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HABITUAL CHOCOLATE CONSUMPTION AND 24-HOUR BLOOD PRESSURE CONTROL IN OLDER ADULTS WITH HYPERTENSION

To the Editor: There is evidence from randomized clinical trials that chocolate or flavanol-rich cocoa products decrease blood pressure (BP) in the short-term,[1–4] and some studies suggest that this BP-lowering effect is stronger in individuals with hypertension and prehypertension.[4] This is relevant because control of hypertension is still suboptimal in treated individuals [5] and especially in elderly adults,[6] but it is unclear whether habitual consumption of cocoa products yields long-term BP reductions. Most research on the effect of chocolate or flavonoid-rich products on BP has relied on single measurements of BP, despite the fact that an isolated clinical BP reading may not reflect true BP.[7] Also, the night-to-day ratio of BP is an important predictor of cardiovascular disease.[8] Therefore, the association between habitual chocolate intake and BP control and having a blood pressure dipper pattern was assessed in a large sample of community-dwelling older adults with hypertension.

PARTICIPANTS AND STUDY DESIGN

This was a cross-sectional study with data obtained during follow-up of the Seniors Study on Nutrition and Cardiovascular Risk in Spain (ENRICA) cohort.[9] In 2012, ambulatory blood pressure monitoring (ABPM) was performed in 1,274 subjects aged 63 and older who also underwent a telephone interview and physical examination. Information about habitual diet and chocolate consumption in the last year was assessed using a computerized dietary history.[10] ABPM was performed using a validated device (WatchBP O3, Microlife Corp., Widnau, Switzerland) programmed to register BP at 20-minute intervals during the day and 30-minute intervals during the night for a 24-hour period. Valid registries had to fulfill a series of preestablished criteria, including 24-hour duration and at least 70% successful recordings of systolic BP (SBP) and diastolic BP (DBP) during the daytime and nighttime periods, or at least 20 recordings during the day and seven during the night. Night-to-day ratios for SBP and DBP were calculated, and circadian patterns were defined by calculating percentage decline in BP during the night using the formula [(daytime BP – night-time BP)/daytime BP] × 100. Participants were classified as dippers when SBP decline was 10% or greater. Ambulatory hypertension was defined as mean 24-hour BP of 130/80 mmHg or greater or being under antihypertensive treatment.

Statistical Analysis

Of the 1,274 individuals with 24-hour BP measurement, 1,164 provided complete information on the study variables and adhered to preestablished ABPM quality criteria; the 715 of these who had ABPM-based hypertension formed the analytical sample. Logistic regression with adjustment for potential confounders was used to calculate odds ratios (ORs) for the association between chocolate consumption and controlled 24-hour BP (<130/80 mmHg). ORs were similarly calculated for having a dipper BP pattern according to categories of chocolate consumption.

RESULTS

Of the 715 participants, 325 (45.4%) consumed chocolate habitually (mean consumption 8.0 ± 15.2 g/d). Mean 24-hour, daytime, and nighttime SBP were 127 ± 12, 130 ± 12, and 121 ± 13 mmHg, and nocturnal decline in SBP was 6.4 ± 6.4%. Mean 24-hour, daytime, and nighttime DBP were 71 ± 7, 73 ± 8, and 66 ± 8 mmHg and nocturnal decline in DBP was 9.6 ± 8.1%.

There were 393 (55.0%) participants with controlled 24-hour hypertension. The odds of having controlled BP in hypertensive individuals were similar in those consuming less than 10 g/d (OR=0.85, 95% CI=0.54–1.33) and in those consuming 10 g/d or more (OR=1.11, 95% CI=0.73–1.69) than in those consuming not chocolate (*P* for trend=.64) (Table 1). In addition, stratified analyses did not show differences in the association between chocolate and BP control according to age, lifestyle, and chronic diseases, although greater chocolate consumption was associated with greater probability of BP control in men (*P* for trend= .009), but not women.

Two hundred three (28.4%) participants had a dipper pattern. No association between chocolate consumption and having a dipper BP pattern was found (<10 g/d: OR=0.85, 955 CI=0.53–1.35; ≥10 g/d: OR=1.02, 955 CI=0.66–1.56) (*P* for trend=.52) (Table 1). Never smokers with consumption of 10 g/d or more of chocolate had an 87% higher probability of having a dipper pattern than those who did not eat chocolate (*P* for trend=.04).

In conclusion, these results do not support a beneficial effect of habitual consumption of small amounts of chocolate on BP in elderly adults with hypertension. The slightly beneficial effect of chocolate on 24-hour BP control in men and nonsmokers needs to be examined in further studies. Still, possible beneficial effect on BP of high amounts of cocoa, such as those tested in short-term clinical trials, cannot be excluded.

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Table 1. Odds of Having Controlled 24-Hour Blood Pressure (BP) and of Having a BP Dipper Pattern According to Chocolate Consumption in 715 Individuals with Hypertension

Characteristic	Total Chocolate Consumption, g/d (Reference 0, n = 390)		*P* Trend[a]	*P* Interaction[b]
	<10, n = 139	≥10, n = 186		
	Odds Ratios (95% Confidence Interval)[c]			
Controlled 24-hour BP[d]	0.85 (0.54–1.33)	1.11 (0.73–1.69)	.64	
Sex				
Male (n = 367)	0.88 (0.45–1.72)	1.65 (0.89–3.10)	.009	.002
Female (n = 348)	0.83 (0.41–1.66)	0.84 (0.45–1.57)	.13	
Age				
<80 (n = 611)	0.87 (0.53–1.43)	1.08 (0.67–1.74)	.78	.77
≥ 80 (n = 104)	0.54 (0.12–2.45)	0.82 (0.24–2.75)	.65	
BMI, kg/m^2				
< 25.0 (n = 126)	2.18 (0.42–11.2)	1.40 (0.36–5.42)	.84	.70
≥25.0 (n = 589)	0.63 (0.38–1.05)	1.09 (0.67–1.75)	.56	
Smoker				
Never (n = 418)	0.63 (0.34–1.16)	0.92 (0.52–1.62)	.89	.54
Ever (n = 297)	1.14 (0.54–2.41)	1.34 (0.67–2.67)	.79	
Leisure-time physical activity				
<Median (n = 285)	0.82 (0.39–1.70)	1.00 (0.51–1.97)	.48	.16
≥Median (n = 430)	0.92 (0.50–1.70)	1.17 (0.66–2.07)	.35	
Mediterranean diet score				
<8 (n = 235)	1.10 (0.45–2.69)	1.27 (0.55–2.94)	.58	.56
≥8 (n = 480)	0.69 (0.39–1.21)	0.90 (0.54–1.51)	.81	
Sodium intake				
<Median (n = 357)	0.67 (0.34–1.33)	1.05 (0.56–1.97)	.45	.38
≥Median (n = 358)	1.09 (0.54–2.20)	1.19 (0.63–2.26)	.79	
Diabetes mellitus				
No (n = 545)	0.90 (0.53–1.52)	1.16 (0.70–1.91)	.67	.52
Yes (n = 170)	0.53 (0.18–1.54)	1.20 (0.44–3.25)	.57	
Hypercholesterolemia				
No (n = 348)	0.70 (0.35–1.39)	0.86 (0.43–1.71)	.88	.20
Yes (n = 367)	0.89 (0.46–1.72)	1.34 (0.76–2.39)	.28	
Number of antihypertensive drugs				
0–1 (n = 410)	0.83 (0.47–1.49)	1.20 (0.71–2.01)	.67	.50
≥2 (n = 305)	0.70 (0.35–1.39)	0.87 (0.45–1.67)	.44	
Dipper pattern[e]	0.85 (0.53–1.35)	1.02 (0.66–1.56)	.52	
Sex				
Male (n = 367)	0.98 (0.51–1.88)	0.75 (0.39–1.39)	.28	.38
Female (n = 348)	0.83 (0.39–1.73)	1.33 (0.69–2.55)	.39	
Age				
<80 (n = 611)	0.84 (0.51–1.37)	0.99 (0.63–1.55)	.74	.69
≥ 80 (n = 104)	1.74 (0.22–13.7)	1.03 (0.16–6.27)	.86	
BMI, kg/m^2				
<25.0 (n = 126)	1.40 (0.39–5.01)	0.57 (0.15–2.07)	.57	.94
≥25.0 (n = 589)	0.70 (0.41–1.20)	1.06 (0.65–1.70)	.41	
Smoker				
Never (n = 418)	1.12 (0.58–2.16)	1.87 (1.05–3.35)	.04	.01
Ever (n = 297)	0.70 (0.33–1.45)	0.41 (0.19–0.84)	.20	
Leisure-time physical activity				
<Median (n = 285)	0.23 (0.08–0.71)	0.64 (0.29–1.42)	.03	<.001
≥Median (n = 430)	0.92 (0.50–1.70)	1.17 (0.66–2.08)	.35	
Mediterranean diet score				
<8 (n = 235)	1.12 (0.46–2.71)	1.14 (0.50–2.62)	.55	.96
≥8 (n = 480)	0.86 (0.49–1.52)	0.94 (0.56–1.58)	.70	
Sodium intake				
<Median (n = 357)	0.84 (0.42–1.70)	1.36 (0.73–2.52)	.76	.62
≥Median (n = 358)	0.86 (0.44–1.68)	0.83 (0.44–1.59)	.50	
Diabetes mellitus				
No (n = 545)	0.97 (0.57–1.64)	1.19 (0.73–1.94)	.18	.09
Yes (n = 170)	0.61 (0.18–2.06)	0.70 (0.24–2.01)	.28	

(continued)

Table 1 *(continued)*

Characteristic	Total Chocolate Consumption, g/d (Reference 0, n = 390)		*P* Trend[a]	*P* Interaction[b]
	<10, n = 139	≥10, n = 186		
Hypercholesterolemia				
No (n = 348)	1.16 (0.59–2.30)	0.95 (0.48–1.88)	.63	.83
Yes (n = 367)	0.66 (0.33–1.32)	0.95 (0.54–1.70)	.94	
Number of antihypertensive drugs				
0–1 (n = 410)	1.06 (0.58–1.93)	0.99 (0.57–1.72)	.43	.94
≥2 (n = 305)	0.64 (0.27–1.49)	1.17 (0.58–2.35)	.83	

[a]*P*-value from models in which chocolate consumption was modeled as a continuous variable.
[b]*P*-value from likelihood-ratio test, which compared models with and without cross-product interaction terms of chocolate intake with categories of the stratification variables.
[c]Logistic regression models adjusted for age (<70, 70–79, ≥80); sex; education (≤primary, secondary, university); smoking status (never, past, current); body mass index (BMI; <25.0, 25.0–29.9, ≥30.0 kg/m^2); leisure-time physical activity (tertiles); poor sleep quality (yes, no); Mediterranean Diet Adherence Screener score (tertiles); energy, alcohol, and sodium intake (tertiles); cardiovascular disease; diabetes mellitus; hypercholesterolemia; duration of hypertension (<1.0, 1.0–4.9, 5.0–9.9, ≥10.0 years); and number of antihypertensive drugs used (0, 1, 2, ≥3), except for the stratification variable.
[d]Twenty-four-hour BP <130/80 mmHg.
[e]Decrease in nocturnal systolic BP of ≥10% of daytime value.

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MEDICATION RECONCILIATION: WILL THE REAL MEDICATION LIST PLEASE STAND UP?

To the Editor: The Joint Commission defines medication reconciliation as "a process of obtaining and documenting a complete list of the patient's current medications upon the patient's admission to the organization and with the involvement of the patient."[1] Medication reconciliation on admission to the hospital is an essential step to prevent downstream medication discrepancies and adverse drug events.[2] At Magee-Womens Hospital (MWH) of the University of Pittsburgh Medical Center (UPMC), nurses document initial medication lists as soon as possible upon admission as part of the admission process. Pharmacists are not routinely or systematically involved in admission medication reconciliation at MWH, but prior research has shown tremendous promise for pharmacist-led medication reconciliation.[3–6] Thus, using a pharmacist-led quality improvement process, the current study sought to determine the prevalence of medication clarifications (initial differences between outpatient medication list and first-documented list that require clarification to be reconciled) and medication discrepancies (unexplained differences between outpatient medication list and inpatient list present after 24 hours) and the potential severity of detected medication clarifications and discrepancies.

METHODS

This was a prospective cohort study of a convenience sample of 69 older adults (≥65) admitted from a non-nursing