabetes care.

Hypothesis: Type 1 diabetic children with low numeracy will have poorer diabetes control.

Aim: Assess the level of basic and diabetes-related numeracy in our type 1 diabetic children and their caregivers and to correlate this with diabetes control.

Methods: A cross-sectional sample of 53 type 1 diabetic children and 37 primary caregivers completed a basic maths and numeracy based questionnaire. HbA1c was also measured.

Results: The mean age of the children was 12.92 ± 2.96 years and the mean HbA1c level was $12.84 \pm 3.04\%$. Both groups performed better in basic maths than in numeracy ($p < 0.0001$). A significant negative correlation ($r = -0.32$, $p = 0.029$) was found between the HbA1c levels and the numeracy scores.

Conclusion: Both groups performed poorly in diabetes-related numeracy and performed below their actual grade potential. A significant negative relationship was also found between HbA1c levels and the diabetes-related numeracy scores.

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GLOSSARY OF TERMS

T1DM: Type 1 Diabetes Mellitus

HbA1c: Glycosylated haemoglobin

DMQ: Diabetes Mathematical Questionnaire

DNT: Diabetes Numeracy Test

DLNET: Diabetes Literacy and Numeracy Education Toolkit

DCCT: Diabetes Control and Complications Trial

CHBAH : Chris Hani Baragwanath Academic Hospital

CMJAH: Charlotte- Maxeke Johannesburg Academic Hospital

RNCS: Revised National Curriculum Statement

REALM: Rapid Estimate of Adult Literacy in Medicine

WRAT-3: Wide Range Achievement Test, 3rd Edition

ISPAD: International Society for Paediatric and Adolescent Diabetes

IDDM: Insulin Dependent Diabetes Mellitus

