Conflict of Interest

The author has declared no conflict of interest.

IMPLEMENTATION OF CONTINUOUS GLUCOSE MONITORING IN A HUMANITARIAN SETTING

Sahar Masri[1], Mariana Gutierrez[1], Alejandro Vargas Pieck[1], Idelette Botha[1] Philippa Boulle[2]

[1] MSF, Beirut, Lebanon; [2] MSF Geneva, Switzerland

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Brief on Lebanon

4.5 million Lebanese residing in the country in 2011

More than 1.5 million Syrians have fled to Lebanon since the conflict began in 2011

Main barriers to accessing healthcare: cost of consultations, laboratory tests and medication

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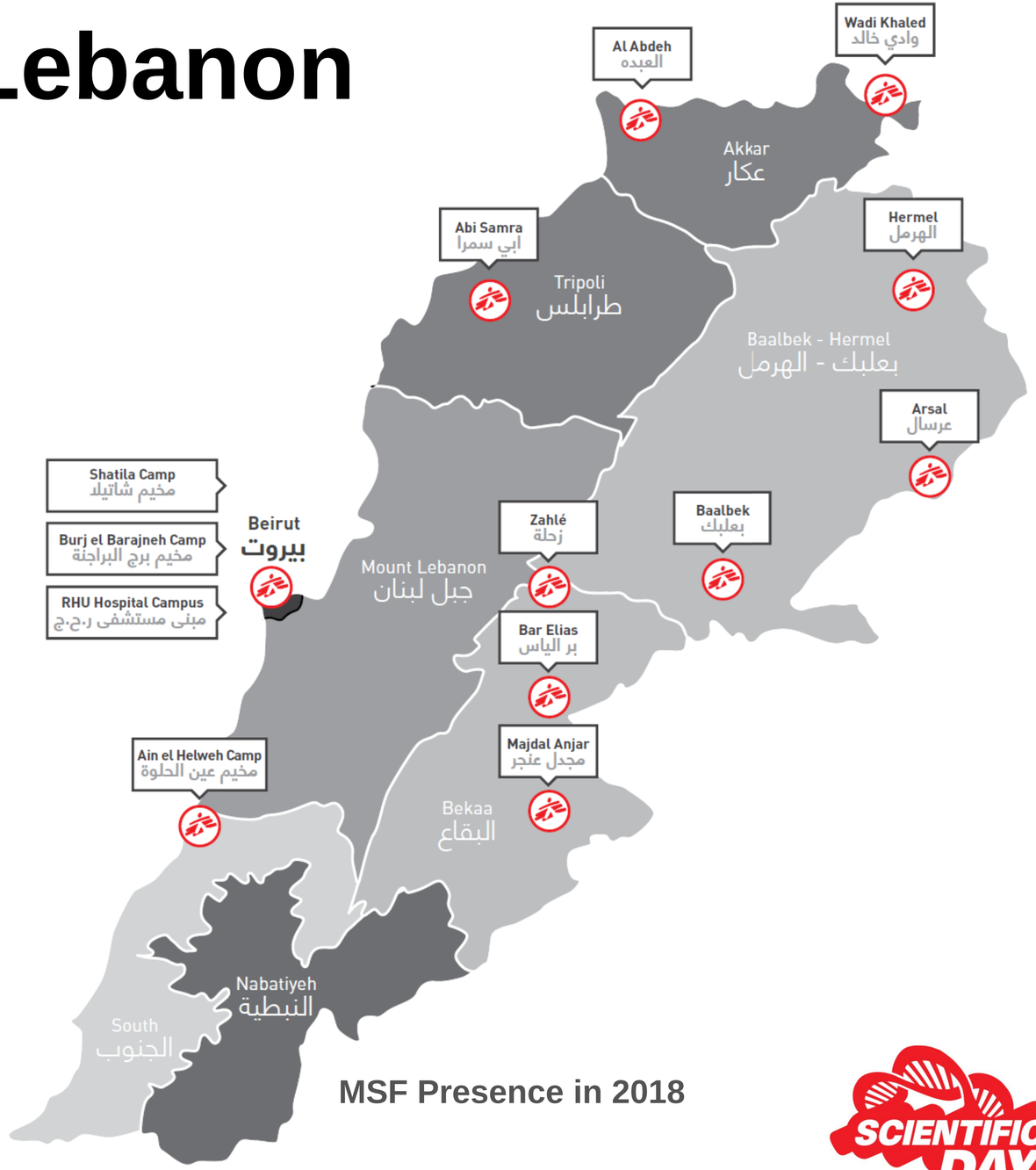
MSF in Lebanon

- Non-communicable disease (NCD) care in the North, Bekaa and Beirut governorates
- Patient support and education
- Mental health support
- Sexual reproductive health and family planning services
- Community outreach activities
- Mother and child care centers



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Images from informal tented settlements in Bekaa (2019)

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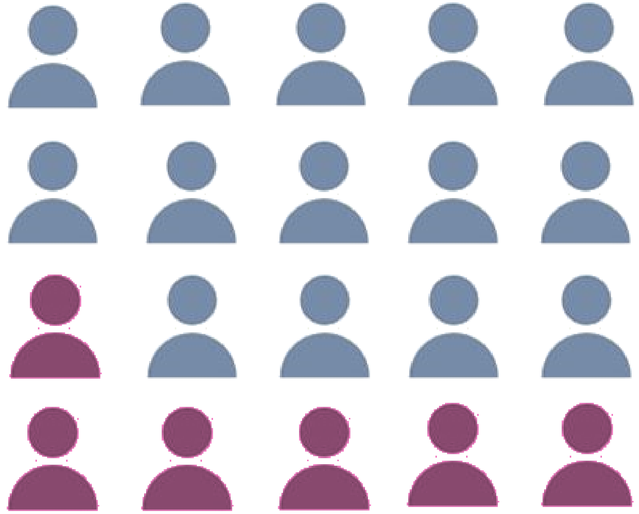
Type 1 Diabetes in MSF Clinics

2019

228

Active patients with Type I Diabetes attending MSF clinics in North and Bekaa



34.6%

Younger than 16 years old

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Type 1 Diabetes in MSF Clinics

Self-monitoring of blood glucose

↓

Frequent finger-prick tests

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Continuous Glucose Monitoring (CGM)

Sensor

- Measures glucose every minute
- Saves data every 15 minute on sensor memory
- Wearable for 14 days on upper arm

Reader

- Scans sensor to save glucose data
- Shows 8 hour glucose history and trends
- Uploads saved data for past 14 days

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CGM implementation at MSF

- **Start date: April 2019 and ongoing**
- **Target group:** Children with type 1 diabetes under 16 years old in six MSF clinics providing NCD care
- **Device used:** Freestyle libre (Abbott)
- **Period of use:** 14 days per month
- **Data collection:** Sensor data uploaded to Libreview
- **Training:** Medical team and patients

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Implementation of CGM in a humanitarian setting

Type	Retrospective descriptive study
Objective	Assess the feasibility and progress of CGM use in a refugee setting
Ethics	- Use of routinely collected data for clinical care - Exempted from review by MSF ethical review board
Conflict of interest	None

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Methods

Study sample	Children with type 1 diabetes (under 16 years old) using the sensor
Data collection	Sensor data reports for 12 weeks of CGM use were extracted per patient
Data analysis	Descriptive statistics using STATA 15.1

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Results

I. Patient Characteristics

Table 1:
Patient distribution by age, sex

Total patients	**62**
Mean Age (±sd)	10.5 (±3.7)
Females	30 (48%)
Males	32 (52%)

Table 2:
Hba1c values prior to CGM implementation (N=52)

Mean Hba1c (±sd)	9.4% (±1.9)
Mean time period (days) prior to initial sensor insertion (±sd)	46 days (±34)

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Results

II. Captured Sensor Data

Table 3: Variation of the mean proportion of captured sensor data per 14 days of CGM use

	Wk1-2	Wk3-4	Wk5-6	Wk7-8	Wk9-10	Wk11-12
Total pts	**62**	**58**	**52**	**46**	**35**	**27**
Mean (%)	78.5%	74.4%	75.1%	78.6%	84%	87.7%
(± sd)	21.8	22.7	20.6	24.5	16.3	13.2

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Results

III. Glucose Readings within Target

Table 4: Variation of the proportion of glucose readings within target range (70-180 mg/dl) per 14 days of CGM use

	Wk1-2	Wk3-4	Wk5-6	Wk7-8	Wk9-10	Wk11-12
Total pts	**62**	**58**	**52**	**46**	**35**	**27**
Mean (%)	31.3%	31.4%	31.5%	31.1%	29.3%	27.9%
(± sd)	13.6	14.1	13.4	15.3	14.3	14.9

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Results

IV. Low Glucose Events (LGEs)

Table 5: Variation of frequency and average duration of LGEs

	Total Pts (N)	Mean LGEs, 95% CI	Mean duration, 95% CI
Week 1-2	62	11.1 {9.1-13.1}	124.6 {109.7-139.5}
Week 3-4	58	9.7 {7.8-11.7}	129.2 {110.7-147.7}
Week 5-6	52	8.2 {6.3-10}	124.5 {103.7-145.3}
Week 7-8	46	9.7 {7.2-12.2}	120.1 {97.9-142.2}
Week 9-10	35	8.9 {6.6-11.3}	107.3 {89.8-124.7}
Week 11-12	27	8.3 {5.4-11.2}	103.5 {79.1-127.9}

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Conclusion

- Feasibility of use as part of NCD care programme in a refugee setting
- Improved CGM use among children shows promising results, mainly in limiting hypoglycemic events
- Reasons for the slight decrease in proportion of glucose readings within target range should be further explored

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Limitations

- Lack of set targets for the variables; study limited to temporal comparison only
- Small number of patients with complete 12 weeks of CGM data by the end of the study

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Future Considerations

- Impact of prolonged CGM use on patient outcomes (i.e. Hba1c, hypoglycemic events…)
- Impact of CGM use on treatment adaptation by GPs and nurses
- Qualitative methods to explore patient and provider satisfaction, perceptions on challenges and enablers of CGM use in a refugee context

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ADVOCACY:
Availability & Affordability

WHO and MoH's should ensure:

- Funding mechanisms exist for the package of medicines, delivery and monitoring devices
- R&D innovations tailored to needs of people in humanitarian and resource-poor settings
- Inclusive implementation policies designed for diabetic patients
- Advocacy efforts to improve access to insulin and quality diabetes care

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Acknowledgements

- MSF Teams
- Patients, parents, caregivers

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To many more…

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