

A Simulation-based Intervention Teaching Illness Management Skills to Caregivers of Children with Adrenal Insufficiency: a Randomized Controlled Study



UNIVERSITY OF CALGARY

Heidi Virtanen¹, Eileen Pyra¹, Wendy Schwarz¹, Helen Catena², Amy Cripps², Adam Cheng², Vincent Grant² & Rebecca Perry¹

1. Division of Endocrinology 2. KidSIM-ASPIRE Research Program, Department of Pediatrics, University of Calgary, Calgary, Alberta, Canada

Background

Permanent Adrenal Insufficiency (AI) is uncommon but potentially life-threatening

Patients at risk during stress, thus, caregivers need good illness management skills

Caregivers taught illness management, including IM injection, by Endocrine RN at diagnosis with regular review at clinic visits

Despite teaching & seemingly good knowledge – we still see a reluctance of caregivers to administer IM hydrocortisone at home as reported by colleagues in the US¹

Simulation (SIM) shown be effective in improving caregiver competence & confidence in managing chronic conditions e.g. Cystic Fibrosis² & seizures³

SIM has not yet been evaluated in teaching illness management to caregivers of children with AI

Objective

To compare the impact of illness management teaching delivered using SIM or traditional teaching on caregivers' knowledge, ability and confidence with managing illness (including intramuscular hydrocortisone injection) in children with AI

Methods

Subjects were randomly assigned to SIM-based teaching or traditional teaching

All participants completed knowledge and self-confidence questionnaires and performance assessments using SIM scenarios, before and after teaching

Independent samples t-test compared scores between traditional and SIM groups

Paired samples t-test compared scores within individuals, pre- and post-teaching

Control Group

- Caregiver knowledge & self-confidence questionnaire
- Performance assessment
- **CLINIC-BASED TEACHING**
- Caregiver knowledge & self-confidence questionnaire
- Performance assessment

Intervention Group

- Caregiver knowledge & self-confidence questionnaire
- Performance assessment
- **SIMULATION-BASED TEACHING**
- Caregiver knowledge & self-confidence questionnaire
- Performance assessment

Participant Demographics (n=39)

		Traditional Teaching (n=19)	SIM-based Teaching (n=20)
Relationship N (%)	Father	6 (31.6%)	9 (45.0%)
	Mother	13 (68.4%)	9 (45.0%)
	Grandmother	0 (0.0%)	2 (10.0%)
Age (yr) mean (SD)		38.9 (8.1)	41.4 (9.2)
Duration of Child's AI (yr) mean (SD)		7.2 (5.0)	5.4 (4.4)



Caregiver demonstrating IM hydrocortisone injection on SIM mannequin during an assessment

KidSIM™ AI Illness Management Checklist					
Scenario Code	Date (day/month/year)		Reviewers Initials: _____ Research Code		
Task	Not Done 0 points	Partially Done 1 point	Done 2 points	Comments	Score (max: 26)
Illness Recognition and Decision making					
a) Recognizes mild illness	Doesn't recognize		Verbally indicates child is ill OR acts appropriately		
b) Decides to give oral stress dose	Does not give stress dose	Gives incorrect stress dose*	Gives correct* stress dose OR pages Endo MD on call		
c) Recognizes signs of inability to absorb oral meds	Does not recognize		Verbally indicates child is unable to absorb oral meds		
d) Decides to give IM steroid as not absorbing oral meds	Does not recognize		Recognizes need for IM steroid OR pages Endo MD on call (N.B. injection not actually demonstrated)		
e) Recognizes adrenal crisis	Doesn't recognize adrenal crisis Time: : : :		Recognizes adrenal crisis Time: : : :		
Preparation of Intramuscular Medication					
f) Mixes powder with liquid in preparation for administration	Powder not mixed with liquid	Powder partially mixed with liquid	Powder completely dissolved in liquid		
g) Correct volume*	None drawn up	Incorrect volume* drawn up e.g. has air bubbles	Correct volume* drawn up		
Administration of Intramuscular Medication					
h) Gives correct medication dose	Does not give any Time: : : :	Delivers part of dose Time: : : :	Delivers correct dose Time: : : :		
i) Administration technique	Gives in non-muscle area	Gives at wrong angle in thigh or arm	Gives at 90° angle into muscle (thigh or arm)		
j) Engages safety cap on needle after inj.	Does not engage cap		Fully engages cap		
k) Time from recognizing adrenal crisis to injection	> 5 minutes	3-5 minutes	< 3 minutes		
Post Medication Administration Management					
Activates 911 for adrenal crisis	Does not activate 911	Activates 911 > 1 min after administration	Activates 911 within 1 min of administration		
Can prompt caregiver at the end to verbalize what were the signs that suggested an adrenal crisis					
Identifies signs of adrenal crisis (see appendix)	Recognizes 0-1 signs of crisis	Recognizes 2-4 signs of adrenal crisis	Recognizes 5 signs of adrenal crisis		
*Correct doses of oral and IM steroid written on child's "pink" illness management sheet					Total
Safety Debriefing Checklist (check all that apply to your debriefing session)					
<input type="checkbox"/> When to give oral stress steroids <input type="checkbox"/> When to give IM steroids <input type="checkbox"/> Recognizes signs of adrenal crisis <input type="checkbox"/> Medication administration <input type="checkbox"/> When to call 911					

Results

	Traditional	SIM	
Knowledge Scores (Max score: 10)	Pre-teaching	7.0 (2.2)	p=0.226
	Post-teaching	8.3 (1.6)	p=0.838
	Change observed	+1.1 (1.4)* p=0.005	+0.5 (1.2)* p=0.076
Confidence Scores (Max score: 40)	Pre-teaching	29.3 (7.1)	p=0.225
	Post-teaching	37.8 (3.0)	p=0.232
	Change observed	+8.6 (5.6)* p=<0.001	+7.4 (3.1)* p=<0.001
SIM-scenario Scores (Max score: 26)	Pre-teaching	18.7 (5.4)	p=0.298
	Post-teaching	23.4 (1.7)	p=0.024
	Change observed	+4.8 (5.8)* p=<0.002	+4.9 (6.3)* p=<0.003

Conclusions

Caregiver performance in both groups was sub-optimal at baseline

- ✓ Underscores the importance of on-going education of caregivers' of children with established Adrenal Insufficiency

Caregiver confidence and performance, as assessed using simulated scenarios, improved significantly in both arms with no difference observed between SIM and traditional teaching arms

- ✓ Lack of difference may be due to both groups undergoing the assessment using the SIM scenarios (pre- and post- education session)
- ✓ Would consider incorporating SIM scenarios into current standard of care teaching education

References:

1. Fleming LK *et al.* Caregiver knowledge and self-confidence of stress dosing of hydrocortisone in children with congenital adrenal hyperplasia. *J Pediatr Nurs.* 2011;26:e55-60.
2. McDonald C *et al.* Self-efficacy: Empowering parents of children with cystic fibrosis. *J Cyst Fibros* 2013;12:538-43.
3. Sigalet E *et al.* A simulation-based intervention teaching seizure management to caregivers: A randomized controlled pilot study. *Paediatr Child Health* 2014;19:373-8.

Contact

Heidi Virtanen, MSc
Heidi.Virtanen@albertahealthservices.ca



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Adrenals and HPA Axis

Heidi Virtanen

58ESPE