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### ABSTRACT

Sudden unexplained death syndrome (SUDS) is a leading cause of death among young men from rural areas of northeastern Thailand. In contrast, urban Thais and those from other areas of Thailand experience a very low incidence of SUDS. SUDS primarily occurs at night with no obvious proximate cause. Previous studies suggest that the autonomic nervous system plays a significant role in many forms of sudden cardiac death. This study tests the hypothesis that autonomic nervous system controls of arterial pressure of young rural northeastern Thai men are different from those of young urban northeastern and central Thai men. Forty-seven healthy second to third year students from the Khon Kaen University (20-25 years of age) were divided into central (n = 15) or northeastern urban (n = 16) and northeastern rural (n = 16) groups. Serum sodium, serum potassium, blood glucose, glucose tolerance test, ulnar nerve conduction, baroreflex sensitivity, resting respiration, arterial pressure, and heart rate were measured, and cardiorespiratory and autonomic nervous system responses (power spectral density of heart rate variability) to upright tilt, cold, and oral saline load were tested in awake, resting subjects who had been fasted overnight. Body weight, body height, serum Na (central,  $132.39 \pm 1.39$  mEq/L; urban,  $136.58 \pm 1.45$  mEq/L; rural,  $133.10 \pm 1.42$  mEq/L), serum K (central,  $3.92 \pm 0.13$  mEq/L; urban,  $4.05 \pm 0.11$  mEq/L; rural,  $4.01 \pm 0.13$  mEq/L), fasting blood sugar (central,  $69.67 \pm 1.62$  mg/dl; urban,  $69.31 \pm 2.29$  mg/dl; rural,  $65.25 \pm 2.24$  mg/dl), glucose tolerance, and baseline heart rate variability (central,  $67.60 \pm 8.04$  msec; urban,  $71.94 \pm 11.33$  msec; rural,  $68.89 \pm 5.18$  msec) were not significantly different among the three groups. Resting respiratory rate, mean arterial pressure (central,  $93.28 \pm 0.16$  mm Hg; urban,  $92.98 \pm 0.10$  mm Hg; rural,  $92.92 \pm 0.07$  mm Hg), heart rate (central,  $63.88 \pm 2.37$  bpm; urban,  $60.11 \pm 3.15$  bpm; rural,  $58.44 \pm 1.34$  bpm), and sympathetic (central,  $38.83 \pm 1.96$  %, urban  $36.37 \pm 3.00$  %, rural  $36.84 \pm 1.77$  %) and parasympathetic (central,  $61.17 \pm 1.96$  %, urban  $63.63 \pm 3.00$  %, rural  $63.16 \pm 1.77$  %) nervous system activity were also similar among the groups. In contrast, compared to urban northeasterners and central Thais, rural northeasterners displayed greatly impaired autonomic nervous system responses to cold stress and oral saline load. However, baroreflex sensitivity (central,  $2.38 \pm 0.47$  bpm/mm Hg; urban,  $2.08 \pm 0.40$  bpm/mm Hg; rural,  $2.44 \pm 0.62$  bpm/mm Hg) and sustained autonomic nervous system responses to upright tilt were not significantly different among the three groups. Further, there were no differences among the groups in ulnar nerve conduction velocities

(central,  $50.26 \pm 1.63$  m/s, urban  $46.67 \pm 1.36$  m/s, rural  $46.01 \pm 1.90$  m/s), suggesting that there is no general peripheral neuropathy. The present data indicate that northeastern rural Thais display abnormal autonomic nervous system responsiveness to sensory stimuli, and this phenomenon may, in part, underline their high risk of SUDS.