

Background

Cardiovascular disease (CVD) and diabetes mellitus (DM) are responsible for billions of dollars in health care costs each year with the highest incidence found in older adults. Exercise has been shown to be an effective tool for reducing the risk of CVD and DM, though older adults consistently show lower levels of physical activity. National Senior Games athletes have been described as an active aging population with exercise habits unique from the general population and may be ideal subjects for analyzing the impact of exercise on these conditions.

Purpose

- 1. Describe the waist circumference (WC), waist-to-hip ratio (WHR) and Body Mass Index (BMI) of competitive senior athletes (SAs).
- 2. Compare SA prevalence of CVD (coronary heart disease, heart failure, stroke, hypertension) and diabetes mellitus (DM) to the general population.
- 3. Determine anthropometric (WC, WHR, BMI) cut-points associated with increased risk of CVD and DM in SAs.
- 4. Describe disease prevalence differences between SAs competing in high demand cardiovascular events (CAs) compared to non-cardiovascular sport athletes (NCAs).

Methods

Participants (N=1636) were SAs aged 50 and older, registered to compete at the National Senior Games. Each reported their registered sport, health history of CVD and DM and their weekly volume of exercise in interview format. WC, WHR and BMI were then physically measured. In addition to descriptive statistics, binomial approximation to the normal compared CVD and DM prevalence in SA with the incidence reported in the general population. ROC analysis and Youden's index were utilized to determine cut-points of anthropometric tests and relative risk ratio and ANOVAs compared health measures of CA to NCA.



Cardiovascular Disease, Diabetes and Anthropometric Measures in Competitive Senior Athletes

Results

Table 1 – Senior Athlete Descriptive Statistics

	Age	WC (in)	WHR	BMI	Cardiovascular Exercise Min/Week
Men (684)	69.42 (9.46)	37.17 (4.20)	.91 (.06)	26.94 (3.67)	320.10
Women (952)	66.54 (8.98)	33.06 (4.73)	.81 (.07)	25.95 (4.42)	(243.9)

The values in the parenthesis indicate standard deviation.

Figure 1 – Prevalence of CVD in General Population vs Senior Athletes - Tested with **Binomial Approximation to the Normal**



A statistical difference was noted for both genders in all age groups – all p values were less than .0001

Figure 2 – Prevalence of DM in General Population vs Senior Athletes - Tested with **Binomial Approximation to the Normal (Men and Women)**



A significant difference was noted for all age groups – p <.0001 for all differences.

Brisk B, Jordre B, Schweinle W University of South Dakota School of Health Sciences Sanford School of Medicine & Department of Physical Therapy



Table 2 – Cutoffs for Increased CVD **Risk using ROC Analysis and** Youden's Index

	WC (in)	WHR	BMI		WC (in)	WHR	BMI
Men	36.93 (0.65)	0.91 (0.64)	26.97 (0.63)	Men	38.29 (0.70)	0.90 (0.69)	29.23 (0.67)
Women	31.40 (0.60)	0.81 (0.61)	26.36 (0.58)	Women	31.99 (0.74)	0.87 (0.72)	25.09 (0.70)

Table 4 – National Senior Games Events

Cardiovascular At (CA)

Non-cardiovascul (NCA)

Conclusions

- across all age groups.
- too generous.
- DM than NCAs.

Clinical Relevance

Our findings suggest that maintaining high levels of cardiovascular exercise and competition with aging may lead to lower incidence of of CVD and DM.

Table 3 – Cutoffs for Increased DM **Risk using ROC Analysis and** Youden's Index

The values in parenthesis indicate AUC

hletes	Roadrace (5K, 10K), Tennis, Racewalking, Swimming, Cycling, Table Tennis, Volleyball, Triathlon, Basketball, Track and Field, Badminton, Racquetball, Pickleball
ar Athletes	Field Events Only, Softball, Shuffleboard, Golf, Horseshoes, Bowling, Archery

• WC (p<.0001), WHR (p<.0001), and BMI (p<.0001) were significantly lower in CAs.

• CAs are 31.5% less likely to have CVD than NCAs. (RR = 0.695, 95% CI = 0.598 to 0.808)

CAs are 68.4% less likely to have diabetes than NCAs. (RR = 0.316, 95% CI = 0.204 to 0.488)

SA report higher levels of weekly cardiovascular exercise than the general population. • The prevalence of CVD and DM in SAs is significantly lower than the general population,

• Optimal values of WHR appear well aligned with current CDC guidelines. Current BMI guidelines appear too stringent for this population while current WC guidelines appear

• CAs appear to enjoy lower WC, WHR and BMI as well as lower incidence of CVD and

• This observational study is limited by SA self-selection for participation and would benefit from controlled trials to support these findings.