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# Worksite Energy Cost Assessment in Non-surgical versus Surgical Medical Residency Programs

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After earning medical degree, several residency programs are available to become a full specialist doctor in a discipline. The residents' work activity, under the constant supervision of senior tutors, is different according to which area of specialization has been chosen—non-surgical or surgical. Even if the medical doctor activity could be considered sedentary in nature,<sup>1</sup> a prolonged physical stress could be required with the maintenance of prolonged postures or with continuous low-impact aerobic activities like standing and walking. However, the energy cost in residents and the eventual differences among those involved in surgical or non-surgical programs, have not been investigated previously.

Thirty-three volunteer residents (19 from non-surgical and 14 from surgical programs) involved in residency programs at the Department of Public Health, University of Naples "Federico II," enrolled in this cross-sectional study. Residents with known medical conditions with potential impact on energy expenditure (*eg*, obesity, diabetes, metabolic disease or endocrinopathy) were excluded. Demographic and anthropometric characteristics were collected (age, sex, weight, height and BMI). The energy cost of each participant was as-

sessed during a 12-hour working time, by a multi-sensor SenseWear Armband (Body-Media Inc, Pittsburgh, PA, USA). Worn on the back of the arm (triceps region), the device was able to measure several physiological parameters. The validity of the device has been demonstrated in young adults, sedentary people, older individuals and in several pathological conditions.<sup>2</sup> Results about energy expenditure were reported in Metabolic Equivalent of Tasks (METs) and compared between groups.

The mean METs recorded on the whole sample was 1.66 (SD 0.22); it was 1.72 (0.18) in non-surgical group 1.58 (0.20) in surgical group ( $p=0.043$ ) (Table 1). Due to the recognized impact of body weight on energy cost,<sup>3</sup> the correlation between BMI and recorded METs of the whole sample was investigated; there was a non-significant correlation ( $r=0.189$ ,  $p=0.326$ ) between these two variables in the present sample.

We found that residents in non-surgical medical area had a higher energy cost expenditure compared with residents in the surgical area. Probably, it should be taken into account that while surgical activity requires the maintenance of a prolonged nearly fixed standing position, a non-surgical medical activity is characterized by a

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**Table 1:** Characteristics of the study sample and groups comparisons. Values are either n (%) or mean (SD).

Parameter	Non-surgical	Surgical	p value
Male sex	12 (63%)	7 (50%)	0.450
Age (yrs)	31.4 (6.7)	167.3 (9.1)	0.961
Height (cm)	171.2 (8.3)	167.3 (9.1)	0.201
Weight (kg)	67.3 (14.5)	73.9 (16.0)	0.219
BMI (kg/m <sup>2</sup> )	23.8 (1.3)	25.5 (2.0)	0.199
METs	1.72 (0.18)	1.58 (0.20)	0.043 <sup>a</sup>

frenetic hospital routine.

The relative low values of METs recorded in both groups during a 12-hour working time confirmed that medical doctor activity was a low expenditure activity.<sup>4</sup> This result is even more relevant if related to the high number of hours/week of this working category. Therefore, low expenditure activity combined with lack of exercise, stress situations, sleep deprivation could negatively impact on the work performance of residents and determine lower performance in patients' care.

These results could be used in a health management prospective to plan adequate primary prevention programs in individuals at the worksite, which are still rare and incomplete, especially among health care professionals.<sup>5</sup> Future research projects could include a wider study population with less narrowed criteria to better clarify the impact of different physiological and pathological conditions on energy cost expenditure related to the residents' work activity.

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