

# Do General Health, Sleep Quality and Fatigue Contribute to Cardiovascular Disease Risk in Autistic Adults?

## Background

- Increased risk for health conditions, including cardiovascular disease (CVD), is commonly reported among autistic adults (Croen et al., 2015).
- CVD risk factors are well established in the general population and include age, smoking, high blood pressure, diabetes, high BMI, general health, mental health, sleep and fatigue. These factors are often elevated in autistic adults, however research exploring the effect of these factors on CVD risk in autistic adults is limited.
- An American study recently reported that being male, older age and sleep quality contributed to CVD risk in autistic adults (Bishop et al., 2023). They did not include a non-autistic comparison group or examine smoking, and CVD risk factors were unweighted.
- CVD risk factors may also vary with country of residence as health service access, cultural influences and risk factors may differ internationally.



## Aim

To examine CVD risk and its associations in Australian autistic and non-autistic adults. We expected that:

- Compared to non-autistic adults, autistic adults would have higher CVD risk score, poorer mental, physical health and sleep quality, and more fatigue.
- Autism diagnosis would be associated with CVD risk score together with our four health variables.

## Method

### Participants

- 409 females (61.9% autistic) and 175 males (80% autistic).
- Age 25 to 80 years, with no intellectual disability.
- Participants were from the Autism CRC Australian Longitudinal Study of Autism in Adulthood ([autismcrc.com.au/ALSAA](http://autismcrc.com.au/ALSAA)).

### Measures

Framingham CVD Non-Lab risk scores (D'Agostino et al., 2008) were calculated for separately for males and females. Weighted scores are calculated for age, BMI, blood pressure (treated/untreated), diabetes and smoking and summed for a total CVD risk score. Higher scores indicate greater CVD risk.

Health-related measures were:

- Physical (SF-12 PCS) and Mental health (SF-12 MCS); Scores < 50 = worse health
- Sleep quality (PSQI); Score > 5 = poor sleep quality
- Fatigue (FFS) – 6-item version

We also measured autistic traits (AQ-short); Score > 65 = likely autism

### Analyses

- Diagnostic group (autistic, non-autistic) differences for males and females.
- Conducted 1000 resamples bootstrapped hierarchical regressions for males and females with CVD risk score as the DV.

## Results

### Group Comparisons

#### Females:

- Non-autistic females had higher CVD risk ( $p = .004$ ) (Figure 1).
- Autistic females had poorer physical health, mental health and sleep quality, and more fatigue (all  $p < .001$ ) (Figure 2; sig \*).

#### Males:

- No group difference on CVD risk (Figure 1).
- Autistic males had poorer mental health ( $p < .001$ ) and sleep quality ( $p = .005$ ), and more fatigue ( $p < .001$ ) (Figure 3; sig \*).

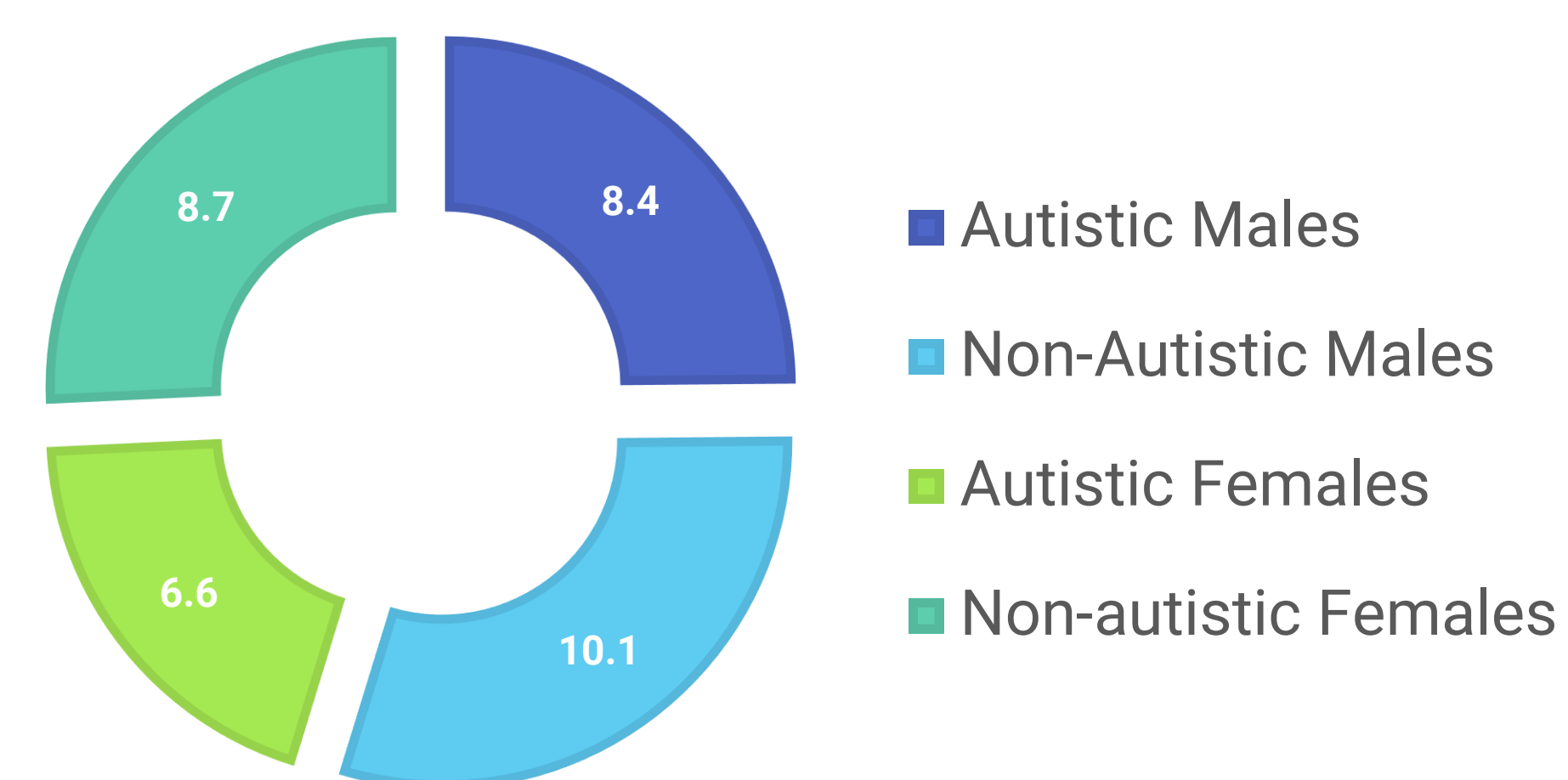


Figure 1. CVD Risk Scores

## References

- Bishop, L., Charlton, R. A., McLean, K. J., McQuaid, G. A., Lee, N. R., & Wallace, G. L. (2023). Cardiovascular disease risk factors in autistic adults: The impact of sleep quality and antipsychotic medication use. *Autism Research, 16*(3), 569-579.
- Croen, L. A., Zerbo, O., Qian, Y., Massolo, M. L., Rich, S., Sidney, S., & Kripke, C. (2015). The health status of adults on the autism spectrum. *Autism: The International Journal of Research and Practice, 19*(7), 814-823
- D'Agostino, R. B., Sr., Vasan, R. S., Pencina, M. J., Wolf, P. A., Cobain, M., Massaro, J. M., & Kannel, W. B. (2008). General cardiovascular risk profile for use in primary care the framingham heart study. *Circulation, 117*(6), 743-753.

Figure 2: Females

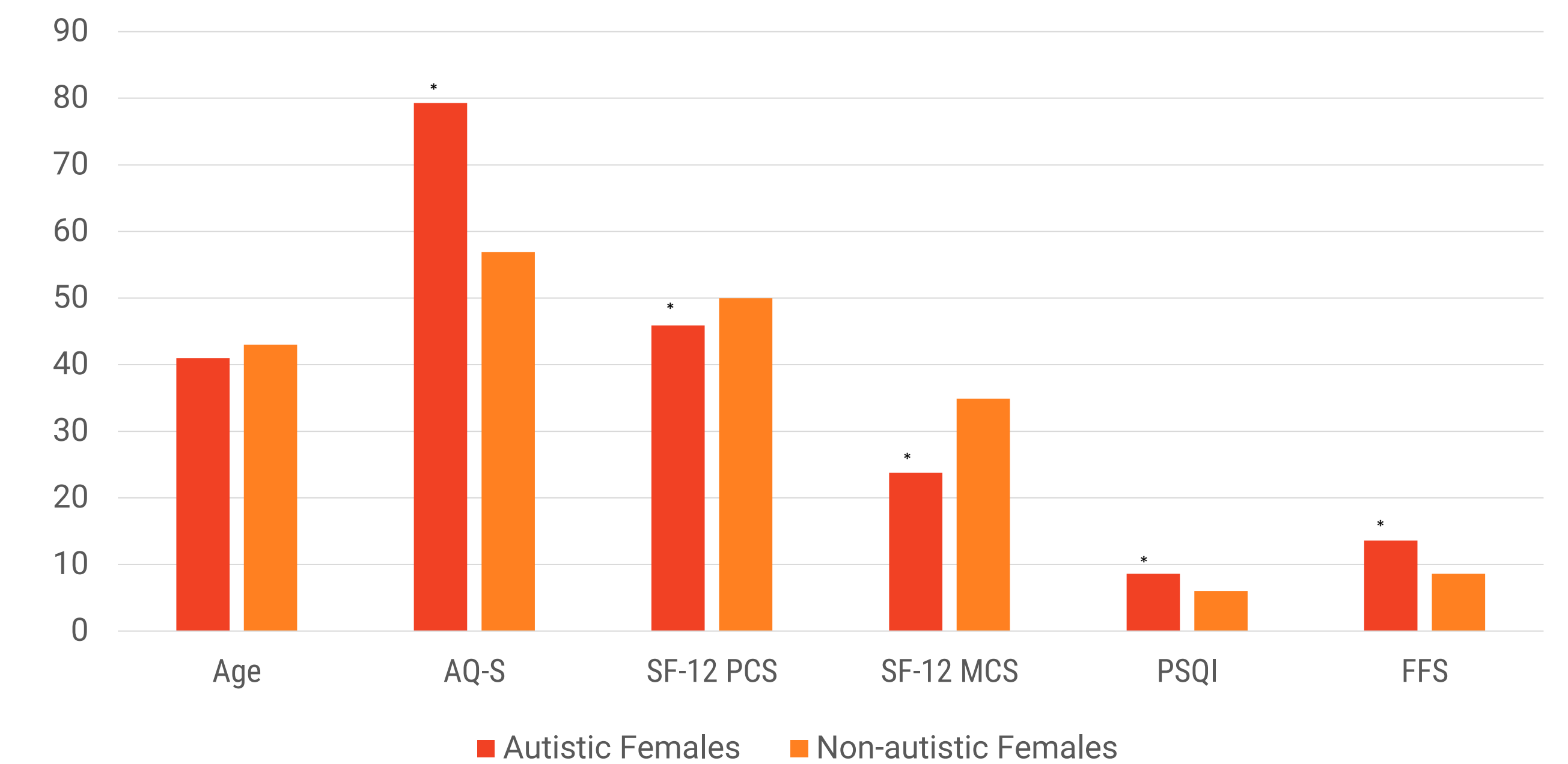
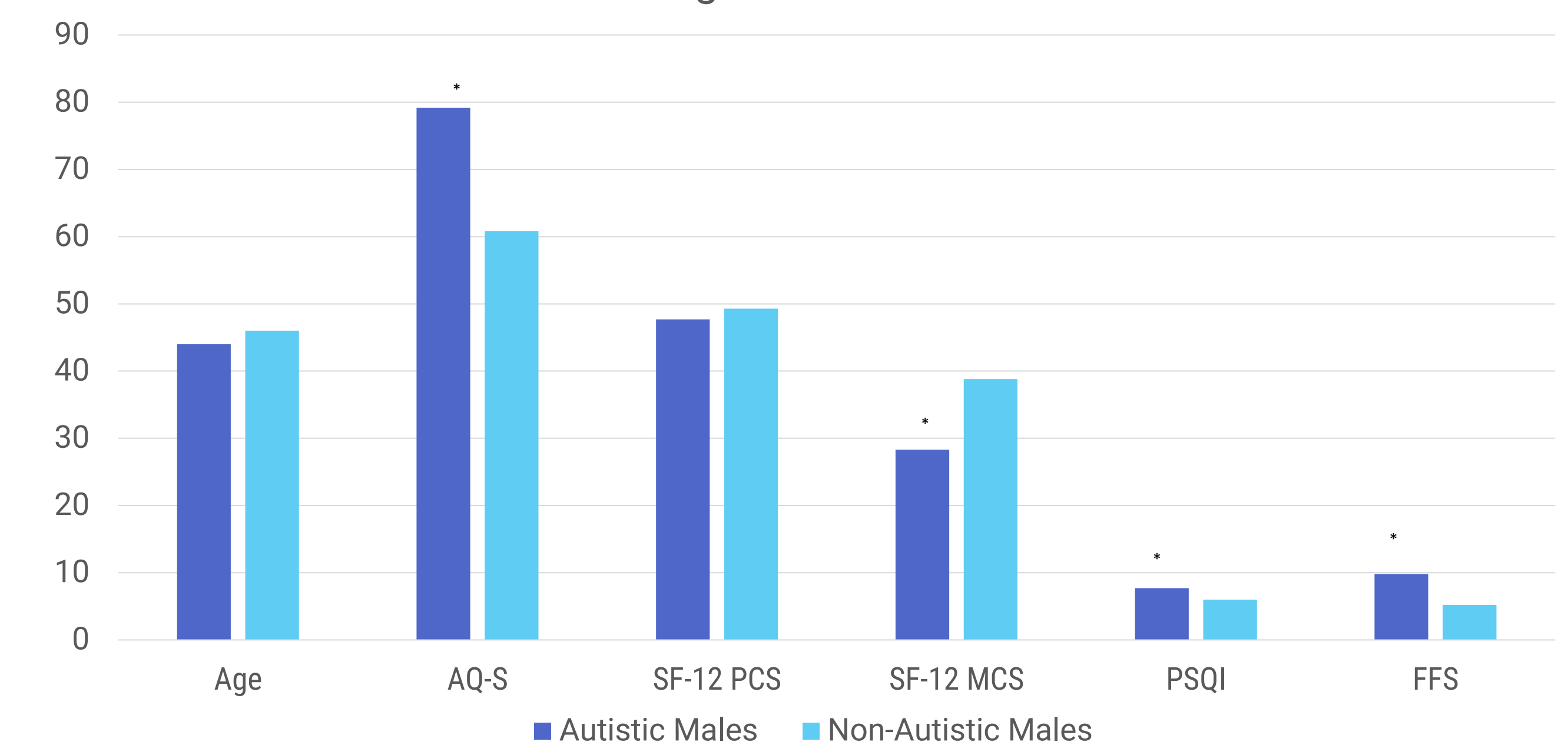


Figure 3: Males



**Regressions:** After controlling for diagnosis at Step 1, variables entered were based on significant correlations with CVD Risk score.

**Females:** Step 2 - physical health; Step 3 - autistic traits. The final model accounted for 5.7% of variance in CVD risk ( $p < .001$ ); being non-autistic, BCa 95%CI [0.90, 4.59], and poorer physical health, BCa 95%CI [-0.15, -.03], were significant in the final model.

**Males:** Step 2 – physical health, sleep quality; Step 3 – autistic traits. The final model accounted for 12.2% of variance in CVD risk ( $p = .007$ ); more autistic traits (BCa 95%CI [0.04, 0.21]) and poorer physical health (BCa 95%CI [-0.28, -0.07]) were significant in the final model.

## Conclusions

- Regardless of diagnosis, poor physical health predicted CVD risk for both males and females. Higher autistic traits were a risk factor for males and non-autistic females had increased CVD risk compared to autistic females.
- Results differed from a recent USA study, suggesting local environmental factors such as health care may be important. We also used a weighted measure of CVD risk, not used in the USA study. Our results suggest that while autistic individuals have poorer overall health, relationships with CVD risk are complex.

