

Racial and Ethnic Influence on Diabetes Mellitus Prevalence in Uranium Miners.

Laila Lobo MD, Kevin Vlahovich MD, Maria Johana Zambrano DO, Sher Ali Khan MD, Asma Qamruddin MD, Hossein Azadi MD.

Division of Preventive Medicine at Department of Internal Medicine
University of New Mexico, Albuquerque, New Mexico, USA

Background and Methods

Uranium (U) exposure may increase risk of developing Diabetes Mellitus (DM). U-miners may be at increased risk of DM due to occupational U exposure. American Indians (AI) are a vulnerable population with a high rate of DM and may be at greater risk of developing DM due to U exposure than are U-miners of other races/ethnicities. Our aim is to assess DM prevalence in U-miners among different races/ethnicities.

This was a retrospective cohort study using survey data from former U-Miners in the Radiation Exposure Screening & Education Program at University of New Mexico (UNM) from 4/1/2005-9/30/2022. Age, gender, race/ethnicity, educational attainment, body mass index, history of cancer diagnosis, smoking history, and DM diagnosis were determined by self-report and medication history. DM prevalence by race/ethnicity was assessed with adjusted logistic regression and interpreted using odds ratio (OR) and 95% confidence interval (CI) with Stata-17. Statistical significance was defined as $p < 0.05$.

Data source: UNM-REDCap (Research electronic data capture).

Characteristics of Uranium Miners

Variables		Total (% mean, \pm SD)	Diabetes (% mean, \pm SD)		P value
			Yes	No	
Gender	Male	666 (96.5%)	36.5%	63.5%	P=0.919
	Female	24 (3.5%)	37.5%	62.5%	
Age		70 \pm 8.6	70.3 \pm 7.6	69.7 \pm 9.1	P=0.326
Race	White	33.5%	25%	75%	P=0.000
	Non-white	66.5%	43%	57%	
Ethnicity	Hispanic	26.5%	35.2%	64.8%	P=0.549
	Non-Hispanic	73.5%	37.6%	62.4%	
Native Americans	Natives	32.9%	49.2%	50.8%	P=0.000
	Non-Natives	67.1%	31%	69%	
Education Level	High School or Less	65.3%	38.6%	61.4%	P=0.128
	Above High School	34.7%	32.7%	67.2%	
BMI		29.4, \pm 5.6	30.3, \pm 5.5	28.8, \pm 5.6	P=0.0008
Cancer	Yes	78.8%	26.8%	73.3%	P=0.003
	No	21.2%	39.6%	60.4%	
Smoking per Day	\leq 1 Pack	66.8%	36.6%	63.4%	P=0.734
	\geq 2 Pack	33.2%	35.1%	64.9%	

Results, Conclusions and Public Health Implications

The study included 746 U-Miners. Mean age was 70 years. The population was 96.5% male, 3.5% female; 33% white, 67% non-white; 33% AI and 67% non-AI. Statistical analysis showed higher DM prevalence in white (25%) vs. non-white (43%) (OR 2.7; CI, 1.7-4.1; $p < 0.01$); and in AI (49.2%) vs non-AI (31%) (OR 2.4; CI, 1.6-3.6; $P < 0.01$).

U-miner DM prevalence differed by race/ethnicity. Further research is needed to evaluate how race/ethnicity affects DM prevalence following U exposure.

AI U-miners are a vulnerable population with high prevalence of DM. U exposure may further increase DM risk. Many AI U-miners and their families live near active or abandoned mines with ongoing environmental U exposure. Better understanding of U exposure's health risks will enable delivery of more comprehensive, culturally-competent preventive and medical care to vulnerable populations.

Logistic regression model non-adjusted and adjusted

Non-adjusted logistic regression model for assessment of the association of race or ethnicity with diabetes in uranium mine workers

Race / Ethnicity	n	White vs Non-white		Native American vs Non-Natives		Hispanics vs Non-Hispanics	
		OR	P-value	OR	P-value	OR	P-value
Diabetes	741	2.3	0.00	2.2	0.00	0.9	0.55

Adjusted logistic regression model for assessment of the association of race or ethnicity with diabetes in Uranium mine workers. The adjustment age, BMI, sex, Education, and cigarette smoking

Race / Ethnicity	n	White vs Non-white		Native American vs None Natives		Hispanics vs Non-Hispanics	
		OR	P-value	OR	P-value	OR	P-value
Diabetes	490	2.7	0.00	2.4	0.00	1.0	0.74