Frequency doubling of a 946 nm Nd:YAG laser is a route to the generation of high average power in the blue spectral region. Periodically-poled lithium niobate (PPLN), with its combination of high nonlinearity and non-critical phase-matching offers the prospect of high conversion in a simple extra-cavity single-pass arrangement. The PPLN (length 15 mm, grating period 4.5 μm) was heated at a temperature of 140 °C. With 1.5 W incident power at 946 nm in a linearly polarized fundamental mode ($M^2 < 1.1$) and in pulsed operation at the relaxation oscillation frequency (160 kHz, 300 ns pulses), a power of 450 mW with $M^2 = 1.25$ was generated at 473 nm. The conversion efficiency versus internal fundamental power was 40%. No photorefractive damage was observed.