Adiposity and country of origin are associated with sleep efficiency across the Epidemiologic Transition

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WCE
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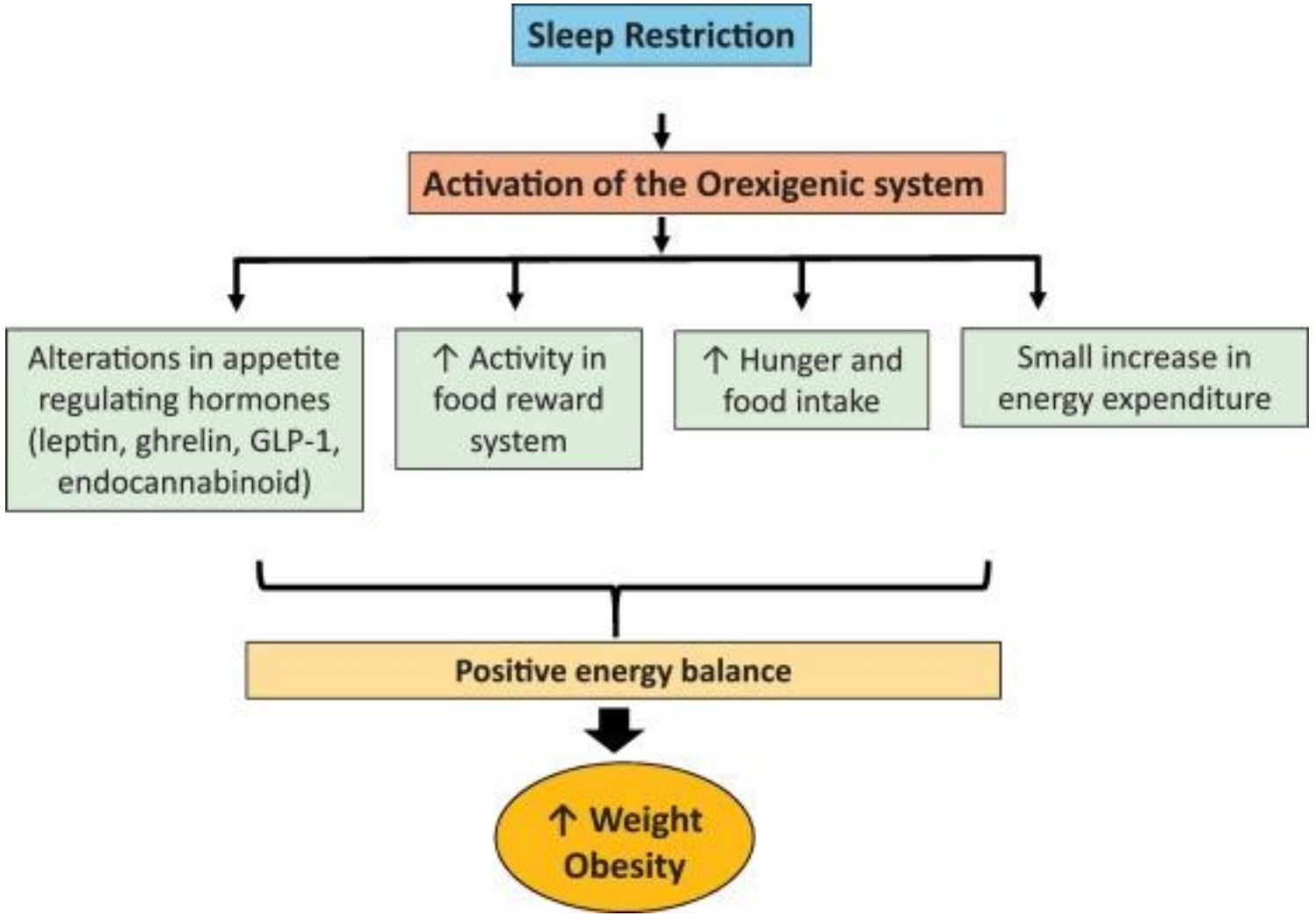
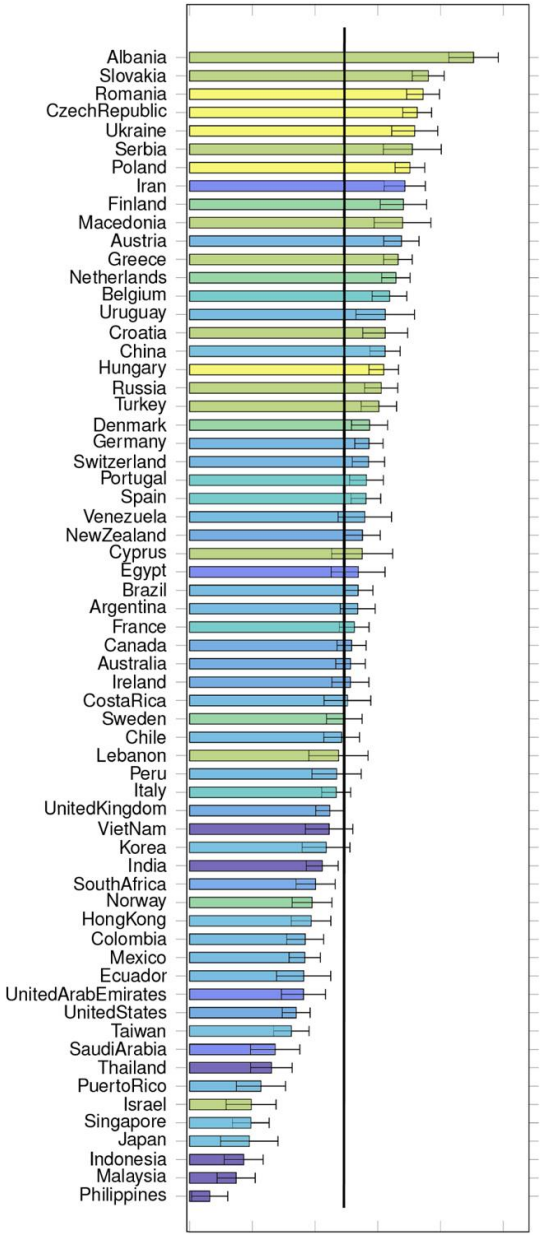
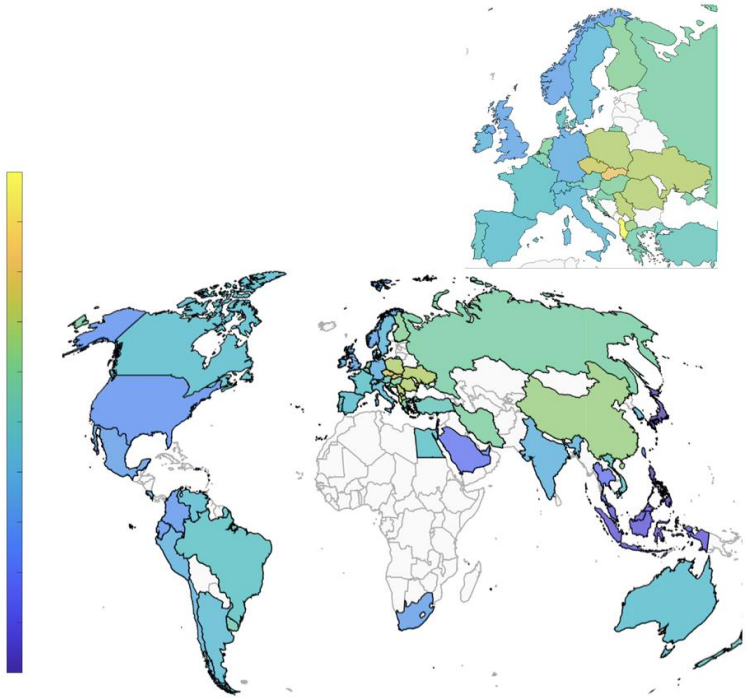
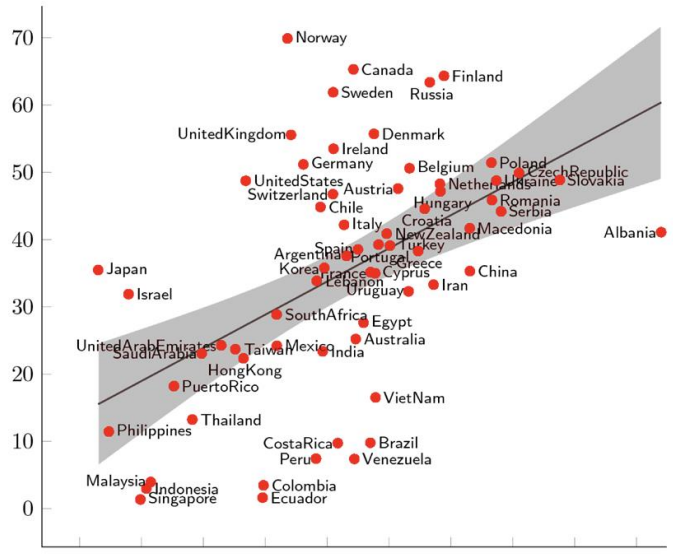
Disrupted sleep, and obesity risk

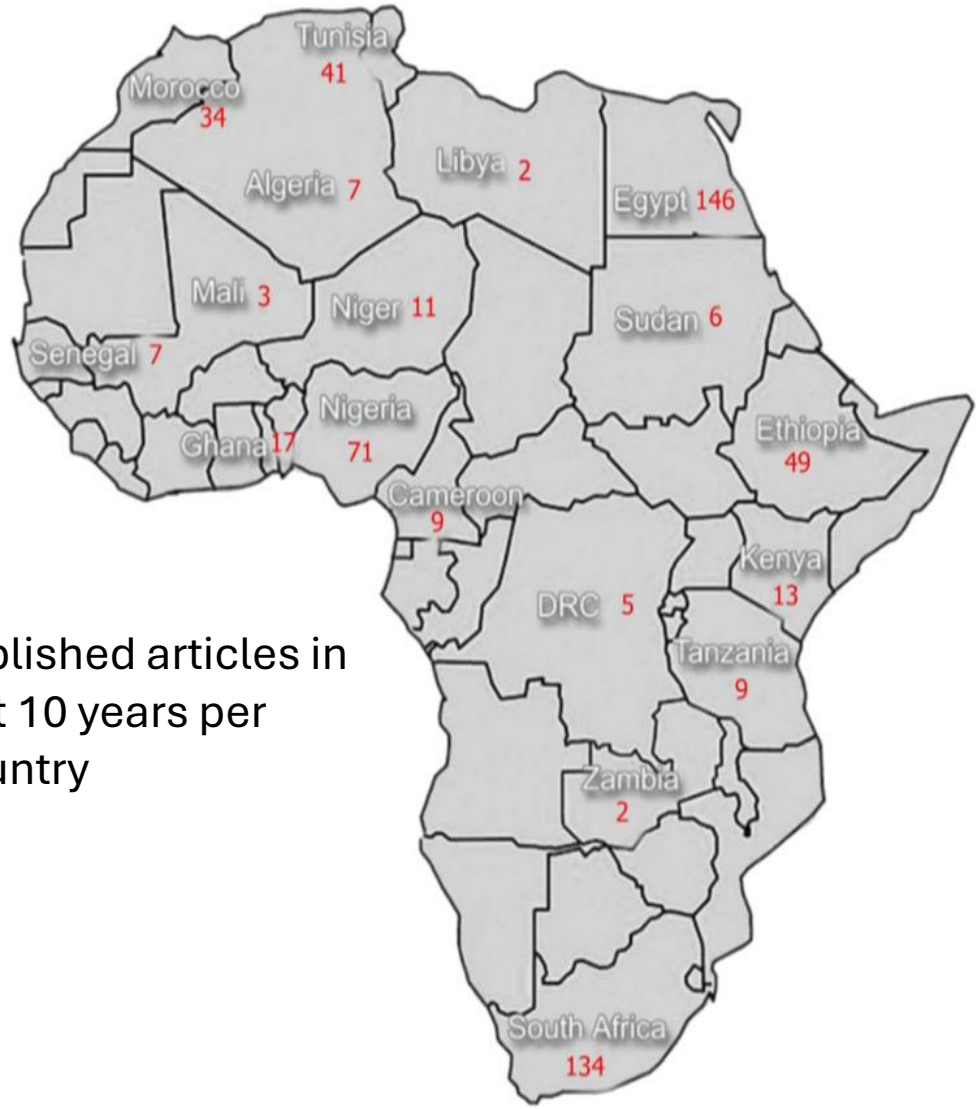


Reutrakul S, Van Cauter E. Sleep influences on obesity, insulin resistance, and risk of type 2 diabetes. Metabolism. 2018 Jul;84:56-66. doi: 10.1016/j.metabol.2018.02.010. Epub 2018 Mar 3.









Published articles in last 10 years per country

4 countries in Africa have a sleep society (South Africa, Egypt, Algeria & Morocco

Nat Commun. 2022; 13: 7697.

J Clin Sleep Med. 2021 Jun 1; 17(6): 1317–1321

METS Coordinating Center
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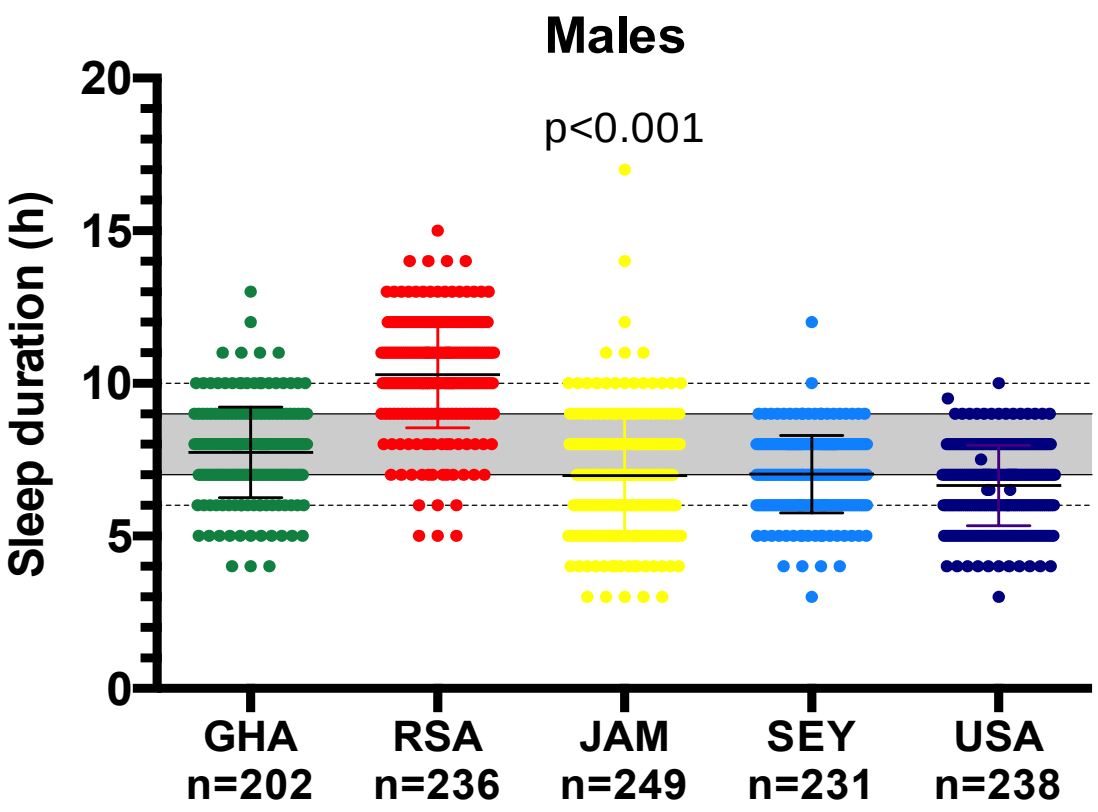
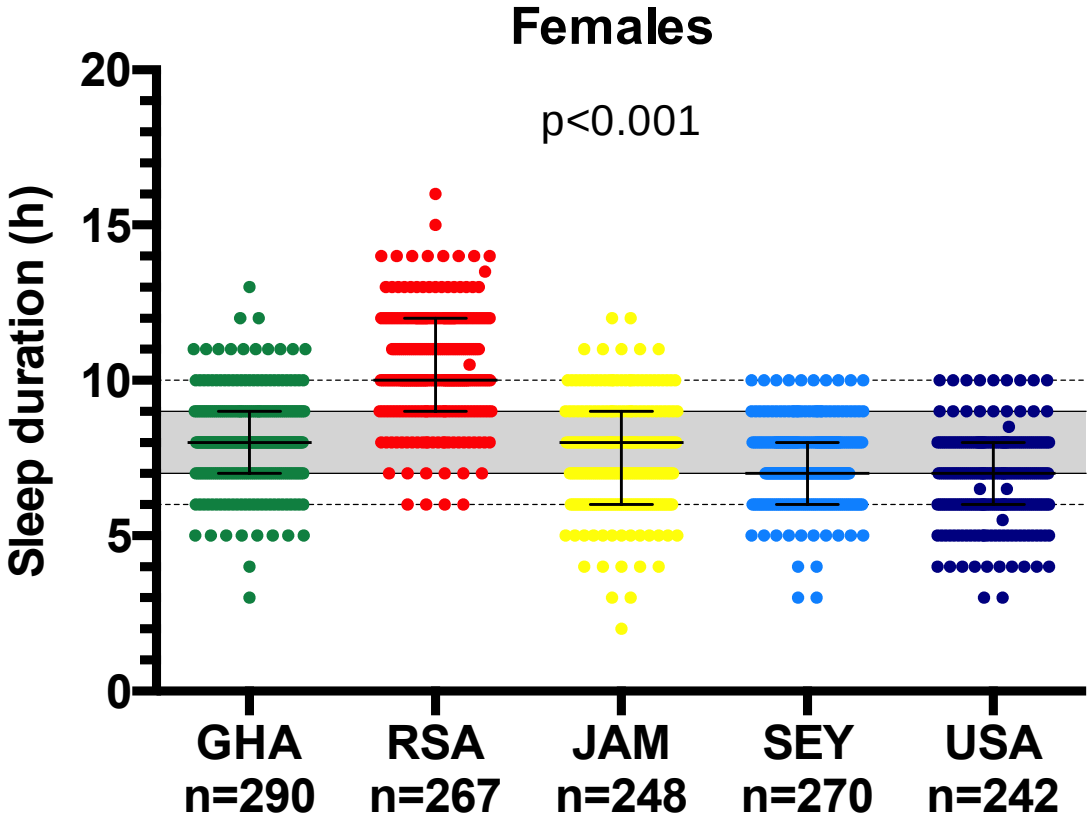
Ghana Site	**South Africa Site**	**Jamaica Site**	**Seychelles Site**	**US Site**
Nkwantakese, GH	Khayelitsha,	Kingston, JA	Victoria, Mahé, SE	Maywood, IL
KNUST	Cape Town, SA	UWI, Mona	Seychelles Ministry of Health	LUC
Lower middle Income	**Middle Income**	**High Income**	**High Income**	**Very high Income**

500 per country, N=2,500
Baseline visit: 2010-2011
Vitamin D & CVD risk: 2013-2015
Gut microbiota & obesity risk: 2018-2019
Sleep behaviour & metabolic risk: 2020-2023

mets
Modeling the Epidemiologic Transition Study

Self-report sleep data (N=2,500, 25-45y)



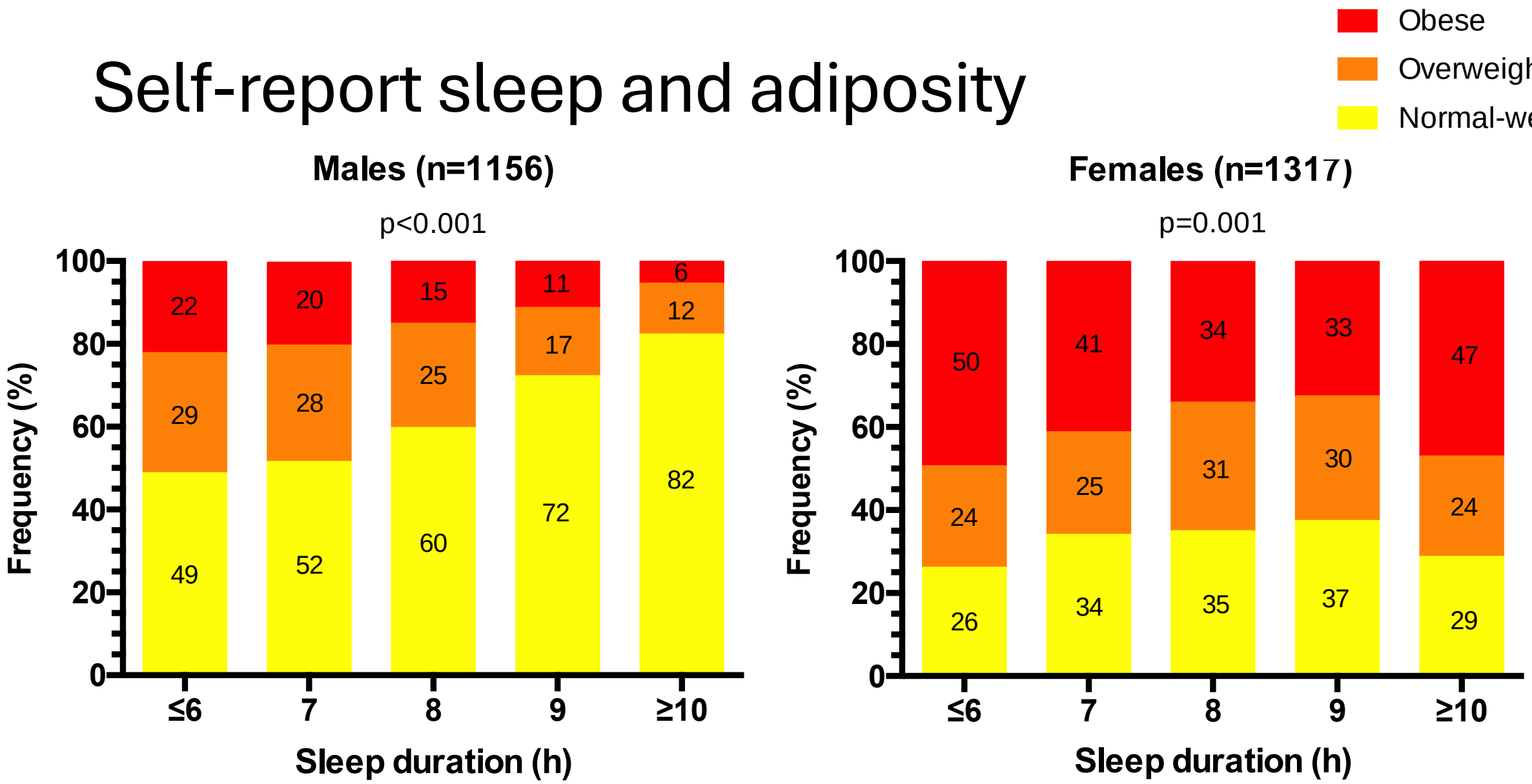


RSA	USA
3% sleep <7h 74% sleep >9h	45% sleep <7h 4% sleep >9h

RSA	USA
2% sleep <7h 73% sleep >9h	43% sleep <7h 0.5% sleep >9h

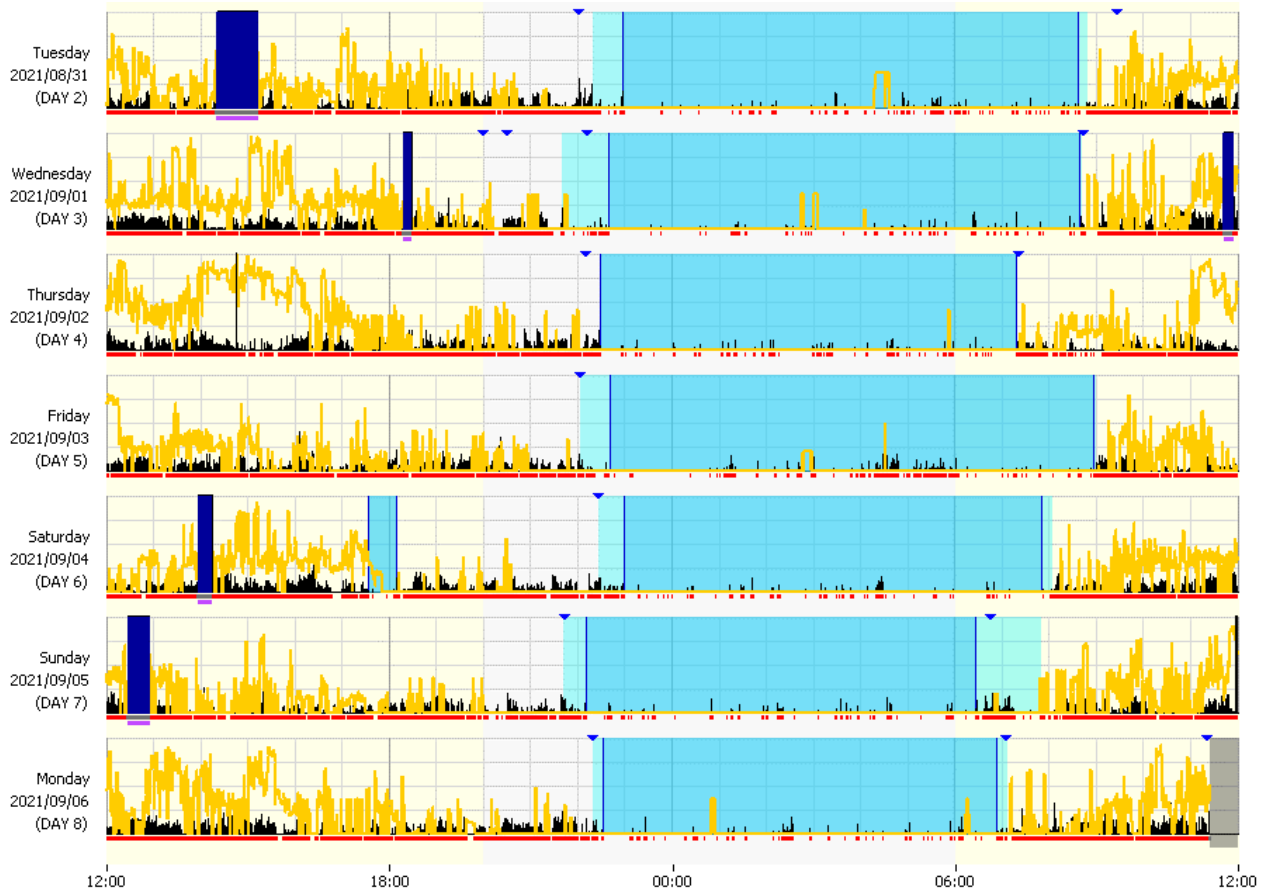
Rae DE et al. 2020. Sleep Health.

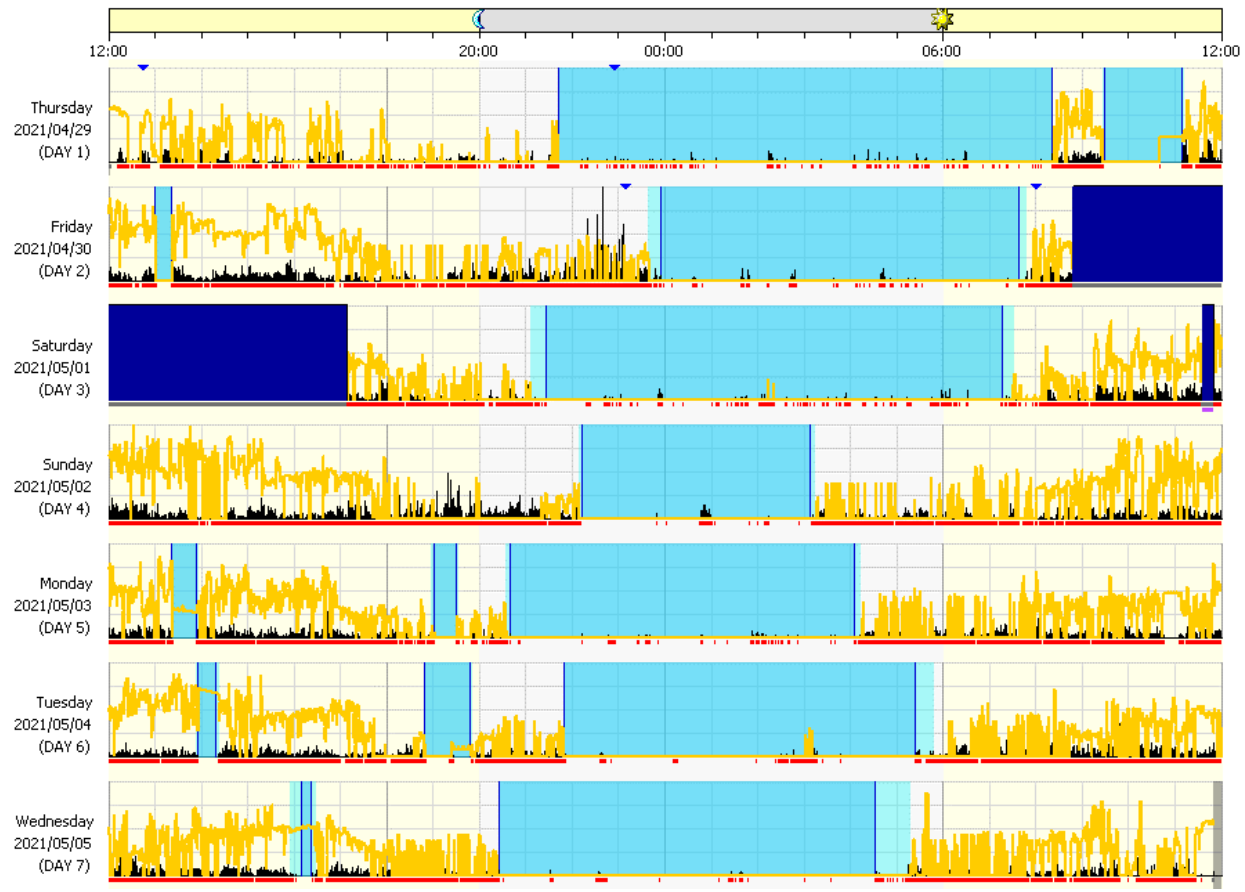
Self-report sleep and adiposity



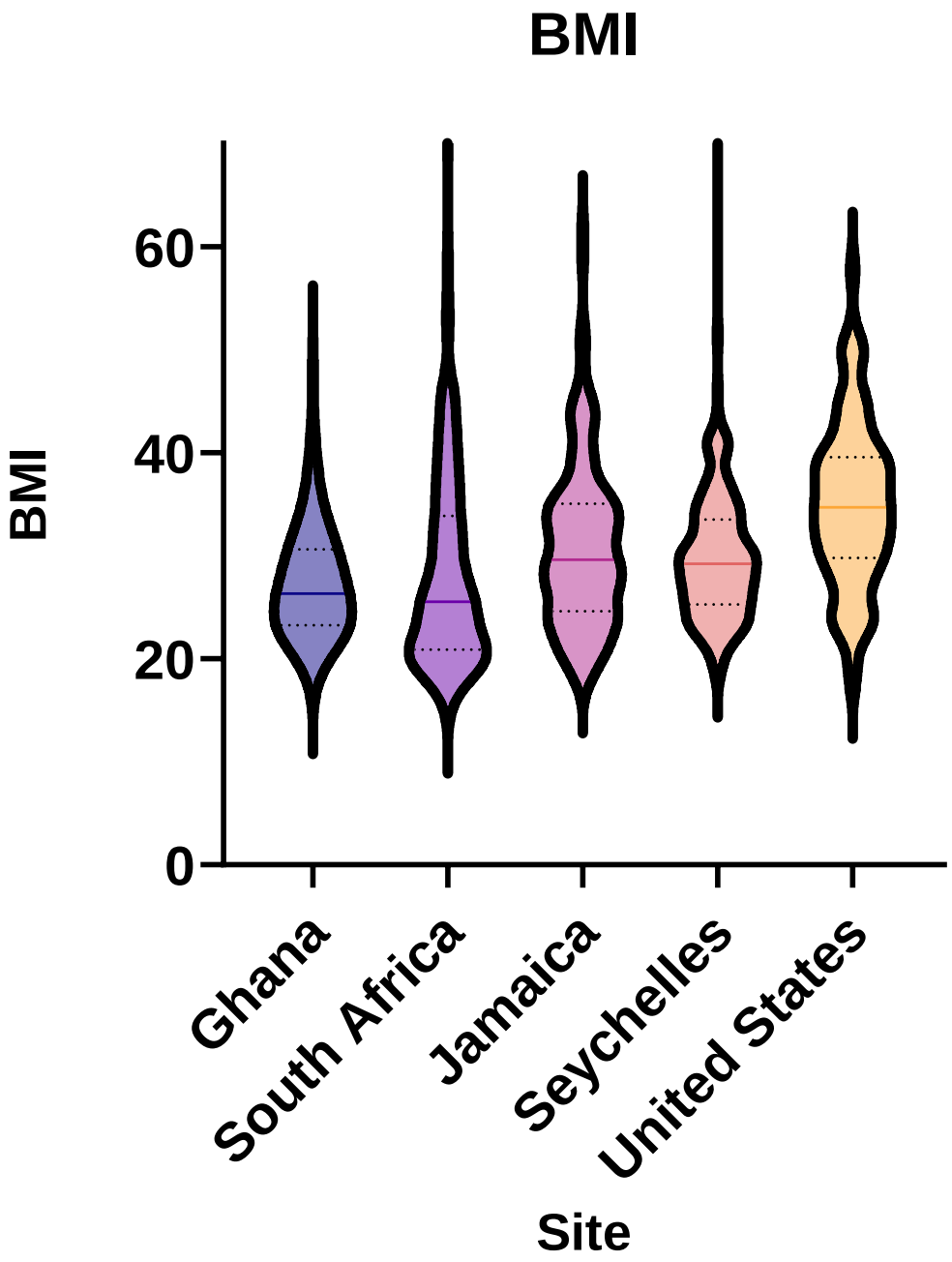
Rae DE et al. 2020. Sleep Health.

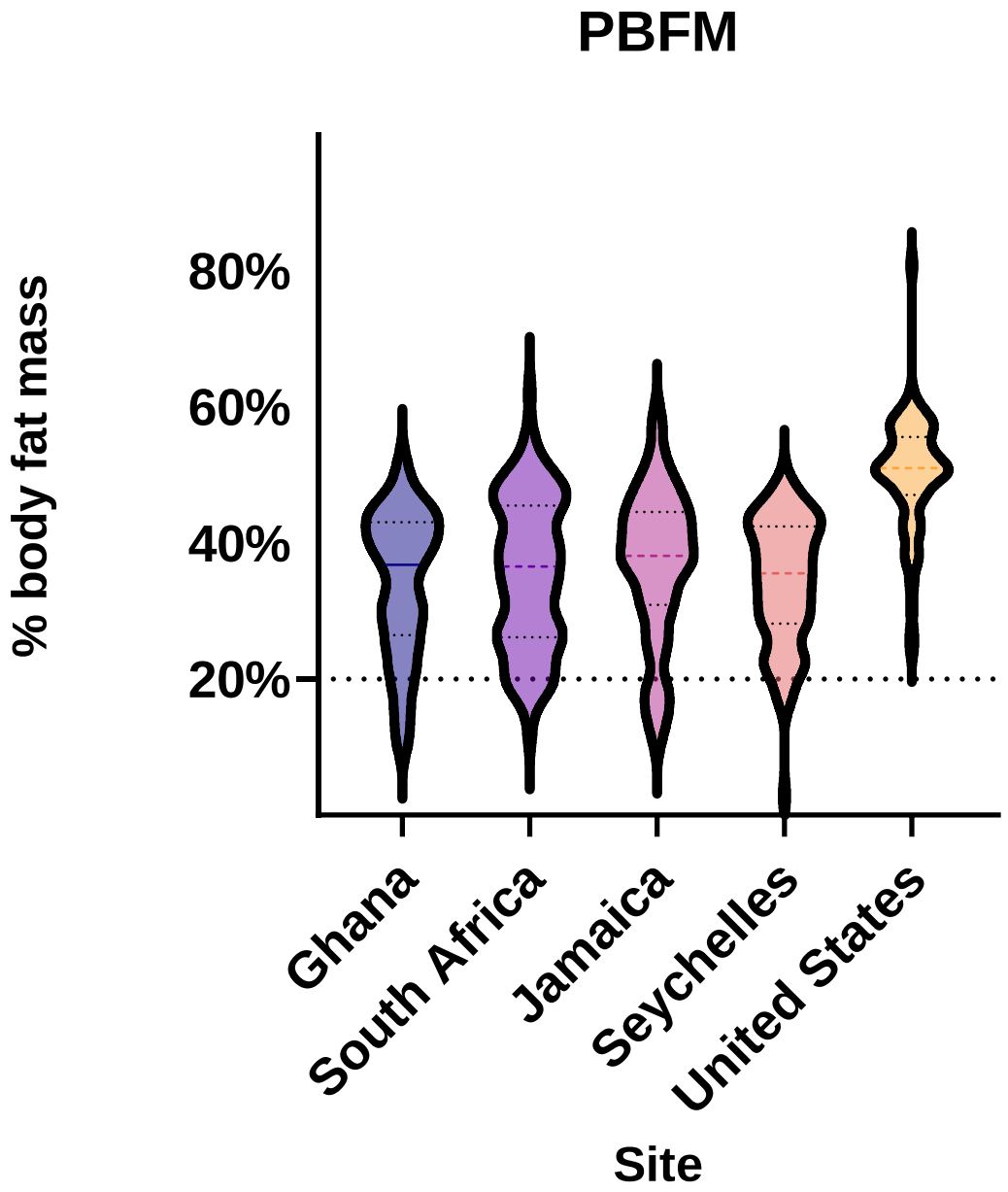
Objective sleep behaviour and obesity risk



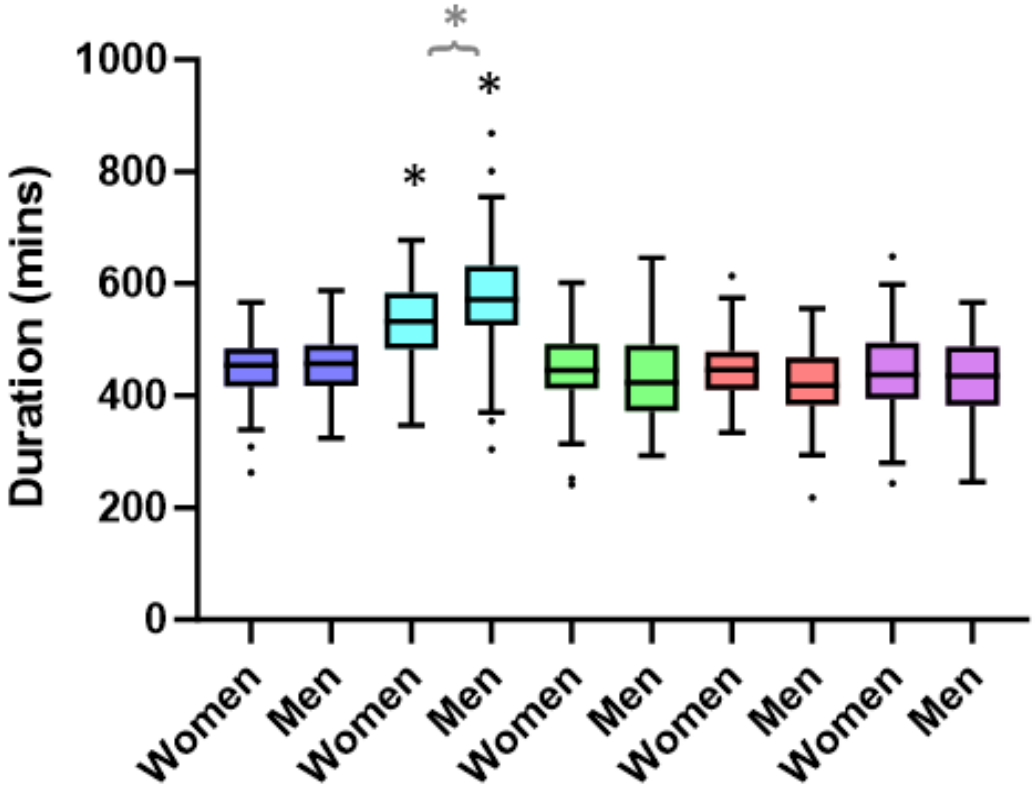


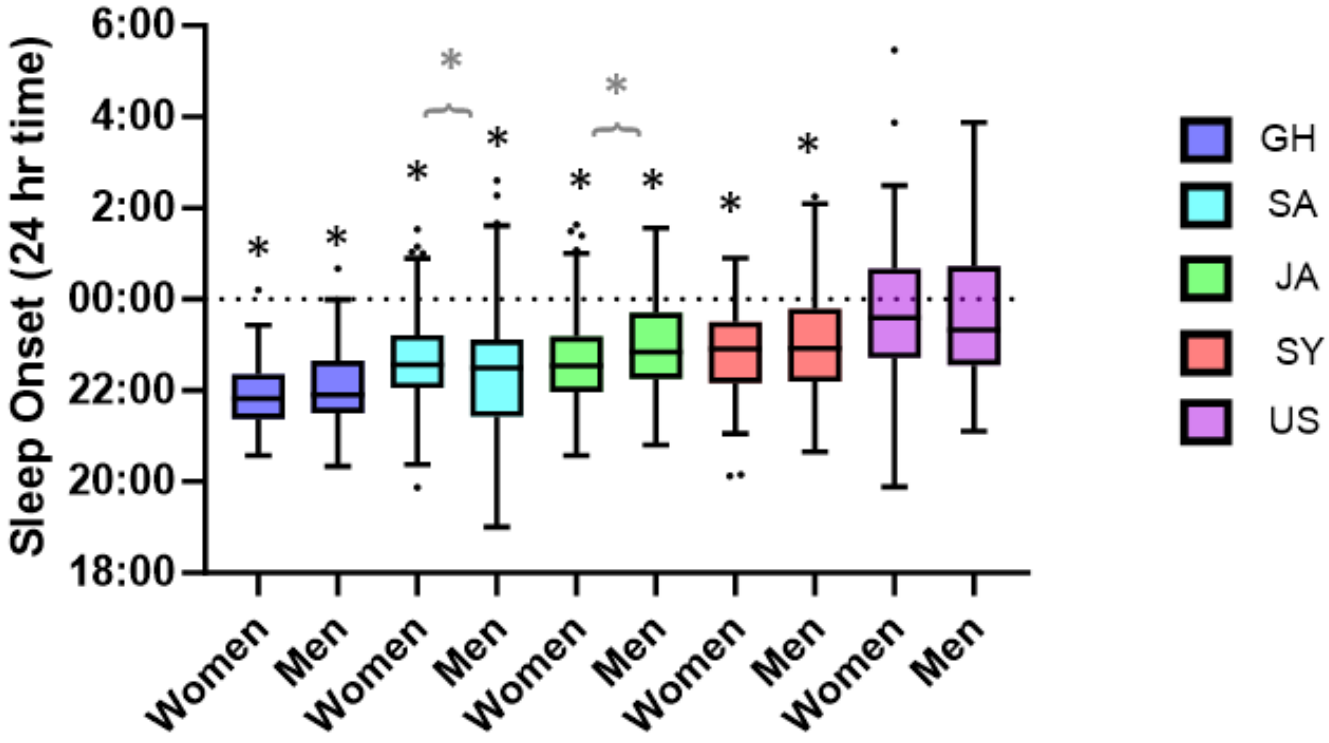
Descriptive statistics stratified by country (N=809): median (IQR)					
	Ghana	**South Africa**	**Jamaica**	**Seychelles**	**US**
	n=125	**n=191**	**n=192**	**n=177**	**n=124**
age (yr)	46.0 (39.0, 43.0)	39.0 (33.0, 45.5)	49.0 (41.0, 54.0)	46.5 (42.0, 50.0)	49.0 (44.0, 53.0)
women	84 (67%)	100 (52%)	134 (70%)	90 (51%)	94 (75%)
BMI (kg/m^2)	26.4 (23.3, 30.7)	25.8 (21.1, 33.8)	29.9 (24.8, 35.1)	29.2 (25.3, 33.2)	33.6 (29.0, 39.5)
obese	35 (28%)	67 (35%)	94 (49%)	75 (42%)	83 (65%)
alcohol	25 (20%)	109 (57%)	63 (33%)	101 (57%)	51 (41%)
working	113 (90%)	68 (39%)	159 (83%)	173 (98%)	75 (61%)
smokers	0	78 (41%)	12 (6%)	21 (12%)	20 (16%)


BMI
BMI
60
40
20
0
Ghana
South Africa
Jamaica
Seychelles
United States
Site


PBFM
% body fat mass
80%
60%
40%
20%
Ghana
South Africa
Jamaica
Seychelles
United States
Site

Sleep duration and sleep onset

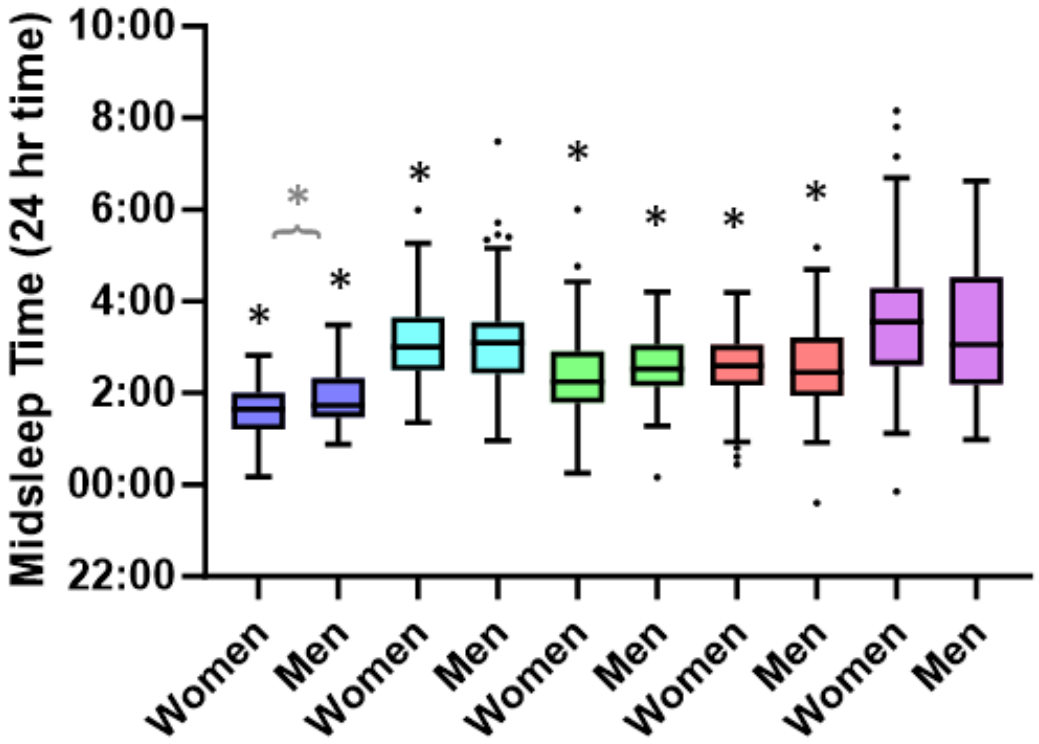




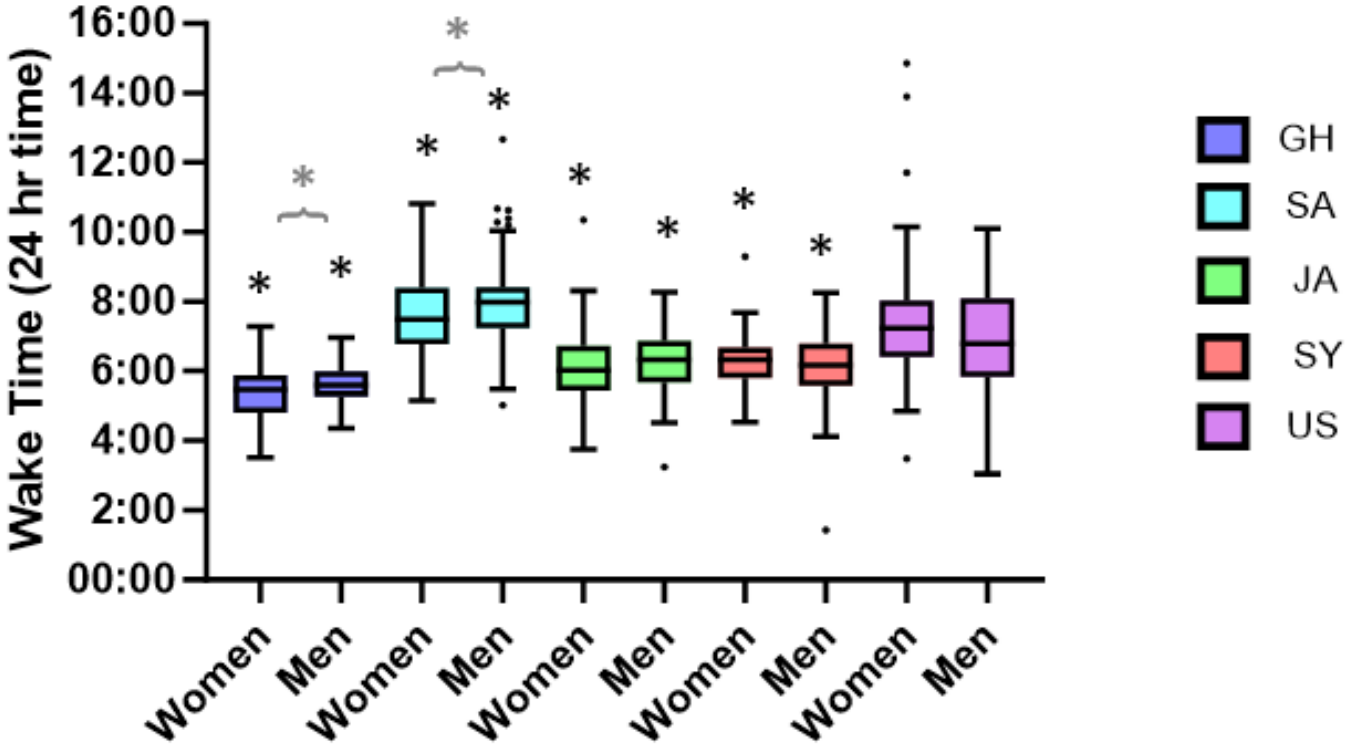
Sleep duration stratified by sex and country. Data are presented as median, interquartile ranges and outliers. Between group comparisons were made using Student's T-test. * indicates significant differences between countries (US is referential site) and * indicates significant differences between women and men within country.

Sleep onset time stratified by sex and country. * indicates significantly different from US women/men, accordingly. * indicates significantly different between women and men within country.

Midsleep time and wake time

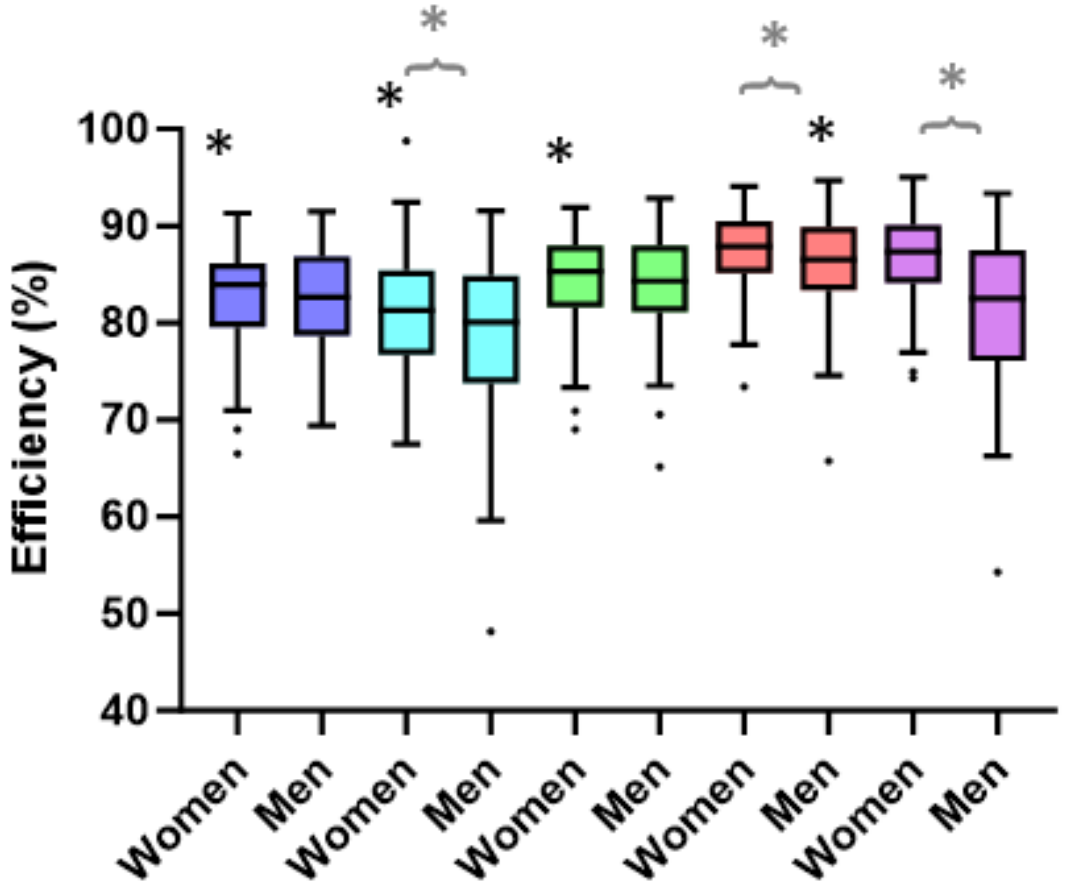


Sleep midpoint time stratified by sex and country. * indicates significantly different from US women/men, accordingly. * indicates significantly different between women and men within country.



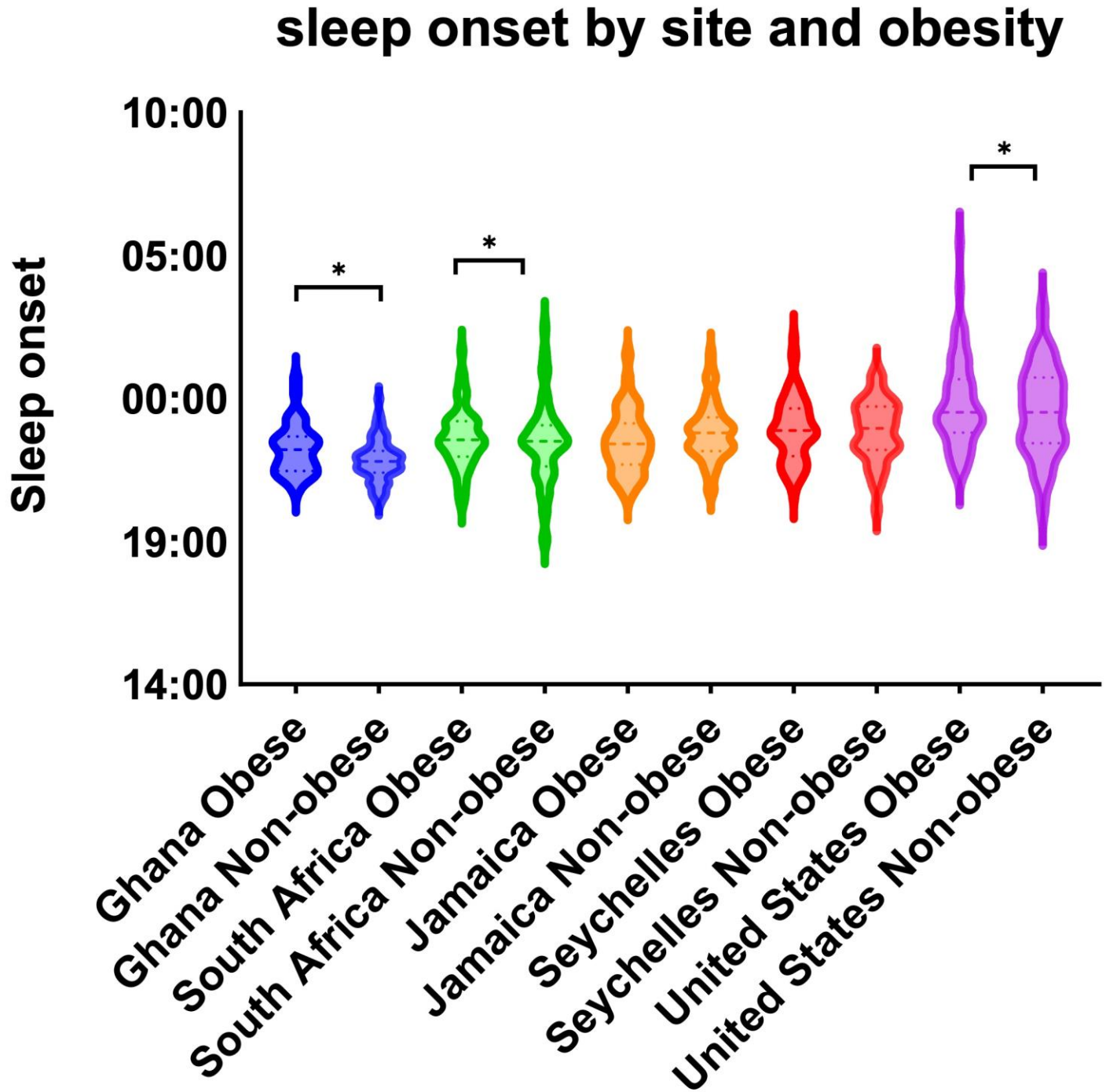
Wake time stratified by sex and country. * indicates significantly different from US women/m accordingly. * indicates significantly different between women and men within country.

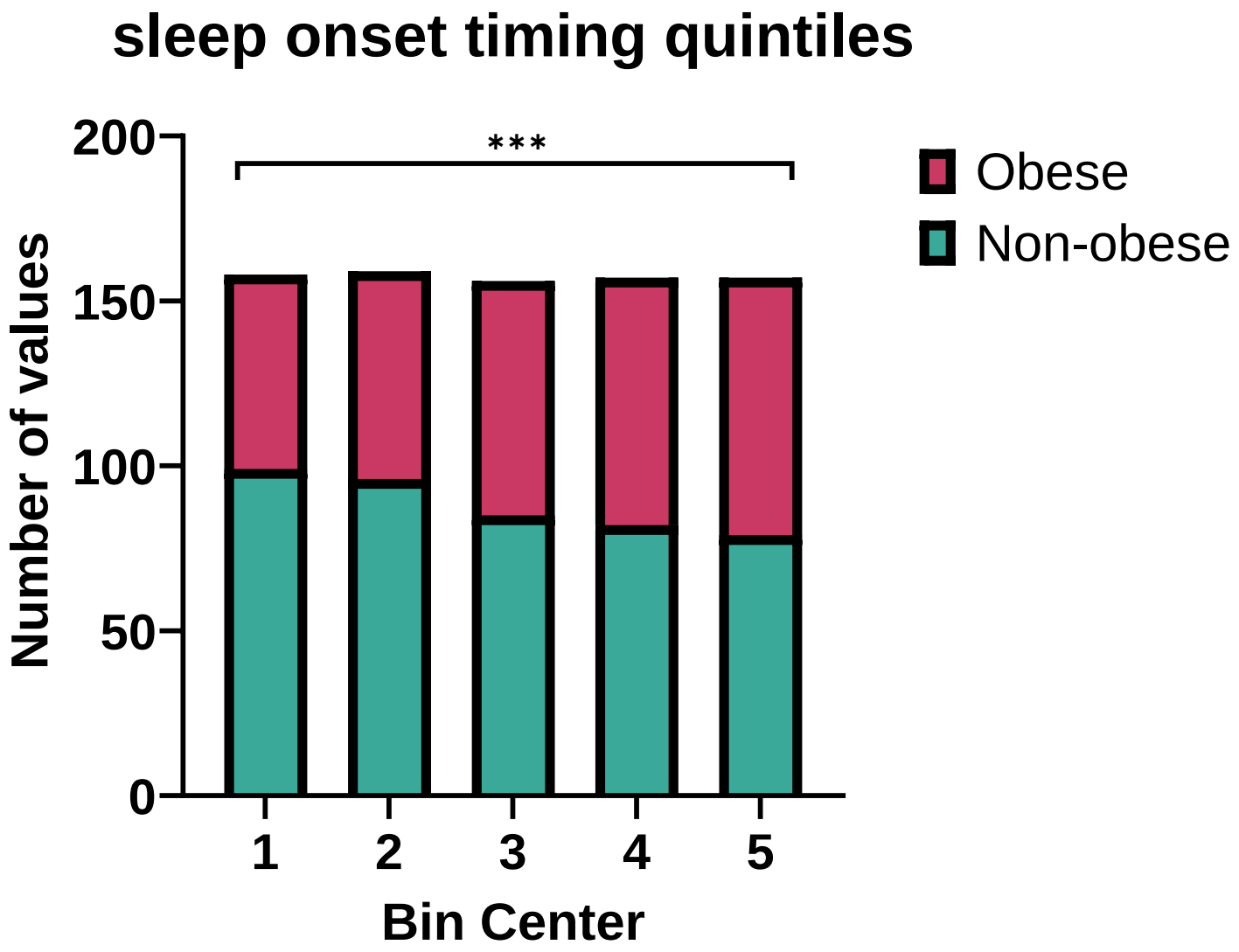
Sleep efficiency by country

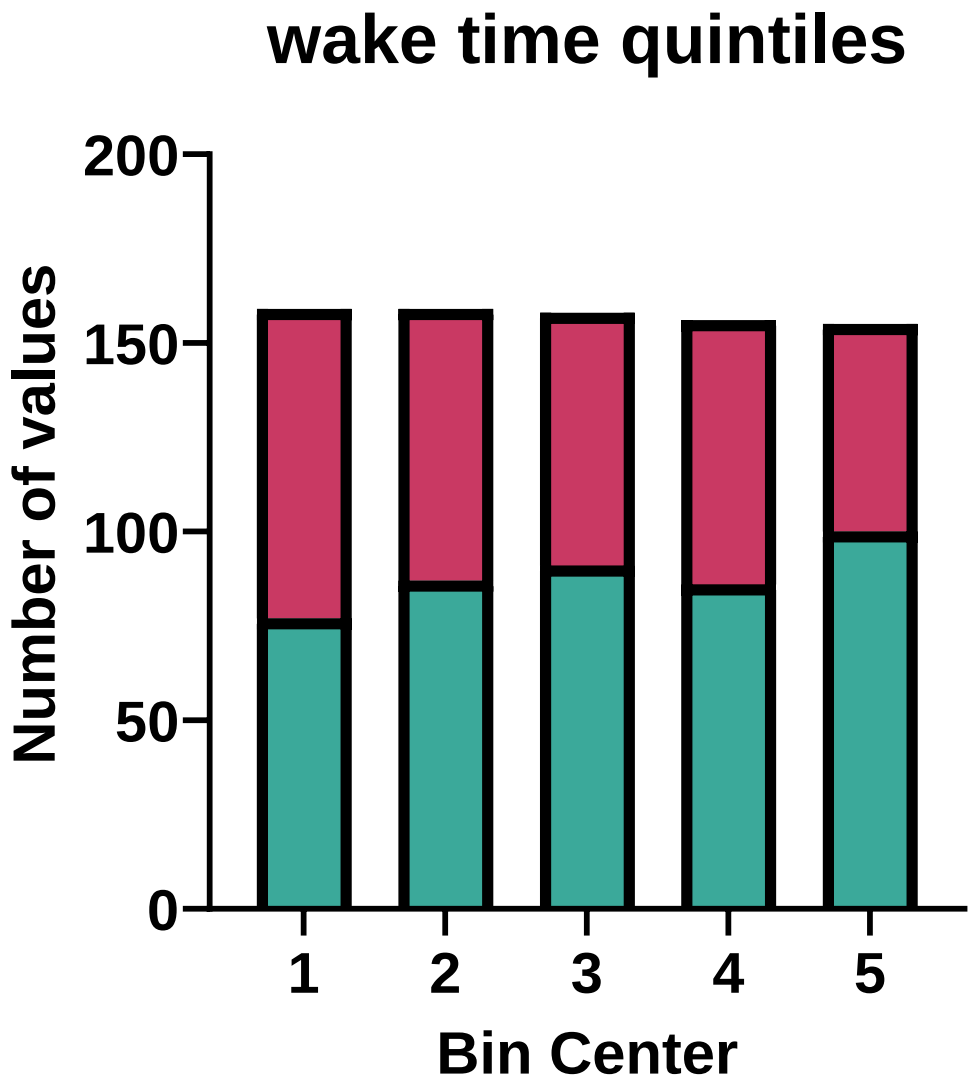


Sleep efficiency was lower in Ghana, South Africa and Jamaica when compared to US (Ghana β: -3.7, South Africa: -5.8, Jamaica:-1.3, $p<0.05$ for all) and higher in Seychelles when compared to US (Seychelles β: 1.6; $p=0.02$).

Sleep efficiency stratified by sex and country. * indicates significantly different from US women/men, accordingly. * indicates significantly different between women and men within country.


sleep onset by site and obesity
Sleep onset
10:00
05:00
00:00
19:00
14:00
*
*
*
Ghana Obese
Ghana Non-obese
South Africa Obese
South Africa Non-obese
Jamaica Obese
Jamaica Non-obese
Seychelles Obese
Seychelles Non-obese
United States Obese
United States Non-obese


sleep onset timing quintiles
***
Obese
Non-obese
Number of values
200
150
100
50
0
1
2
3
4
5
Bin Center


wake time quintiles
Number of values
200
150
100
50
0
1
2
3
4
5
Bin Center

Take home messages

- Sleep duration, timing and efficiency differ by country, sex and obesity status

- Sleep is a modifiable risk factor, thus, understanding sleep patterns in different contexts is needed to make informed and culturally appropriate health recommendations.

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  - Dale Rae
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