

ORIGINAL RESEARCH

Adult Use of Complementary and Integrative Approaches to Improve Athletic Performance

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ABSTRACT

Context • In the United States in 2007, approximately 38% of adults, or 4 in 10, used some form of complementary and alternative medicine (CAM). An area in which little is known is the personal integration of CAM therapies by those individuals seeking to improve athletic performance.

Objectives • The study intended to assess the use of integrative care by adult athletes in the United States as well as their satisfaction with it, as reported in the 2012 National Health Interview Survey (NHIS).

Design • A secondary analysis of the data from the Adult Alternative Health/Complementary Medicine file of the 2012 NHIS was performed.

Setting: The analysis was performed at the Research Institute of Parker University (Dallas, TX, USA).

Participants • The NHIS survey was a representative sample of Americans, with more than 30 000 respondents.

Outcome Measures • National population estimates were generated for all related variables. The study assessed the likelihood that a respondent who reported use of a specific complementary and integrative therapy as their

first top therapeutic modality to enhance sport or athletic performance had perceived it helpful compared with those who used it for other non-sport-related reasons.

Results • Complementary and integrative therapies were used by more than 14 million adults (20.5%) to improve athletic performance, with 97.6% of them perceiving therapies as helpful. The most used therapies were yoga, herbal supplements, manipulation, and massage. The median age of those reporting specific use to improve athletic performance was slightly less than 38 y, and women were almost 3 times as likely as men to report therapies as helpful.

Conclusions • Complementary and integrative therapies were used for improvement of athletic performance by respondents of the 2012 NHIS, with high satisfaction among users. Future research could evaluate athletic-specific use, adverse effects, physiological mechanisms that may exist for the modalities, and ways to integrate these methods better with traditional medical care. (*Altern Ther Health Med*. [E-pub ahead of print.]

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The use of complementary and alternative medicine (CAM) to improve and maintain health is widely practiced. In the United States in 2007, approximately 38% of adults, or 4 in 10, used some form of CAM.¹ Nonvitamin, nonmineral, natural products are the most commonly and generally used CAM therapy among adults, and this use has increased for several other therapies, including deep-breathing exercises, meditation, massage therapy, and yoga.¹

Therapies that are considered to be complementary or integrative are often seen as being paired with or used in conjunction with conventional Western medicine and are viewed as treating the whole person. A report generated by the Institute of Medicine in 2009 suggested that CAM approaches consist of systems of healing that are not typically a part of Western medicine.² That report indicated that patients often use self-healing practices, such as meditation or faith, in addition to natural remedies or hands-on techniques that range from chiropractic to mind-body approaches.

The report further suggested that those therapies should be integrated, for the patient's best interests, into the overall care of the patient where possible and when the patient has reported benefits from use. The change in the name of the National Institutes for Health's *National Center for Complementary and Alternative Medicine* to the *National Center for Complementary and Integrative Medicine*³ can be seen as a way to promote the study of those therapies to integrate them better into mainstream health care. Integration is perhaps less likely when the therapies are presented as alternatives to conventional care.

An area in which little is known is the personal integration of CAM therapies by those individuals seeking to improve athletic performance. One review of the use of CAM in older men and women in the United States found that a variety of techniques were applied for the intended purpose of enhancing immune function, boosting physical performance, and increasing energy.⁴ Athletes, both professional and recreational, have reported use of CAM therapies to improve or assist performance.

In 2005, Pike⁵ published an ethnography on 200 elite, amateur rowers relating to injury risk, pain management, and competing while injured. Of those surveyed, almost 60% of females and 10% of males had sought to use CAM treatments. Nichols and Harrigan⁶ reviewed CAM use at a Division I university in the National Collegiate Athletics Association in the fall of 2004 and found that 56% of the 309 athletes surveyed had reported receiving complementary or integrative care within the 12 months before that study. In 2014, Burdon and Clark⁷ conducted a qualitative study on 12 high-performing female athletes at the national team level; all 12 athletes reported using some form of CAM as of the time of the interviews and had tried between 3 and 12 forms of CAM in the course of their athletic careers.

A variety of CAM therapies are integrated by many Americans into their personal health plans for various

reasons. Some studies have reviewed integration of CAM for general exercise and sport, including a review of 60 years of CAM research. That review found 6088 papers, of which 395 were evaluated for an assessment of the evidence for CAM use.⁸ The authors rated that evidence as it pertained to use for exercise and sport. Maczink et al⁸ concluded that acupuncture, manipulation, and massage had a level of evidence supporting their use but other modalities may have little or no evidence for their use as effective measures in treatment of injuries or improving performance among athletes.

In their in-depth interviews with athletes in Canada, Bundon and Clarke⁷ suggested that CAM use among athletes may be predicated on acceptance of the therapies or modalities within an athlete's specific sport. In other words, if the culture of a specific sport commonly integrates a therapy into the care of the athletes, it is more likely to be used in general. They also suggested that more research is needed, specifically on how and when the services are used.

Although the literature referenced by the current research team in this article often uses the term *CAM*, the team suggests that *complementary and integrative care (CIC)* is a better term for the use of the therapies that are integrated by athletes as a common part of their own routines. One popular therapy is the use of nutritional and dietary supplements. Products in this category rely heavily on marketing to athletes and include drinks, pills, herbs, and botanicals that purport to boost performance and recovery. Of concern are the seemingly frequent recalls of adulterated and/or contaminated products that can affect both the health and the eligibility of the athletes taking them.^{9,10}

Reliance on enhancing products for sports can begin very early. Research indicates that athletes routinely integrate therapies such as dietary supplements for their perceived performance-enhancing effects, despite the potential health risks that have been described.¹¹⁻¹⁵ Concerned about such use, some experts have suggested that the goal for athletics in particular should be to find a safer way to allow performance improvement that is medically supervised.¹¹

The Child Alternative Medicine files of the 2007 National Health Interview Survey (NHIS), published in 2012, specifically noted that vitamin, mineral, herbal, and other supplements were being used for improvement of athletic performance in children and adolescents.¹⁶ Although no sports medicine or pediatric organizations recommend supplement use in children for athletic performance, that study found very early use of supplements, with the median age of use for that purpose being slightly younger than 11 years.

One study estimated that more than 24 000 children used creatine, a dietary supplement, for enhancing athletic performance and that more than 1 million used some combination of dietary supplements for that purpose. Ndetan et al¹⁷ reported on the NHIS's data related to children's use of integrative methods such as movement therapies and breathing or relaxation techniques for such purposes as relief of anxiety, asthma, back and neck pain, attention-deficit disorders, and stress. The methods were positively perceived.

Given those findings, it is clear that virtually all age ranges report integrating some CAM use for the intended purpose of improved function or performance. Although people often integrate those therapies into their health care themselves, they may or may not share that use with other health care providers involved in their care.^{17,18}

More mainstream forms of athletic performance improvement have emerged and are growing as trends internationally. Some of the more common methods include sports psychology training methods, such as positive motivation, visualization techniques, relaxation methods, and self-talk and other forms of positive affirmation.¹⁹ In addition to those techniques that have been applied from an athletic and sports-performance perspective, athletes and coaches have turned to CIC for improvement of specific athletic performance, chronic pain management, and improvement in other forms of performance, such as in dance or other performing arts.²⁰

The aims of the current study were to analyze the 2012 NHIS data to assess adult respondents' use of CIC therapies for the purpose of improving sport and athletic performance, as well as other tasks related to such performance. The research team's intention was to answer the following questions: (1) What are the demographics of the US population of adults using CIC therapies to improve athletic performance?; (2) What are the specific types of CIC therapies used by those adults to improve athletic performance during that period?; and (3) What are the perceived benefits of integrating specific therapies as they pertain to helping with improvement of athletic performance?

METHODS

Participants

The current study was a secondary analysis of the data from the Adult Alternative Health/CAM file of the 2012 NHIS. That national survey is conducted every few years, with more than 30 000 adult respondents who are considered representative of the US population.

Procedures

Secondary Analysis. The research team imported the ASCII data sets of the Adult Alternative Health/CAM file into the Statistical Analysis System System (SAS), version 9.3 (SAS Institute Inc, Cary, NC, USA) for analysis. Variables of interest were selected from the original survey to obtain the answers to the research questions. The analysis was performed at the Research Institute of Parker University (Dallas, TX, USA).

Original Survey: Variables of Interest. For the 2012 NHIS, the sampled adults were prompted to identify specifically the top 3 forms of CIC that they had used within the 12 months before the survey. They chose the forms from a list of potential therapies or types of practitioners. They also identified the therapy or type of practitioner that they believed had been most important for their health or area of interest for improvement.

The survey listed options from which they could choose the top 3 forms of CIC and their most important or first top modality. The choices included (1) chiropractic or osteopathic manipulation; (2) massage; (3) acupuncture; (4) energy healing therapy; (5) naturopathy; (6) hypnosis; (7) biofeedback; (8) craniosacral therapy; (9) traditional healers; (10) herbal supplements; (11) homeopathy; (12) mantras, mindfulness, and spiritual meditation; (13) guided imagery; (14) progressive relaxation; (15) yoga; (16) tai chi; (17) qi gong; (18) special diets; and (19) movement or exercise therapy.

Participants were further asked if they had used their top modality for a specific reason, such as to (1) improve energy, (2) improve athletic or athletic performance, (3) improve memory or concentration, (4) motivate themselves to eat healthier, (5) motivate themselves to exercise more regularly, or (6) improve attendance at a job or school. Valid responses to those questions were *yes* or *no*; other responses, such as *refused*, *not ascertained*, or *don't know*, were considered missing responses and, for the purpose of the study, were excluded from the analysis.

Respondents were further queried on how much they thought their most important or top therapeutic modality had helped them in achieving the most important goal for which they had used it. The responses included *a great deal*, *some*, *only a little*, and *not at all*.

For comparative purposes, the current research team constructed a new variable—*helped/not helped*—that collapsed the first 3 categories into one category, *helped*, and they renamed the response *not at all* as *not helped*.

Outcome Measures

The main exposure of interest for this investigation was the reported use of a specific CIC therapy or a type of practitioner as first top therapeutic modality to improve sport or athletic performance within the 12 months before the NHIS survey by respondents and the corresponding outcome of interest was their perception of whether they found it helpful.

Statistical Analysis

Data analyses were performed using SAS 9.3. National population estimates (NPEs) and weighted percentages for all of the selected variables were generated using the NHIS survey strata, clusters, and weight. Not all respondents answered every question that the current research team used to derive the results for the variables. Thus, reported percentages are based only on those participants who provided answers to a specific question; therefore, the percentages for the results do not always have a common denominator.

Crude odds ratios (ORs) and 95% confidence intervals (CIs) were calculated using binary logistic regression models to assess the likelihood that a respondent who reported use of a specific CIC therapy as their first top therapeutic modality to enhance sport or athletic performance had perceived it helpful compared with those who used it for

other non-sport-related reasons. Multiple logistic regression models were applied to adjust for respondents' ages, genders, races, and body weights, which are potential confounders, generating adjusted ORs.

RESULTS

Demographic Distribution

The 2012 NHIS contained data from 34 518 general respondents. Among those, 10 158 responded to questions on the use of integrated health therapies. From that point, the analysis varies as to the number of respondents answering specific questions that related to CIC use for athletic and other performance enhancements.

The respondents reported the use of a variety of CIC therapies or modalities for a variety of reasons, including, but not limited to, improvement of sport or athletic performance. Table 1 summarizes the demographics of adult CIC users in the United States and the likelihood that they had perceived the therapies to be helpful to them, in a general sense, and helpful in the specific improvement of athletic performance.

The range of ages of those integrating a therapy or technique was from 18 to 70 years. The median age of the sample in aggregate was 36 years, but among those specifying some use of an integrative therapy in general, the median age was 46.5 years. Among those reporting specific use to improve athletic performance, the median age was slightly younger than 38 years.

No statistically significant difference existed between any age groups in their perception regarding whether a CIC therapy was helpful. Of those who reported some CIC use, 59.1% were women, and they were approximately 3 times as likely as men to report that it had been helpful in improving athletic performance (OR, 2.94; 95% CI, 1.25 to 6.67)

Within the category of body weight, a higher proportion of those respondents with a normal weight (37.4%) reported use of CIC techniques or therapies compared with those who were underweight (1.8%), overweight (33.5%), or obese (27.3%). However, compared with people of normal weight, those who were overweight were more likely to report that the therapy had helped (OR, 3.27; 95% CI, 1.04 to 10.32). Although more whites (78.4%) reported using integrative therapies compared with other racial groups, race in general was not predictive of which respondents would report CIC as helpful for the purpose of improvement of athletic performance.

All Therapies and Athletic Improvement

Table 2 shows the reasons that respondents used CIC therapies, such as to improve athletic performance or other related performance measures. The research team was interested in responses that could potentially improve athletic performance, such as use to improve energy.

Among those integrating any CAM procedure, 20.5% (NPE, 14 097 594) used a therapeutic modality for the specific purpose of improving sport or athletic performance, and 97.6% (NPE, 13 759 370) of those individuals reported the therapy to be helpful. Although the odds increased that those respondents who reported use of a therapeutic modality for improving sport or athletic performance had perceived it to be helpful compared with respondents who used the therapy for other purposes, the result was not statistically significant (OR, 1.208; 95% CI, 0.71 to 2.06). The large majority found the therapy to be helpful.

Table 1. Demographic Distribution

	N	NPE (%) ^a	CIC Helped for Any Specific Reason OR (95% CI)	CIC Helped for Athletics OR (95% CI)
Age				
18-24 y	820	6 316 456 (09.1)	1	
25-34 y	1870	12 871 746 (18.5)	0.82 (0.41 to 1.64)	0.371 (0.06 to 2.38)
35-54 y	3605	26 530 878 (38.2)	1.35 (0.68 to 2.65)	0.61 (0.09 to 4.25)
≥55 y	3863	23 694 514 (34.1)	1.15 (0.53 to 2.48)	0.64 (0.08 to 4.97)
Gender				
Male	3899	28 409 772 (40.9)	1	1
Female	6259	41 003 822 (59.1)	1.45 (0.93 to 2.27)	2.94 (1.25 to 6.67)
Body Mass Index				
Underweight	160	1 230 309 (01.8)	0.96 (0.21 to 4.37)	0.49 (0.13 to 1.83)
Normal weight	3703	25 595 806 (37.4)	1	
Overweight	3330	22 922 679 (33.5)	1.17 (0.76 to 1.82)	3.27 (1.04 to 10.32)
Obese	2828	18 716 672 (27.3)	1.15 (0.67 to 1.97)	1.14 (0.32 to 4.09)
Race				
White	7289	24 347 520 (78.4)	1	
Black	910	2 278 163 (07.3)	1.96 (0.75 to 5.10)	3.54 (0.47 to 26.68)
Hispanic	1140	2 621 245 (08.4)	0.72 (0.41 to 1.27)	0.96 (0.31 to 2.94)
Asian	709	1 543 048 (05.0)	0.97 (0.41 to 2.26)	1.07 (0.17 to 6.83)
Other	150	252 762 (00.8)	1.77 (0.24 to 13.13)	0.65 (0.05 to 8.26)

Note: This table shows the demographic distribution of US adults who reported the general use of CIC therapies and the likelihood that the therapy had helped with respect to some specific health-related reason or for athletic enhancement (NHIS, 2012).

^aNot all respondents of the 2012 NHIS answered every question that the current research team used to derive the results for the above variables. The percentages above do not have a common denominator (ie, they are based only on the answers of the respondents who answered a specific question).

Abbreviations: CIC, complementary and integrative care; NPE, national population estimate; OR, odds ratio; CI, confidence interval; NHIS, National Health Interview Survey.

Table 2. Athletic-related Use of CIC Therapies and the Likelihood That They Helped (NHIS, 2012)

Reasons for Use	Used		Helped		Crude OR ^b (95% CI)	Adjusted OR ^b (95% CI)
	N	NPE (%) ^a	N	NPE (%)		
Improve athletic/sport performance	2018	14 097 594 (20.5)	1973	13 759 370 (97.6)	1.208 (0.71 to 2.06)	1.348 (0.78 to 2.32)
Improve energy level	3554	23 623 367 (34.4)	3450	22 845 121 (96.7)	1.670 (1.08 to 2.57)	1.637 (1.03 to 2.60)
Improve memory/concentration	1826	11 913 283 (17.3)	1767	11 491 051 (96.5)	0.918 (0.49 to 1.74)	0.916 (0.47 to 1.77)
Eat healthier	2465	16 765 950 (24.4)	2420	16 442 890 (98.1)	1.422 (0.41 to 4.96)	1.55 (0.43 to 5.54)
Increase motivation for exercise	2714	18 615 782 (27.1)	2667	18 317 728 (98.4)	0.860 (0.49 to 1.51)	0.83 (0.46 to 1.48)
Improve control of own health	4144	28 128 755 (40.9)	4051	27 436 096 (97.5)	5.560 (3.05 to 10.15)	5.400 (2.92 to 9.98)
Improve job/school attendance	1301	8 801 058 (16.6)	1289	8 727 741 (99.2)	2.673 (1.16 to 6.18)	2.74 (1.17 to 6.40)

^aNot all respondents of the 2012 NHIS answered all the questions that the current research team used to derive the results for the above variables. The percentages above do not have a common denominator (ie, they are based only on the answers of the respondents who answered a specific question).

^bCrude ORs and 95% CIs were calculated using binary logistic regression models to assess the likelihood that a respondent who reported use of a specific CIC therapy as their first top therapeutic modality to enhance sport or athletic performance had perceived it helpful compared with those who used it for other non-sport-related reasons. Multiple logistic regression models were applied to adjust for respondents' age, gender, race, and body weight, which are potential confounders, generating adjusted ORs.

Abbreviations: CIC, complementary and integrative care; NPE, national population estimate; OR, odds ratio; CI, confidence interval; NHIS, National Health Interview Survey.

Table 3. Reported Usage of Specific CIC Therapies for Enhancing Athletic Performance and the Likelihood That They Helped

CIC	Used		Helped		Crude OR ^b (95% CI)	Adjusted OR ^b (95% CI)
	N	NPE (%) ^a	N	NPE (%)		
Yoga	636	4 568 369 (50.1)	618	4 468 486 (98.1)	-	-
Herbal supplement	372	2 429 349 (12.2)	356	2 297 252 (97.7)	-	-
Manipulation	362	2 598 585 (14.7)	358	2 572 572 (99.0)	-	-
Massage	254	1 752 212 (19.4)	252	1 729 609 (98.7)	-	-
Spiritual healing	149	1 068 305 (23.1)	148	1 067 728 (100)	5.71 (1.21 to 26.82)	5.18 (5.18 to 5.18)
Diet	88	559 422 (21.7)	88	559 422 (100)	4.43 (-)	4.277 (-)
Meditation	71	583 521 (56.8)	71	58 3521 (100)	-	-
Acupuncture	28	130 619 (8.75)	28	130 619 (100)	2.494 (0.24 to 25.60)	2.49 (2.49 to 2.49)
Homeopathy	20	154 001 (11.7)	17	102 034 (82.2)	-	-
Traditional healer	14	97 214 (15.7)	14	97 214 (100)	2.27 (-)	2.31 (-)
Biofeedback	8	70 894 (18.5)	8	70 894 (100)	2.07 (0.028 to 154.275)	2.28 (2.282 to 2.282)
Naturopathy	7	37 694 (14.0)	7	37 694 (100)	1.80 (1.799 to 1.799)	1.74 (1.736 to 1.736)
Energy healing therapy	4	25 209 (8.7)	4	25 209 (100)	1.69 (-)	1.50 (0.01 to 172.73)
Hypnosis	4	21 413 (6.8)	3	16 329 (76.3)	-	-
Cranial	1	787 (1.2)	1	787 (100)	-	-

^aNot all respondents of the 2012 NHIS answered all questions that the current research team used to derive the results for above variables. The percentages above do not have a common denominator (ie, they are based only on the answers of the respondents who answered a specific question).

^bCrude ORs and 95% CIs were calculated using binary logistic regression models to assess the likelihood that a respondent who reported use of a specific CIC therapy as their first top therapeutic modality to enhance sport or athletic performance had perceived it helpful compared with those who used it for other non-sport-related reasons. Multiple logistic regression models were applied to adjust for respondents' age, gender, race, and body weight, which are potential confounders, generating adjusted ORs. The OR and 95% CI could not be generated in some cases because of sparse data.

Abbreviations: CIC, complementary and integrative care; NPE, national population estimate; OR, odds ratio; CI, confidence interval; NHIS, National Health Interview Survey.

For improved energy levels, 34.4% of respondents (NPE, 23 623 367) used CIC therapies, and they were more likely to have found the therapies to be helpful compared to those using a therapy for another reason (96.7%; OR, 1.67; 95% CI, 1.08 to 2.57). Other general uses that may have been indirectly related to improved athletic performance included the following results: improved memory or concentration, control of one's own health, improved job or school attendance, motivation to eat healthier, and motivation to exercise. Among those who reported the use of CIC to improve sport or athletic performance, 15.9% (NPE, 2 150 698) said that they used it because combining it with medical treatment would help (OR, 1.47; 95% CI, 1.17 to 1.85). In addition, 16.5% (NPE 2 229 486) said it had been recommended by a medical doctor (OR, 0.67; 95% CI, 0.59 to 0.76), and 35.6% (NPE, 4 993 971) said that they had told their personal health care provider about the use of the therapy (OR, 0.86; 95% CI, 0.76 to 0.97).

Specific Therapies and Athletic Performance

When reporting CIC use for improvement of athletic performance, more than 76% reported that the therapy had helped with the task or performance (Table 3). For example, yoga was the most common technique reported, with 50.1% (NPE, 4 568 369) of those respondents using CIC for the purpose of enhancing athletic performance. Among those individuals, 98.1% stated that the therapy had helped.

Manipulation, the most commonly used hands-on therapy was reported by 14.7% (NPE, 2 598 585) of the sample, and among those users, 99% stated that it had been helpful. The list also included spiritual healing, special diets, acupuncture, meditation, and homeopathy, together with other less commonly used modalities.

Among those who used CIC therapies for the specific purpose of improving sport and athletic performance, a benefit was reported across 6 categories of therapies: (1) hypnosis—76.3%; (2) homeopathy—82.2%; (3) herbal therapies—97.7%; (4) massage—98.7%; (5) yoga—98.1; and (6) manipulation—99%. In addition, 100% reported help in performance from spiritual healing, special diets, acupuncture, meditation, use of a traditional healer, biofeedback, naturopathy, and energy healing therapies. However, the ORs on those variables as to helpfulness could not be generated because of sparse data after stratification and subgrouping.

DISCUSSION

Some of the techniques reported in this study can be integrated into routine practice or care without the assistance of a health care provider. However, among those respondents to the survey, self-practice techniques were not reported as often as those that required a provider. For example, only 71 of the 2018 people in the sample who used CIC for enhancing athletic performance stated that they had used meditation, but 254 stated that they had used massage. The availability and need for a provider for a CIC therapy could have affected use as could the costs associated with paying the provider.

The use of CIC therapies or modalities in the area of sport and athletics is not surprising. Special diets, guided imagery, and biofeedback have been used for decades. Virtually every National Football League team has employed the use of a CIC practitioner, such as a chiropractor or massage therapist, to provide treatment for professional athletes.²¹ In addition, chiropractic medicine and other alternative health care treatments have been highly used among athletes in other high-level athletic events.^{12,21-24}

As noted by Macznik et al,⁸ acupuncture, manipulation, and massage have significant research associated with their use and are not seen as alternative care in many circles today, particularly for the musculoskeletal conditions that respond best to their applications. Each of these had very high satisfaction rates within the national sample in the current study.

Accounts of the use of illegal or banned substance are reported in the news on a regular basis, and many athletes likely still seek out illicit or prohibited means to gain increased performance, often blurring the lines between performance improvement and medical treatments.^{10,25} The current study identifies the CIC practices that average Americans have used and provides insight on their perceptions of the benefits of those common and not-so-common practices in affecting their ability to participate successfully in athletics as well as perform better in other areas.

Most respondents to the NHIS, as covered in the current study, reported a significant benefit from integrating various modalities into their treatment regimes. Techniques such as biofeedback and yoga can be self-practiced. In addition, the vast majority of the mechanisms reported in the current study are not only safe, but, in some cases, therapeutic effects have been noted and approved for decades by various athletics groups. An example is the licensing of massage therapists or chiropractic and osteopathic physicians who commonly apply manual therapy.

However, the use of sports-specific nutritional supplements does present a possible concern in that users may not be aware of the effects of some ingredients. They may have no way of knowing if the product contains contaminants or adulterated ingredients banned by some sanctioned sports. This study, however, indicated that 97% of those using herbal supplements found them helpful.

Supplements are not regulated like other foods or drugs in the United States. However, the US Food and Drug Administration (FDA) does regulate the use and labeling of ingredients.⁹ In addition, the FDA regulates them as foods, and manufacturers are governed by the Code of Federal Regulations, Title 21 (CFR 21), which outlines extensive Good Manufacturing Practices required for the manufacturing, packaging, labeling, or holding of dietary supplements.²⁶ That requirement does not necessarily mean that all supplement manufacturers are compliant, and the consumer has more personal responsibility to ascertain risk of use compared to other alternative treatments, such as a technique that can be self-practiced or delivered by a

licensed or regulated practitioner. With recent research suggesting that dietary supplements and other complementary therapies are being explored for performance enhancing effects,¹² the present study represents continued efforts to investigate the issue using a nationally representative sample of US adults.

Integration of Care

Shelley et al¹⁸ indicated that those individuals using integrative therapies do not always tell their conventional medical providers. The current study confirmed that fact, with approximately 35% stating that they shared CIC experiences with their primary care provider. In the case of those using modalities for athletic performance, they reported using them in place of conventional medical care or as a complement to it.

Athletes who are using the therapies are often integrating them into their care plans with their primary care and other specialty care providers. It would seem prudent for conventional health care providers to know what is helping a patient stay physically active, to include questions regarding use in their intake information or history, and to embrace those actions perceived to be beneficial to patients. The current study indicates high satisfaction among those who have integrated CIC modalities into their treatment regimen or practice routines.

Athletes of all types should share what helps them with their primary care provider, and, in turn, primary care providers should respect the autonomy of the choices their patients are making when a high satisfaction rate is involved, the risk of harm is limited, and the potential to keep a person physically active is also noted.

Limitations

The use of secondary data analysis is always limited by the questions that appear in a larger national survey such as the NHIS. The current report is no exception. All of the limitations involved in surveys are also inherent in the current study, including recall and selection bias pertaining to those answering the specific questions.

In addition, the issue of reliability inherent in most data-driven hypotheses cannot be overemphasized. For example, the current research team does not know the specific sport or athletic activities that were practiced, or in some cases, the specific herbal products or compounds used. Sparse data that resulted from subgrouping further limited the ability of the current study to generate valid effect estimates or find statistical significance in some cases. Although large datasets are typically generalizable, they are limited to subgroups of the sampled population. In this case, such subgroups included those responding to questions related to improved performance and those that used CIC, and those responses varied based on the individual questions, changing the denominator of the results.

CONCLUSIONS

National population estimates suggest that millions of Americans are using a variety of what can be considered CIC modalities specifically to improve performance. The adults in the NHIS survey ranged in median age from 30 to 69 years, depending on what technique or method was used. In addition, many reported integrating their use to improve sport and athletic performance. Among those respondents, the satisfaction rate for the modality or technique helping them was very high.

Treatment and personal CIC alternatives to more invasive forms of care may exist and should be promoted for athletics and other areas where increased functionality and performance is desired. Studies that investigate the safety, the physiological effects, the adverse or side effects, and, more specifically, the primary mechanisms related to how the modalities affect athletic and other forms of performance could be a part of the future research.

This article adds knowledge about what American adults do related to the use of CIC, specifically for enhancing athletic performance. Furthermore, it gives readers insight into what therapeutic modalities are most commonly used, together with the perception of benefit experienced by users of those modalities.

By nature, CIC therapies do not use prescription drugs, and owing to the manual nature of many therapies, such as mobilization, manipulation, movement therapies, and mind-body applications, those modalities may be valid alternatives to banned substances, drug-based therapies, or other methods that may not physically improve performance beyond simple pain abatement. These modalities should be explored for their physiological mechanisms as they relate to improved movement, athletic performance, and physical function.

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