Walter Reed National Military Medical Center

An Educational Smart Phone Application Improves PAP Adherence

Karen Sheikh
APSS
June 2, 2014

MAJ Jordanna Hostler MD[1], Karen Sheikh[2], Andrei Khramtsov MD[1], Tim Andrada RPSGT[1], LTC Aaron B. Holley MD[1]

Walter Reed National Military Medical Center, Bethesda, MD, USA [1]
Respira,℠ Inc. Linthicum, MD, USA[2]

Walter Reed National Military Medical Center

Conflict of Interest Disclosures

■ 1. I do not have any potential conflicts of interest to disclose, **OR**

☐ 2. I wish to disclose the following potential conflicts of interest

Type of Potential Conflict	Details of Potential Conflict
Grant/Research Support	
Consultant	
Speakers' Bureaus	
Financial support	
Other	

■ 3. The material presented in this lecture has no relationship with any of these potential conflicts, **OR**

☐ 4. This talk presents material that is related to one or more of these potential conflicts, and the following objective references are provided as support for this lecture:

Walter Reed
National Military
Medical Center

MILITARY DISCLOSURE

This material has been reviewed by the Walter Reed National Military Medical Center, and there is no objection to its presentation. However, the opinions or assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the position of the Department of the Army or the Department of Defense.

INTRODUCTION

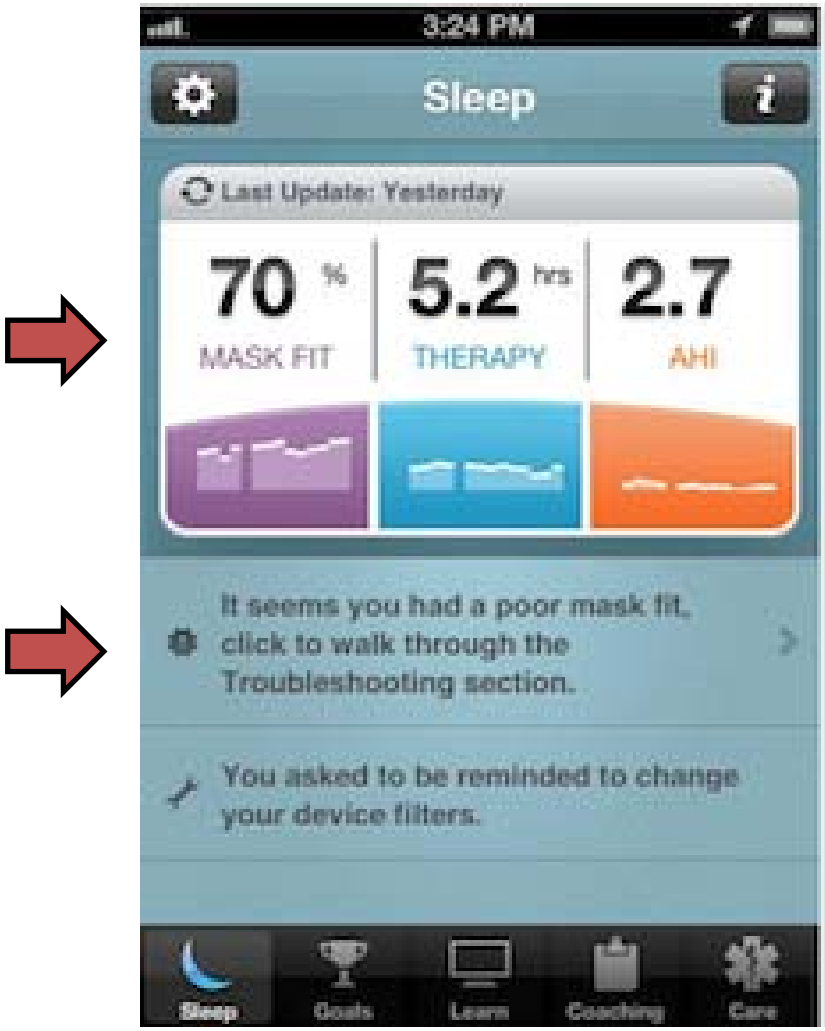
- PAP adherence is poor
- Numerous interventions have not shown much benefit
- What has shown benefit:
  - Sedative hypnotics
  - Patient education
  - Heated humidification

Walter Reed
National Military
Medical Center

SleepMapper™

- Free mobile and web-based system
- Patients can track their PAP therapy, AHI, mask fit
- Patients can set up reminders for themselves
- Motivational and educational literature and videos

Walter Reed
National Military
Medical Center



Walter Reed
National Military
Medical Center

STUDY OBJECTIVES

- **Aim:** To compare PAP adherence with SleepMapper™ patients vs standard of care patients

- **Hypothesis:** PAP adherence would be improved with the group using SleepMapper™

Walter Reed National Military Medical Center

METHODS

- **Study design:** Retrospective review of prospectively collected performance improvement data

- **Study group:** 31 patients—standard care vs. 30—standard care with SleepMapper ™ application

- **Standard care:** Initiation of CPAP in a group therapy format
  - Comprehensive four hour group session patients (previously published data shows this improves adherence)
  - Lectures include overview of OSA, PAP and good sleep habits
  - 30 day follow-up appointment with respiratory therapist

Walter Reed National Military Medical Center

METHODS

- **OSA diagnosis:** ICSD-2 criteria with attended in-lab PSG at an AASM certified center interpreted by a sleep-certified physician
- **Group assignment:** Based on group therapy day
- **CPAP treatment (both groups):**
  - Same PAP platform/device
  - Standard follow-up care protocol
- **Primary outcome:** PAP adherence assessed at 11 weeks

Walter Reed National Military Medical Center

RESULTS: GROUP CHARACTERISTICS

	SleepMapper™	Control	p-value
Age	44.5 ± 11.3	42.1 ± 6.8	0.31
Sleep Efficiency	**85.0 ± .9.9**	**78.43 ± 15.4**	**0.05**
Arousal Index	16.2 ± 8.1	17.2 ± 11.8	0.70
AHI	19.3 (10.1 - 25.3)	18.1 (10.3 - 29.5)	0.86
Auto PAP Min.	8.8 ± 1.7	8.4 ± 1.3	0.35
Auto PAP Max.	12.8 ± 2.8	13.5 ± 3.4	0.41

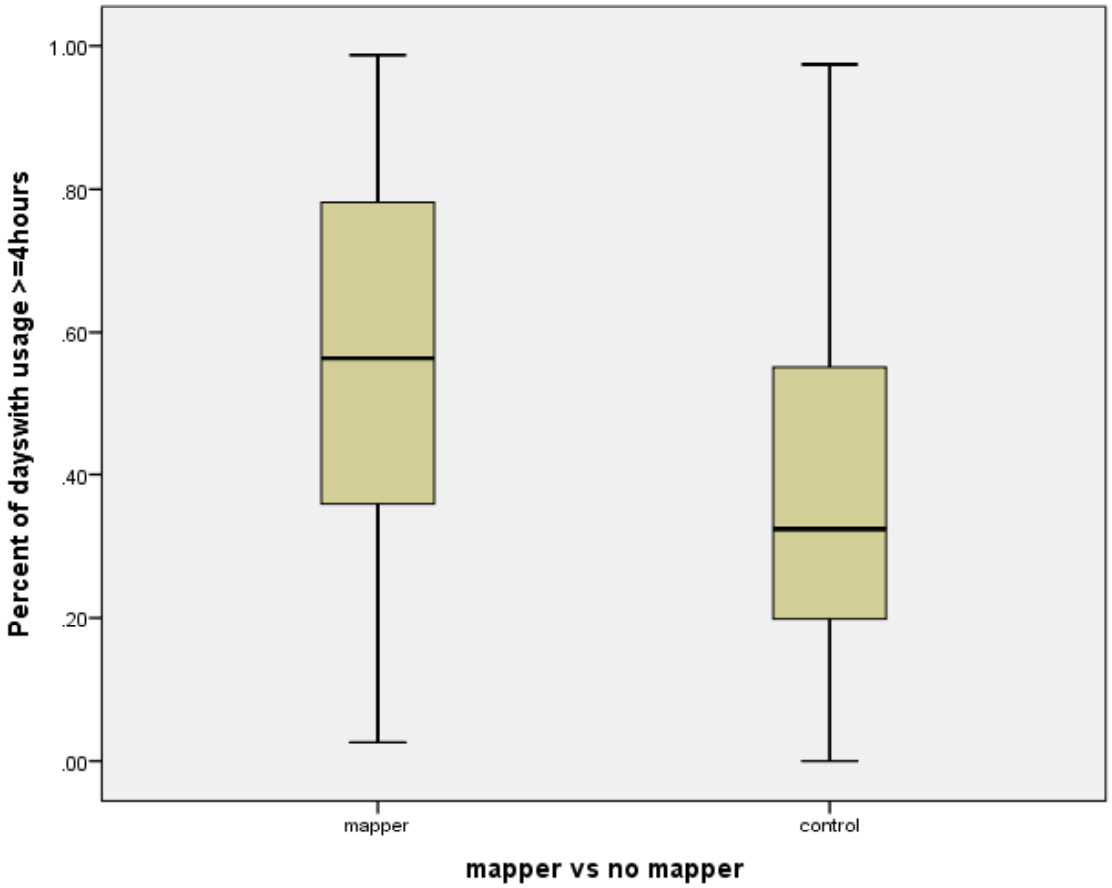
Walter Reed National Military Medical Center

11 WEEK FOLLOWUP: EFFICACY DATA

	SleepMapper™	Control	p-value
AHI 11 Week	3 (1.6-3.8)	2.3 (1.2-5.0)	.70
% of night PB	.004 ± .01	.005 ± .01	.33
90% pressure	10.7 ± 2.0	10.10 ± 1.5	.16
Average CA	0.4 (.1-.9)	0.5 (.2-1.3)	.45
Large leak per day	0 (0-5)	0 (0-1)	.23

Walter Reed National Military Medical Center

11 WEEK FOLLOWUP: % days ≥ 4 hours



Walter Reed National Military Medical Center

11 WEEK FOLLOWUP: ADHERENCE DATA

	SleepMapper™	Control	p-value
Hrs./night (days used)	4.78±1.43	4.73±1.98	.90
% days ≥ 4 hours	**54 ± .27**	**37 ± .25**	**.02**
% days device used	**78 ± .22**	**55 ± .24**	**<.001**

Walter Reed National Military Medical Center

PREDICTORS for % DAYS ≥ 4 HOURS

Multivariate linear regression

Variables	Coefficient (ß)	SE	95% CI	p-value
SleepMapper ™	.17	.07	.03 to .31	.02
Max Pressure*	- .30	.01	-.05 to - .01	.01
Sleep efficiency**	- .003	.003	-.01 to .002	.26

R^2 for model = 0.24

* Initial maximum pressure setting

** Sleep efficiency on diagnostic portion of PSG

Walter Reed National Military Medical Center

DISCUSSION

- Patients with SleepMapper™ increased the percentage of nights > 4 hours by 17% after controlling for maximum PAP pressure and sleep efficiency

Annals of Internal Medicine. 2009;151(10):696-702.
CHEST 2013; 144(2):680; 680-693

Walter Reed National Military Medical Center

DISCUSSION

- We surveyed SleepMapper ™ patients after 11 weeks follow-up

- Scores included an average of 7.7 for the question ‘I am confident that I am using my mask and device in the proper way for the appropriate amount of time’ to 9.2 for ‘overall I like the software.’

Walter Reed
National Military
Medical Center

LIMITATIONS

- Survey Response
- Limited Sample Size

Walter Reed National Military Medical Center

CONCLUSIONS

- SleepMapper™ application when added to our standard educational program improved adherence
- SleepMapper™ group had a 17% increase in nights PAP was used >4 hours
- Larger prospective randomized control trial being developed to study SleepMapper™ adherence

Walter Reed
National Military
Medical Center

ACKNOWLEDGEMENTS

LTC Aaron Holley MD

MAJ Jordanna Hostler MD

Ronald E. Kramer MD

Walter Reed National Military Medical Center Sleep Lab

Respira Medical Military [RMM], *a division of* Respira, Inc.

Walter Reed National Military Medical Center

An Educational Smart Phone Application Improves PAP Adherence

Karen Sheikh
APSS
June 2, 2014

MAJ Jordanna Hostler MD[1], Karen Sheikh[2], Andrei Khramtsov MD[1], Tim Andrada RPSGT[1], LTC Aaron B. Holley MD[1]

Walter Reed National Military Medical Center, Bethesda, MD, USA [1]
Respira,℠ Inc. Linthicum, MD, USA[2]