

Table II - Characteristics of the studies included in the systematic review

Author and year	Participant profile	Study design	Exposure	Control	Evaluation	Follow-up	Result 1	Result 2
Fothergill and Sims, 2010 [7]	n = 19 SEALS (highlighted = 29.26 ± 4.2 years; not highlighted = 29.76 ± 5.8 years), height (highlighted = 1.806 ± 0.047 m; not highlighted = 1.7826 ± 0.082 m) and body mass (highlighted = 83.76 ± 6.3 kg; not highlighted = 84.76 ± 11.5 kg)	Observational (cohort)	10 participants stayed on the submarine "USS Kamehameha SSN 64" (highlighted)	9 remained on the submarine "Ford Island" for control (not highlighted)	12 min Cooper test (pre and post-mission assessment)	33 days	Cardiorespiratory fitness: Percentage variation in distance covered between pre- and post-implantation tests - not highlighted showed a non-significant increase of 2 ± 4.7% in distance covered, while highlighted ones showed a decrease of 7 ± 3.7% in traveled distance after implantation (p < 0.01)	Heart Rate: Decreased performance of standouts was not associated with any changes in mean HR and max HR, however, HR recovery time was 47 ± 39.1% longer after implantation [p < 0.05]. Additionally, recovery HR decreased by 17 ± 16.7% for those deployed after implantation.
Gasier et al., 2016 [5]	n = 53 US Navy submariners (20-39 years old)	Observational (cross-sectional)	Nuclear submarine mission	None	Body composition; Food frequency; Physical activity frequency questionnaire; Lipid profile and other blood markers. Pre and post-mission	3 months	Body composition/diet: A significant mean reduction in body mass (5%) and fat mass (11%) occurred in the obese group as a result of reduced energy intake (~2000 kJ) during the mission	Biochemistry: Modest improvements in serum lipids were observed, as well as a mean reduction in interferon gamma-induced protein 10 and protein 1 and monocyte chemotactic
Gregg et al., 2012 [6]	n = 37,473 Small submarines (n= 6,192); large submarines (n = 4,198); aircraft carrier (n = 27,083)	Observational (cross-sectional)	Small or large submarines	Aircraft carrier military	BMI and Navy Fitness Readiness Test score (push-ups, sit-ups, and 1.5-mile run test)	None	Body composition: Submariners with higher BMI compared to aircraft carrier military; Higher prevalence of obesity	Neuromotor assessment: Score in the physical test of soldiers of small submarine inferior to the military of aircraft carriers; Sit-ups, Push-ups, and Running: Worst

								Performing Small Submarine Soldiers
Luria et al., 2010 [14]	n = 32 (22.8 ± 3.8 years), healthy male submariners	Observational (cross-sectional)	Mission on the Dolphin-class non-nuclear submarine	None	BMI; thigh and calf circumference; 2000m run; Bone function markers; Endocrine regulators; Bone assessment with ultrasound	30 days	<p>Body composition: BMI increased from 23.05 ± 0.5 to 23.4 ± 0.5 (p = 0.002)</p> <p>Cardiorespiratory fitness: Running time from 507.3 ± 11.6 to 529.2 ± 8.8s (p = 0.005)</p>	<p>Bone function markers: Albumin levels from 4.56 ± 0.25 to 4.84 ± 0.30 g/dL (p=0.0005); there was a significant increase in circulating calcium. PTH and 25(OH)D levels decreased significantly. Significant decreases were observed in TRAP5b and CTx levels, markers of bone resorption, as well as in PINP</p>
Kang and Song [2018] [1]	n = 513 submariners and 4577 non-submariners	Observational (case-control)	Submariners were defined as individuals who had completed the submarine training course and were working on a submarine at the time of testing	Non-submariners	Post, alcoholism, smoking, physical activity, BMI, lipid profile, metabolic syndrome.	None	<p>Physical activity: Compared with non-divers, submariners had higher risks of MetS [odds ratio (OR) 1.31 (CI) 1.02, 1.68</p>	<p>Metabolic syndrome: low HDL (OR 1.73, 95% CI 1.36, 2.20), and impaired fasting glucose (OR 1.46, 95% CI 1.21, 1.76). When stratifying subjects according to physical activity, an increased risk of high blood pressure associated with underwater service was evident only in the subgroup with moderate or vigorous physical activity (P for interaction = 0.006).</p>

SEALS = US Navy Combat Divers; HR =heart rate; BMI = Body Mass Index; US = Ultrasonography; PTH = Parathyroid hormone; 25 (OH) D = 25-hydroxy-vitamin D; TRAP 5b = Acid Phosphotase 5; CTx = C-terminal telopeptide fragment; PINP = N-terminal collagen type I propeptide; HDL = High Density Lipoprotein Cholesterol