

Ventilation and breathing patterns during walking in the 3rd trimester of pregnancy

Dataset from EVOBREATH 2016-2017

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This Dataset includes data from an experimental research project led by Dr. A. Mateos and approved by the Hospital Universitario de Burgos Ethical Committee (Burgos, Spain) (BioE6-CEIC 1595) on the breathing pattern and energetic cost of walking in pregnant women during the last trimester of gestation (Mateos and Rodríguez, 2024). The entire data set acquired was incorporated into the EVOBREATH database (Mateos and Rodríguez, 2023)

The aim of the project was to quantify the energetic cost of walking and describe the ventilation patterns in a sample of 31 urban pregnant women, aged 28 to 44 years, during the last trimester of gestation (weeks 28th and 32nd). As it is known, the last trimester of gestation implies an increase in the body mass of the mother, and this condition can affect the energetic expenditure of her physical activity. The progressive changes in the shape and configuration of the abdomen, diaphragm, and chest wall (due to the uterus distension) over the pregnancy may compromise the mechanical response of the respiratory system (Gilroy et al., 1988) and generate some perception of discomfort (gestational breathlessness). The increased metabolic demands of the fetus, uterus, and maternal organs result in increased oxygen consumption (VO_2), carbon dioxide production (VCO_2), and basal metabolic rate (by up to 21% and 14%; Jensen et al., 2007, 2008).

The sample of volunteers was exhaustively controlled using exclusion criteria that aimed to eliminate or minimize the effects of medication, food ingestion, or metabolic and cardio-respiratory pathologies. Participants were required to fast overnight before their metabolic measurements were taken in a post-absorptive state in the morning. The experiments were conducted at the Bioenergy and Motion Lab (LabBioEM) of the National Research Center on Human Evolution (CENIEH, Burgos, Spain) in a session indoors in 2016-2017, under standard conditions of temperature (21.5°C-23°C) and humidity (29%-31%).

The following standardized protocols were applied:

- ✓ An *Anthropometric Protocol* was performed following normalised standards. Stature (Height) was measured to the nearest 0.1 cm with a Harpenden stadiometer (Holtain Limited). Body mass (Weight) was obtained with a digital scale to the nearest 0.1 kg.
- ✓ *Indirect Calorimetry and Breathing Protocols* were carried out with an ergospirometer Master Screen-CPX JAEGER® and the LabManager®

IntelliSupport 5.72 software application. Ventilatory tests were measured using breath-by-breath procedure, monitored through oxygen (O₂) consumption and carbon dioxide (CO₂) production. Each participant wore a breathing mask, heart rate monitor, and pulse oximeter during the trials. Ventilation parameters (oxygen uptake, carbon dioxide output, breathing frequency, respiratory exchange ratio) were measured during the exercise. Walking tests (W20) were carried out on the treadmill for 20 minutes at a speed of 4 km/h. Ventilatory rates were recorded during the 28th and 32nd weeks of gestation of participants in the walking tests (W20_28, W20_32).

The dataset contains the following variables:

Variable	Description	Units
ID	Identification code of the subject	
Sex	F (Female)	
Age	Age of the participant	years
Height	Stature	cm
Weight	Body mass	kg
W20_28	Walking test at 28 th week during 20 minutes at 4 km/h	
W20_32	Walking test at 32 nd week during 20 minutes at 4 km/h	
V'O _{2m}	Oxygen uptake (average) during the walking test	mL/20min
V'O _{2d}	Oxygen uptake (standard deviation, Sd)	mL/20min
V'CO _{2m}	Carbon dioxide output (average) during the walking test	mL/20min
V'CO _{2d}	Carbon dioxide output (standard deviation, Sd)	mL/20min
RER	Respiratory Exchange Ratio, ratio volume CO ₂ / volume O ₂	
BF	Breathing Frequency during 20 minutes walking test at 4 km/h	L/20min

References

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