

# Personal health behaviors and physical activity and nutrition counseling by nurse practitioners: An online survey

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## ABSTRACT

**Background:** Healthy lifestyle counseling improves nutritional intake and participation in exercise, yet the rate of patient counseling varies and clinicians' personal behaviors can influence counseling practices.

**Purpose:** This cross-sectional study evaluated lifestyle counseling by nurse practitioners (NPs) and the relationship between their personal behaviors and patient counseling.

**Methodology:** Practicing NPs ( $N = 1,220$ ) completed an online survey regarding personal behaviors and counseling for healthy body weight, moderate-vigorous physical activity, muscle strengthening, fruit and vegetable consumption, and dietary protein.

**Results:** The majority reported counseling "usually" or "often" for healthy weight (54%), moderate-vigorous physical activity (53%), and fruits/vegetables (57%), whereas only 44% and 17% reported "usually" or "often" counseling for dietary protein and muscle strengthening. When NPs did not personally engage in the behavior, the odds for counseling were significantly reduced: NPs were 21% less likely to counsel for moderate-vigorous physical activity (odds ratio [OR] = 0.79 [0.65–0.97],  $p = .026$ ), 27% less likely to counsel for muscle strengthening (OR = 0.73 [0.60–0.90],  $p = .004$ ), 57% less likely to counsel for fruit/vegetable consumption (OR = 0.43 [0.35–0.54],  $p < .001$ ), and 72% less likely to counsel for dietary protein (OR = 0.28 [0.18–0.45],  $p < .001$ ). Personal body mass index did not predict counseling for a healthy weight.

**Conclusion:** Although NPs report regular patient counseling regarding healthy lifestyle behaviors, the odds for counseling are increased approximately 20–75% when they engage in the behaviors themselves.

**Implications:** Promotion of healthy behaviors during professional education may have long-term implications for preventive health counseling.

**Keywords:** Dietary protein; exercise; fruit and vegetable consumption; healthy weight; muscle strengthening; nurse practitioners; patient counseling; physical activity.

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## Background

Healthy lifestyle behaviors that include exercise and nutrition promote mental health and are protective against morbidity and mortality related to cancer, heart disease, hypertension, diabetes, osteoarthritis, and depression (Aune et al., 2017; Glabska et al., 2020; Goh et al., 2019; Kyu et al., 2016; Schuch et al., 2018; Schwingshackl, Hoffmann, et al., 2017; Schwingshackl, Schwedhelm, et al., 2017; Xu

et al., 2020). Three percent of all cancers in the United States that account for more than 46,000 cases annually are attributed to the lack of physical activity (Minihan et al., 2022), and when activity is increased, risk of cancer-related death can be decreased by as much as 20% (Xie et al., 2021). Achieving even 150 min per week of activities can decrease risk of depression by 15% (Kim et al., 2019), risk of heart disease by 17%, and risk of type 2 diabetes by 26% (Wahid et al., 2016). Furthermore, both aerobic and muscle strengthening exercises appear to be similarly effective for heart disease (Liu et al., 2019), hypertension (Cornelissen & Smart, 2013), cancer (Hilfiker et al., 2018), diabetes (Yang et al., 2014), and osteoarthritis (Ferreira et al., 2019).

Nutrition also provides physical and mental health benefits. Higher consumption of fruits and vegetables can decrease risk of depression by 15%, with a slightly increased effect for consumption of fruits compared with

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vegetables (Liu et al., 2016). An inverse association between fruit and vegetable intake and risk for heart disease, stroke, heart failure (Bechthold et al., 2019), type 2 diabetes (Li et al., 2014), osteoarthritis (Han et al., 2017), and all-cause mortality (Leenders et al., 2014) has also been observed. Specifically, an increase of even one serving of fruits or vegetables daily decreases the risk of type 2 diabetes by 7–10% (Li et al., 2014) and the risk for all-cause mortality by approximately 5% (Wang et al., 2014). The effect is even stronger for onset of heart disease, with a decreased risk of up to 40% as daily intake of fruits and vegetables increases (Yu et al., 2014). Furthermore, consumption of five servings a day is associated with the lowest mortality from heart disease and cancer (Wang et al., 2021). Among children and adolescents, protein intake is positively associated with growth and development of lean mass and metabolic health (Lotfi et al., 2022; Switkowski et al., 2019). Dietary protein has also been observed to have a protective effect against the onset of frailty in older adults and can reduce the risk by 35% (Coelho-Junior, Rodrigues, et al., 2018), with the greatest protective effect observed with the intake of at least 1 g of protein per kilograms of bodyweight per day (Coelho-Junior, Milano-Teixeira, et al., 2018). Finally, when protein and exercise are combined, frailty can be both prevented and reversed (Liao et al., 2019).

Counseling by health care providers can improve nutritional intake (Hartley et al., 2013) and participation in exercise (Orrow et al., 2012), and it has been recommended by the US Preventive Services Task Force et al. (2020) and the American College of Preventive Medicine (Jacobson et al., 2005). However, the rate of patient counseling in primary care varies widely. Physical activity counseling rates by physicians have been reported to range from 18% to 81% (Cho et al., 2003; Douglas et al., 2006; Florindo et al., 2013; Peek et al., 2008; Smith et al., 2011). By comparison, nutrition counseling by physicians is reported to be between 36% and 53% (Cho et al., 2003; Peek et al., 2008; Smith et al., 2011). Evidence regarding counseling by nurses is more limited, with registered nurses reporting rates of physical activity counseling between 30% and 90% (Douglas et al., 2006; Florindo et al., 2013; Stanton et al., 2015), and nurse practitioners (NPs) reporting rates between 50% and 95% (Buchholz & Purath, 2007; Burns et al., 2000; Grimstvedt et al., 2012).

There is also evidence that clinicians' own personal lifestyle behaviors can influence their counseling practices. Among physicians and medical students, personal exercise behaviors have a positive relationship with physical activity counseling rates, whereas nutritional habits and body mass index (BMI) within the healthy weight category have a positive influence on nutrition counseling (Bleich et al., 2012; Duperly et al., 2009; Frank et al., 2008, 2010; Omura et al., 2018). Among nurses, evidence appears to be limited to physical activity counseling only. A positive association has been reported between

personal exercise behaviors and exercise counseling by registered nurses in general (Esposito & Fitzpatrick, 2011) and NPs in particular (Burns et al., 2000). However, we can find no evidence regarding nutrition counseling by nurses. Therefore, because health counseling is an expectation of professional practice, the purpose of this study was to expand the existing evidence regarding NPs to evaluate the frequency of lifestyle counseling, including nutrition, and the relationship between their personal lifestyle behaviors and patient counseling practices.

## Methods

### Study design and recruitment

This was a cross-sectional study using an online survey format administered through Qualtrics (QualtricsXM, Provo, UT). Between April and November 2022, NPs were contacted through professional organizations, Facebook groups, and emails using a snowball sampling strategy and asked to complete an online questionnaire in English. Inclusion criteria were willingness to complete the questionnaire and self-reported clinical practice in one of the four advanced practice roles (NP, clinical nurse specialist [CNS], nurse midwife [CNM], nurse anesthetist [CRNA]) at least 1 day a week. The study was approved by the University of Colorado Colorado Springs Institutional Review Board (#2022-147), and all participants indicated their willingness to voluntarily take part in the study before accessing the questionnaire. To ensure anonymity, no personally identifiable information was collected, and all data were aggregated for analysis.

### Questionnaire

The study questionnaire included 16 items in four general categories: (1) advanced practice role description (two items); (2) anthropometric, physical activity, and nutrition data (six items); (3) counseling practices (five items); and (4) demographic information (three items). Items were based on previous questionnaires regarding counseling practices among physicians, medical students, and NPs (Bleich et al., 2012; Buchholz & Purath, 2007; Duperly et al., 2009; Frank et al., 2008, 2010; Omura et al., 2018; Walsh et al., 1999), the Dietary Guidelines for Americans (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020), and recent recommendations for clinical practice (Lorbergs et al., 2022). To decrease respondent burden and facilitate completion, questions were structured for brief fill-in or check-the-box responses. All items were optional, and participants could skip any questions they did not wish to answer.

### Advanced practice roles

The two items used to describe roles were based on the Consensus Model for Advanced Practice Registered Nurse practice. Participants were asked to identify their primary role as NP, CNS, CNM, or CRNA. They were also asked to

identify their primary patient population as family (0–100+ years old), adult-gerontology (18 years and older), neonatal (birth–90 days), pediatrics (birth–21 years old), women's health/gender related, or psychiatric/mental health.

### Personal behaviors

Body mass index was used as a biomarker for healthy body weight (Bleich et al., 2012). Participants answered two questions for self-reported height and weight, which were then used to calculate BMI (Bleich et al., 2012; Frank et al., 2010). Four additional questions assessed personal engagement in moderate-vigorous physical activity (Frank et al., 2008), muscle strengthening (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020), fruit and vegetable consumption (Duperly et al., 2009), and dietary protein (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020; **Table 1**). Response options were dichotomous (yes/no) for these four questions.

### Counseling practices

Patient counseling practices were assessed using five questions matched to individual personal lifestyle behaviors (**Table 1**). Response options were based on frequency using a 5-point Likert scale ranked as 1 (*never*, 0 frequency), 2 (*rarely*, 1–25% frequency), 3 (*sometimes*, 26–50% frequency), 4 (*usually*, 51–75% frequency), and 5 (*often*, more than 75% frequency; Omura et al., 2018; Walsh et al., 1999).

### Statistical analysis

All data were analyzed using SPSS version 28 (IBM Corp., Armonk, New York). Descriptive statistics were used to analyze participant characteristics. Correlation analysis was used to identify significant relationships between personal lifestyle behaviors and patient counseling practices. Ordinal logistic regression analysis was then used to identify predictors and odds for health behavior counseling. Continuous data were reported as means  $\pm$  standard deviations with 95% confidence intervals, and categorical data were reported as frequencies. Statistical significance was set at  $p < .05$ .

### Results

There were 1,498 survey attempts, of which 183 were excluded because they did not include any responses (**Figure 1**). Of the remaining 1,315 surveys, an additional 35 were excluded because they were missing more than one personal behavior or counseling response. After exclusion, a total of 1,280 surveys were retained. Originally, our intent was to include all advanced practice roles in this analysis to compare counseling practices between the roles. However, NPs made up the majority of our sample (95%), with only 2% being clinical nurse specialists, 1%

**Table 1. Survey questions regarding personal behaviors and counseling practices of nurse practitioners**

Personal lifestyle behaviors
On average...
<ul style="list-style-type: none"> <li>• ... do you engage in moderate-vigorous physical activity for at least 30 min on 5 or more days of the week? Moderate-vigorous activity is at an intensity that slightly increases your heart rate or breathing and makes it somewhat difficult to carry on a conversation.</li> <li>• ... do you engage in muscle strengthening activities on at least 2 or more days of the week?</li> <li>• ... do you eat at least 5 servings of fruits and/or vegetables a day?</li> <li>• ... do you eat protein foods and/or protein supplements daily?</li> </ul>
Counseling practices
Considering your typical patients...
<ul style="list-style-type: none"> <li>• ... how often do you counsel patients about maintaining a healthy weight? A healthy weight is considered a BMI between 18.5 and 24.9 kg/m<sup>2</sup>.</li> <li>• ... how often do you counsel patients about engaging in moderate-vigorous physical activity for at least 30 min on 5 or more days of the week?</li> <li>• ... how often do you counsel patients about engaging in muscle strengthening activities on at least 2 or more days of the week?</li> <li>• ... how often do you counsel patients about eating at least five servings of fruits and/or vegetables a day?</li> <li>• ... how often do you counsel patients about eating protein foods and/or protein supplements daily?</li> </ul>
<i>Note: BMI = body mass index.</i>

being certified nurse midwives, and 2% being certified registered nurse anesthetists. Therefore, to avoid comparison of disparate groups, an a priori decision was made to include only NPs ( $n = 1,220$ ) in the current analysis.

Overall, the NPs who responded to the survey were 98% female and 86% White (Supplemental Digital Content 1, Appendix 1, <http://links.lww.com/JAANP/A230>). Their mean age was  $46.6 \pm 11.3$  years (range 25–79 years), and their mean BMI was  $26.5 \pm 5.4$  kg/m<sup>2</sup> (range 16.2–54.8 kg/m<sup>2</sup>). The majority reported pediatrics to be their primary patient population (87%). Although less than half reported engaging in moderate-vigorous physical activity (46%), the majority reported engaging in muscle strengthening (54%), consumption of fruits and vegetables (62%), and consumption of protein foods or supplements (95%). By comparison, the majority of participants reported counseling *usually* or *often* for healthy weight (54%), moderate-vigorous physical activity (53%), and fruits and vegetables (57%). However, in contrast to their personal behaviors, less than half reported

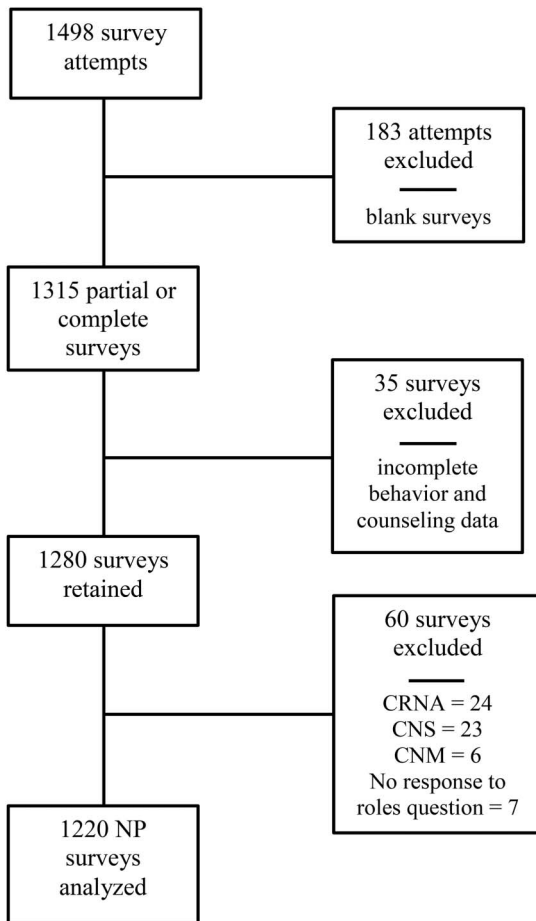


Figure 1. Flowchart of participant surveys.

counseling *usually* or *often* for muscle strengthening (17%) and dietary protein (44%).

Correlation analysis found no statistically significant relationship between BMI and counseling for healthy weight. However, statistically significant relationships were found between personal behaviors and counseling for all other variables. Personally engaging in moderate-vigorous physical activity was positively related to counseling for physical activity ( $r_s = 0.06, p = .027$ ), and personally engaging in muscle strengthening activities was positively related to counseling for muscle strengthening ( $r_s = 0.08, p = .003$ ). Furthermore, consumption of fruits and vegetables was positively related to counseling for fruits and vegetables ( $r_s = 0.22, p < .001$ ), and consumption of protein foods or supplements was positively related to counseling for dietary protein ( $r_s = 0.16, p < .001$ ).

Regression analysis demonstrated a significant association between personal behaviors and counseling practices with the exception of maintaining a healthy weight. Consistent with the results of the correlation analysis, personal BMI did not predict patient counseling for a healthy weight. For all other behaviors, lack of personal engagement decreased the odds for patient counseling regarding that behavior (Table 2). When NPs did not engage in moderate-vigorous physical activity, they were 21% less likely to counsel patients regarding physical activity (odds ratio [OR] = 0.79 [0.65–0.97],  $p = .026$ ); when they did not engage in muscle strengthening activities, they were 27% less likely to counsel patients regarding muscle strengthening (OR = 0.73 [0.60–0.90],  $p = .004$ ). The effect on nutrition

Table 2. Estimated odds ratios for personal behaviors significantly related to patient counseling practices

	Odds Ratio	95% Confidence Intervals		p-Value
		Lower	Upper	
Moderate-vigorous physical activity				
Personal behavior—yes	1.00			
Personal behavior—no	0.79	.65	.97	.026
Muscle strengthening				
Personal behavior—yes	1.00			
Personal behavior—no	0.73	.60	.90	.004
Fruits and vegetables				
Personal behavior—yes	1.00			
Personal behavior—no	0.43	.35	.54	<.001
Protein foods and/or supplements				
Personal behavior—yes	1.00			
Personal behavior—no	0.28	.18	.45	<.001

counseling was even more profound. Nurse practitioners were 57% less likely to counsel patients regarding fruit and vegetable intake when they did not consume adequate fruits and vegetables themselves (OR = 0.43 [0.35–0.54],  $p < .001$ ), and 72% less likely to provide counseling regarding consumption of protein foods or supplements if they did not consume dietary protein themselves (OR = 0.28 [0.18–0.45],  $p < .001$ ).

## Discussion

To our knowledge, this study is the largest and most comprehensive analysis to date of health behavior counseling among NPs. It builds on three previous studies of physical activity counseling by NPs (Buchholz & Purath, 2007; Burns et al., 2000; Grimstvedt et al., 2012). Furthermore, our findings expand on those previous studies to differentiate physical activity into moderate-vigorous physical activity and muscle strengthening, as well as to include nutritional intake and maintenance of a healthy weight. However, a caveat must be recognized that most respondents practice with a pediatric population and their counseling practices may be uniquely different from those of NPs working with other age groups. Indeed, in a recent national survey conducted by the American Association of Nurse Practitioners, NPs certified in pediatrics made up only 3.2% of the overall sample (American Association of Nurse Practitioners, 2021).

In the past two decades, widely varying physical activity counseling rates of 95% (Buchholz & Purath, 2007), 75% (Grimstvedt et al., 2012), and 58% (Burns et al., 2000) have been reported by NPs that are likely related to the phrasing or specificity of the counseling question. When NPs were asked about counseling for physical activity in general (Buchholz & Purath, 2007; Grimstvedt et al., 2012), rates were notably higher (95% and 75%), but when questioned more specifically regarding counseling for moderate activity at least 30 min on most days of the week (Burns et al., 2000), the rate diminished (58%) and was similar to that observed in this study (53%), where we asked almost the identical question. Furthermore, when a very specific question regarding counseling for frequency, duration, and intensity of exercise was used to survey primary care providers, only 65% reported usually or always counseling patients (Frank et al., 2010). Unfortunately, we can find no previous study that has assessed counseling for muscle strengthening, so a comparison with our current findings cannot be made. Future research in this area should not only expand and differentiate categories of physical activity but also provide a clear description of how questions are phrased to allow a more detailed comparison between the studies.

Previously, Burns et al. (2000) reported that NPs who met physical activity recommendations themselves were twice as likely to routinely counsel patients compared with those who did not meet recommendations. By comparison, in our sample of NPs, personal participation

in moderate-vigorous physical activity increased the odds of counseling by only 21%. The difference in findings may be due to the difference in sample characteristics. Burns et al. (2000) included only adult NPs in their study, whereas this study included a more varied sample that was predominantly made up of pediatric NPs. It is possible that pediatric clients are perceived as naturally more spontaneously active than adults, so NPs with specialty practice in this area may not perceive that routine counseling is needed and instead focus on other areas. Furthermore, Burns et al. (2000) questioned participants about “moderate” physical activity only, whereas this study specifically asked regarding “moderate-vigorous” activity, which is consistent with the Physical Activity Guidelines for Americans. As discussed above, it is possible that the phrasing of physical activity–related questions influenced the differences in study findings.

This study is the first to evaluate the effect of personal BMI and dietary habits on counseling for healthy weight and nutritional intake by NPs. As such, it expands the existing evidence that was previously limited to physicians and medical students. Our findings demonstrate not only high rates of personal behaviors for consumption of protein, fruits, and vegetables by NPs but also nutrition counseling rates that are consistent with rates previously reported for physicians and medical students (Cho et al., 2003; Peek et al., 2008; Smith et al., 2011). Unfortunately, though, the previous studies did not evaluate the effect of personal dietary choices on nutrition counseling by physicians and medical students so that comparison cannot be made. Among the NPs in this study, the odds for nutrition counseling were significantly improved by personal dietary choices in favor of protein, fruit, and vegetable intake. Only personal BMI did not influence counseling for a healthy body weight. Although the mean BMI of 26.5 kg/m<sup>2</sup> reported by participants was on the borderline between healthy normal weight and overweight, it was markedly lower than the mean BMI of 29.8 kg/m<sup>2</sup> (borderline between overweight and obese) calculated for all US adults using data from the National Health and Nutrition Examination Survey (Liu et al., 2021). Furthermore, it did not influence patient counseling. This was an unanticipated finding as previous research found a significant increase in nutrition counseling by physicians with personal BMI in the normal, healthy range (Bleich et al., 2012). However, the original research is more than a decade old, and counseling may now be influenced by other factors. Further research to fill these evident gaps in the literature is needed.

## Limitations

This study is not without limitations. The study sample, although large, was weighted heavily by the number of pediatric NPs. It is possible that a more varied sample

would have reported significantly different behaviors and counseling practices. Furthermore, participants were limited to selection of only one patient population by the survey, so it is possible that they provided care and counseling to other patient populations. However, they were asked to identify “the population that best fits your current practice,” so it is likely that the population selected was indeed the population, which made up the majority of their patients. Also, the sample was specific to the United States, so NPs in other countries around the world were not represented. Although the United States has the highest number of NPs worldwide (Maier et al., 2016), this clearly limits generalization of our findings and may have skewed our data toward US cultural norms. An additional limitation was the use of self-report, which can create a risk of recall bias. Although our survey questions were based on previous questionnaires regarding counseling by physicians, medical students, and NPs, and guidelines for physical activity and dietary intake, it is possible that respondents did not accurately report their personal behaviors or patient counseling practices. Finally, the use of dichotomous response options for personal behaviors may also have created unanticipated bias by forcing respondents who engage in the behaviors irregularly or infrequently to choose either complete agreement (yes) or disagreement (no).

### Implications for practice

Although the study results reflect relatively robust patient counseling rates, areas for improvement remain. In particular, counseling for muscle strengthening was reported far less frequently despite relatively high personal participation. Furthermore, although the majority of NPs reported daily consumption of protein, less than half reported counseling more than 50% of the time regarding protein intake. These are two counseling areas in which NPs can easily improve practice.

### Conclusion

Although NPs report regular patient counselling regarding healthy lifestyle behaviors, the odds for counseling are increased approximately 20–75% when they engage in the behaviors themselves. Professional education programs that emphasize the effect of healthy lifestyle choices can reinforce these behaviors in NP students. Development and maintenance of physical activity and nutrition behaviors as a student can have long-term implications for personal health and preventive health counseling.

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**Competing interests:** *The authors report no conflicts of interest.*

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