

How Ready Are Gym Users to Refrain from Performance-Enhancing Substances? The Transtheoretical Model of Change as a Theoretical Framework

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ABSTRACT

Methods: A descriptive predictive correlational design was used to guide this study. The study included a convenience sample of male gym users who agreed to participate in this study. The study subjects were recruited from six private gyms. The study instrument includes subjects' sociodemographic characteristics of age, living arrangement, family's socioeconomic status, the performance-enhancing substances that the gym users use. It also includes the Transtheoretical Model of Change measures of Stages of Change for Performance-Enhancing Substances Scale (Short Form), the Stages of Change for Performance-Enhancing Substances Scale (Continuous Measure), the Processes of Change for Performance-Enhancing Substances Scale, the Self-Efficacy for Performance-Enhancing Substances Scale, the Decisional Balance Scale for Performance-Enhancing Substances. Data were analyzed using the statistical package for social science (SPSS) for windows, version 28.

Results: The study results revealed that around a half are in the Precontemplation Stage of Change, followed by those who are in the Contemplation Stage of Change, those who are in the Action Stage of Change, those who are in the Termination Stage of Change, and those who are in the Preparation Stage of Change.

Conclusion: The greater the Pros, the higher the Stages of Change for performance-enhancing substance use the gym user would therein. The greater the Social Liberation, the higher the Stages of Change for performance-enhancing substance use the gym user would therein. The greater the Helping Relationships, the higher the Stages of Change for performance-enhancing substance use the gym user would therein.

Keywords: Gym Users; Performance-Enhancing Substances; Transtheoretical Model

INTRODUCTION

More than a billion people use performance and image enhancing drugs and substances (PIEDS) on a daily basis to increase muscle mass, burn fat, maintain endurance, resist fatigue, boost energy, improve mood, tolerate pain, reduce inflammation, improve relaxation, promote concentration, sharpen reactions, maintain alertness, control fluid, improve body shape, induce euphoria, and boost confidence⁽¹⁾. Performance and image enhancing drugs and substances include muscle-building, fat-burning/weight-loss, and energy/endurance-boosting substances, taken to modify physiological or psychological states including anabolic-androgenic steroids, anti-oestrogenic agents, beta-2 agonists (e.g., clenbuterol), chorionic gonadotrophin, human growth hormone, and various peptides⁽²⁾ "with the intention of improving appearance and enhancing sporting performance" (Australian Drug Foundation 2016). Because of their negative consequences and widespread usage in many countries, anabolic androgenic steroids (AAS) are considered a public health concern^(3,4). Anabolic androgenic steroids are used in doses exceed supraphysiological limit^(5,6) to obtain the anabolic effect^(7,8,9) and they have huge effect^(10,11). Most of the users are male bodybuilders or those who exercise for recreation^(12,13,14). Men in many parts of the world are dissatisfied with their bodies, which may be a motive for using anabolic androgenic steroids (AAS)^(15,16). Improving the body image and appearance or enhancing the performance are the main motives for using AAS⁽¹⁷⁾. Athletes or bodybuilders may also be motivated to use AAS when they feel low self-esteem, curious, desired for increased braveness or criminality^(18,19,20). Pope et al., (2014) support the medical consensus that abusing various PIEDS can have substantial, long-term health consequences for users, both while they are using them and after they have stopped. Abuse of certain PIEDS, particularly pharmaceutical-grade PIEDS like AAS and hormones, has been linked to an increased risk of death, as well as a slew of other health issues like cardiovascular, psychiatric, metabolic, endocrine, neurological, infectious, hepatic, renal, and musculoskeletal problems. Another research displays that the use of PIEDS only for image enhancement has risen to the extent that it currently outnumbers its use for sporting performance or medicinal interventions. The use of PIEDS for body sculpting or

other recreational, cosmetic, or occupational purposes is referred to as image enhancing^(22,23). A recent study corroborated that appearance, improved health and dysfunctional body image just as much can motivate athletes to use PIEDS than superior sport performance. Use of AAS can cause mild to serious side effects. Higher doses and prolonged use of AAS increases the risk of their side effects^(24,25,26). Sexual difficulties, most often erectile dysfunction and decreased libido, acne, and gynecomastia are common AAS-induced physical side effects in men. A link has been discovered between AAS use and a variety of psychological disorders^(27,28). Depression, sleep problems, and mood swings are common mental side effects triggered by AAS use^(29,30).

METHOD

A descriptive predictive correlational design was used to guide this study. The study was carried out at private gyms for male, private gym users, and those who have been practicing bodybuilding continuously for no less one year. The study included a convenience sample of male gym users who agreed to participate in this study. The study subjects were recruited from six private gyms. The sample size was determined using G*Power software based on an effect size of 0.25, alpha error probability of 0.05, a power of 0.90, five groups. Thus, the recommended sample size would be 255. The final sample size is 268. The study instrument consists of subjects' sociodemographic characteristics of age, living arrangement, family's socioeconomic status was determined based on the Revised Kuppuswamy and B G Prasad socio-economic scales for 2016 (Shaikh & Pathak, 2017) which encompasses parents' level of education which consists of 10 level (10 points for each of the parents), household's occupation which consists of seven levels; the seventh level takes 10 points, and family's monthly income which includes six categories; the highest or sixth category takes 10 points. Thus, the overall scores would be 40. The score ranges between 34-40 is classified as upper class, the score ranges between 21-33 is classified as upper middle class, the score ranges between 15-20 is classified as lower middle class, the score ranges between 6-14 is classified as upper lower class, and the score of 5 or less is classified as lower class. The study instrument also includes the performance-

enhancing substances that the gym users use. It also includes the Transtheoretical Model of Change measures of Stages of Change for Performance-Enhancing Substances Scale (Short Form) (Abd Ali, n.d.) which includes six questions, each question represents one of the Stages of Change for Performance-Enhancing Substances.

RESULTS

Table 1: Participants' sociodemographic characteristics (N = 268)

Age (Years)	Frequency	Percent
20-29	150	56.0
30-39	84	31.3
40-49	30	11.2
50-59	4	1.5
Mean (SD): 29.65 ± 7.35		
Living Arrangement		
Live with parents	140	52.2
Live with my mother	22	8.2
Live with my father	6	2.2
Live with my relatives	20	7.5
Live with my friend	80	29.9

Table 2: Participants' distribution according to Stages of Change for performance-enhancing substance use

Stage	Frequency	Percent
Precontemplation	133	49.6
Contemplation	41	15.3
Preparation	8	3.0
Action	28	10.4
Maintenance	22	8.2
Termination	36	13.4

Table 3: Performance-enhancing substances used by study participants

Performance-enhancing substances	Frequency
Adrenaline	51
Growth Hormone	69
Estrogen	35
Insulin	10
Human growth-like hormone	8
Epinephrin	4
Norepinephrine	2
Glucagon	4
IGF-1	12
Cortisol	2
Testosterone	147
Parabolin Alpha	14
Clenbuterol	22
Anavar	31
Winstrol	12
DIANABOL	18
Deca-Durabolin	42
Primobolan	14
ANADROL	8
SUSTANON	23
Turinabol	12
Deca alpha 250	18
Thyroxine	18
Parabolan acetate la	2
Angiotensin	10
Calcitonin	4
Arimidex	10
Dopamine	28
Nolvadex	8
T3	12

* Participants can use more than performance-enhancing substance. So, there is no cumulative percent

Table 4: Stepwise regression for the study variables

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	78.842	3.298		23.909	.000		
	Age	.023	.101	.014	.228	.820	.966	1.035
	Socioeconomic Status	-.167	.100	-.103	-1.664	.097	.966	1.035
2	(Constant)	-1.168	6.784		-.172	.863		
	Age	.163	.081	.100	2.008	.046	.713	1.402
	Socioeconomic Status	-.092	.080	-.057	-1.147	.252	.705	1.418
	Pros	.669	.142	.273	4.695	.000	.519	1.926
	Decisional Balance	.070	.103	.040	.678	.499	.514	1.944
	Consciousness Raising	-.280	.229	-.077	-1.223	.222	.445	2.248
	Self-Liberation	.669	.238	.165	2.809	.005	.512	1.952
	Dramatic Relief	.060	.274	.016	.218	.828	.314	3.183
	Counterconditioning	.111	.286	.030	.387	.699	.289	3.464
	Stimulus Control	.971	.241	.269	4.031	.000	.394	2.538
	Helping Relationships	.900	.207	.223	4.353	.000	.672	1.489
	Environmental Reevaluation	.749	.299	.199	2.501	.013	.277	3.614
	Social Liberation	1.160	.261	.280	4.449	.000	.444	2.252
	Self-Reevaluation	.260	.109	.124	2.389	.018	.655	1.526
Reinforcement Management	-.409	.275	-.110	-1.490	.137	.324	3.083	

a. Dependent Variable: Stages of Change

DISCUSSION

This descriptive predictive correlational study aims mainly to identify gym users' inclination to use performance-enhancing substances. Around a half are in the Precontemplation Stage of Change, followed by those who are in the Contemplation Stage of Change, those who are in the Action Stage of Change, those who are in the Termination Stage of Change, and those who are in the Preparation Stage of Change. This finding reflects the subjects' great readiness to use performance-enhancing substances. The Pros positively predicted subjects' Stages of Change for performance-enhancing substance use. The Decisional Balance is a mental balancing act that involves considering the benefits and drawbacks of changing behavior. Simply stated, the process always starts with a relative difference between the Pros and Cons, with the Cons winning out. People are ambivalent and have

reasons for not yet adopting the health-protective behavior since the benefits are limited and the disadvantages are high. In this essence, subjects' Pros of refraining from performance-enhancing substances seem to outweigh their Pros which could explain the ability of the Pros to positively predict subjects' Stages of Change for performance-enhancing substance use. The Social Liberation positively predicted subjects' Stages of Change for performance-enhancing substance use. The Transtheoretical Model of Change postulates that the Social Liberation program focuses on taking advantage of/increasing social opportunities that facilitate healthy behavior change. This can be represented by investing social gatherings and events in raising public's health awareness of the deleterious effects of performance-enhancing substances. The Helping Relationships positively predicted subjects' Stages of Change for performance-enhancing substance use. As

contextualized in the Transtheoretical Model of Change, the Helping Relationships combine care, trust, openness, and acceptance, as well as support for healthy behavior change, and can be a powerful change process that can be employed at any step of the change process to promote long-term behavior change. This can be represented by initiating group(s) in which gym users strive for caring themselves through encouraging each other to take care for themselves, consolidating self-confidence of adopting healthy behaviors, particularly adhering to healthy diet that offer them the required amount of calories and build the muscular mass which could their top priorities. Helping connections can be a powerful change agent that can be employed at any stage of the change process to promote long-term behavior change. For example, individuals desire to reduce weight but can't manage to stick to an aerobic exercise routine. Those people would benefit from teaming up with a friend or trainer to highlight the necessity of regular exercise and provide motivation to stick to their fitness routine^(33,34,35). The Stimulus Control positively predicted subjects' Stages of Change for performance-enhancing substance use. This finding implies that according to the Transtheoretical Model of Change, Stimulus Control helps subjects in eliminating cues for using performance-enhancing substances such as the fascinating containers of the performance-enhancing substances which helps in minimizing the likelihood that they would be tempted for using such substance. On the other hand, Stimulus Control offers cues that back the adoption and maintenance of healthy behaviors which could be seeking healthy diet, particularly diet that provide the highest amount of calories which give gym users the endurance they struggle for and help in building muscular mass they aspire for. Individuals might lessen their chances of being enticed to stop in for a snack by avoiding these places. Furthermore, such cues would be to keep healthy diet around or in car as a reminder to consume them⁽³⁶⁾. The Environmental Reevaluation positively predicted subjects' Stages of Change for performance-enhancing substance use. Environmental Reevaluation combines affective and cognitive assessments of how the presence or absence of a specific health behavior affects one's overall health "performance-enhancing substance" influences an individual's social environment. The Transtheoretical Model of Change posits that in early stages, individuals employ cognitive, affective, and evaluative processes to move forward through the stages^(37,38). This contextualizes this finding as the largest proportion of subjects were precontemplators and contemplators who could employ cognitive, affective, and evaluative processes to progress through the Stages. The Self-Liberation positively predicted subjects' Stages of Change for performance-enhancing substance use. Self-Liberation is a Change Process that includes the idea that one can change as well as the commitment and recommitment to act on that belief. It strengthens the resolve to change by encouraging the conviction that one can change. In this regard, gym users who decided they need to start adhering to a healthy diet instead of using performance-enhancing substance. By publicly announcing their intentions to change their performance-enhancing behavior in a multitude of forums (e.g., family, university, work colleagues, neighbors, on social networking websites), they may believe they have the authority to start and continue that positive performance-enhancing activity⁽³⁹⁾. Self-Reevaluation combines both cognitive and affective assessments of an individual's self-image combined with a given health behavior⁽⁴⁰⁾. This implies that gym users may visualize their bodies as having unsatisfactory muscular mass or they have satisfactory muscular mass that could bring them the hero's image. The study finding displayed a positive association between Self-Reevaluation and Stages of Change for performance-enhancing behavior.

REFERENCES

- 1 Australian Criminal Intelligence Commission. (2021). Illicit drug data report 2019–20. Retrieved July 16, 2022, from Australian Criminal Intelligence Commission: <https://www.acic.gov.au/publications/illicit-drug-data-report/illicit-drug-data-report-2019-20>.
- 2 Darke, S., Torok, M., & Duffou, J. (2014). Sudden or unnatural deaths involving anabolic-androgenic steroids. *Journal of Forensic Sciences*, 59(4), 1025–1028. <https://doi.org/ezproxy.okcu.edu/10.1111/1556-4029.12424>
- 3 Australian Drug Foundation (ADF). (2016). Performance and image enhancing drugs: Fact sheet. Melbourne, Australia: Australian Drug Foundation. http://www.adf.org.au/images/stories/CEAP/ADF_FactSheet_PIED.pdf (accessed June 16, 2022).
- 4 Crosby, R. A., Salazar, L. F., & DiClemente, R. J. (2019). Value–Expectancy Theories. In R. J. DiClemente, L. F. Salazar, & R. A. Crosby, *Health Behavior Theory for public health: Principles, foundations, and applications* (Second ed., p. 60). Burlington, MA, USA: Jones & Bartlett Learning.
- 5 Bhasin, S., Storer, T. W., Berman, N., Callegari, C., Clevenger, B., Phillips, J., Bunnell, T. J., Tricker, R., Shirazi, A., & Casaburi, R. (1996). The effects of supraphysiologic doses of testosterone on muscle size and strength in normal men. *New England Journal of Medicine*, 335(1), 1–7. <https://doi.org/10.1056/nejm199607043350101>
- 6 Honour, J. W. (2016). Doping in sport: consequences for health, clinicians and laboratories. *Annals of Clinical Biochemistry*, 53(Pt 2), 189–190. <https://doi.org/ezproxy.okcu.edu/10.1177/0004563216631572>
- 7 Ip, E. J., Trinh, K., Tenerowicz, M. J., Pal, J., Lindfelt, T. A., & Perry, P. J. (2015). Characteristics and behaviors of older male anabolic steroid users. *Journal of Pharmacy Practice*, 28(5), 450–456. <https://ezproxy.okcu.edu:4744/10.1177/0897190014527319>
- 8 Trenton, A. J., & Currier, G. W. (2005). Behavioural manifestations of anabolic steroid use. *CNS drugs*, 19(7), 571–595. <https://doi.org/10.2165/00023210-200519070-00002>
- 9 Weinstein, N. D., Sandman, P. M., & Blalock, S. J. (2008). The precaution adoption process model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice* (4th ed., pp. 123–147). San Francisco, CA: John Wiley & Sons.
- 10 Bolding, G., Sherr, L., & Elford, J. (2002). Use of anabolic steroids and associated health risks among gay men attending London gyms. *Addiction*, 97(2), 195–203.
- 11 Najj, A. B., Ahmed, M. M., & Younis, N. M. (2021). Adherence the preventive measure against for covid-19 among teachers at university of mosul. *International Journal of Medical Toxicology & Legal Medicine*, 24(3and4), 273–277.
- 12 AL-Hraishawi, T. A. H., & Najj, A. B. (2015). Impact of Nurses' Knowledge Upon The Infection Control in Primary Health Care Centers at AL-Amara City. *kufa Journal for Nursing sciences*, 5(2).
- 13 Bonnecaze, A. K., O'Connor, T., & Aloi, J. A. (2020). Characteristics and attitudes of men using anabolic androgenic steroids (AAS): A survey of 2385 men. *American Journal of Men's Health*, 14(6), 1557988320966536. <https://doi.org/10.1177/1557988320966536>
- 14 Börjesson, A., Ekebergh, M., Dahl, M.-L., Ekström, L., Lehtihet, M., & Vicente, V. (2021). Men's experiences of using anabolic androgenic steroids. *International Journal of Qualitative Studies on Health & Well-Being*, 16(1), 1–11. <https://doi.org/ezproxy.okcu.edu/10.1080/17482631.2021.1927490>
- 15 Brower, K. J., Blow, F. C., & Hill, E. M. (1994). Risk factors for anabolic-androgenic steroid use in men. *Journal of Psychiatric Research*, 28(4), 369–380. [https://doi.org/10.1016/0022-3956\(94\)90019-1](https://doi.org/10.1016/0022-3956(94)90019-1)
- 16 Younis, N. M., & Najj, A. B. (2021). Evaluation of Preventive Behaviors of Addiction among Students: Application of Health Belief Model. *Indian Journal of Forensic Medicine & Toxicology*, 15(3).
- 17 DiClemente, R. J., Salazar, L. F., & Crosby, R. A. (2019). *Health behavior theory for public health: Principles, foundations, and applications* (Second ed.). Jones & Bartlett Learning.
- 18 Eklof, A. C., Thurelius, A. M., Garle, M., Rane, A., & Sjoqvist, F. (2003). The anti-doping hot-line, a means to capture the abuse of doping agents in the Swedish society and a new service function in clinical pharmacology. *European Journal of Clinical Pharmacology*, 59(8–9), 571–577. <https://doi.org/10.1007/s00228-003-0633-z>
- 19 Evans, N. A. (2004). Current concepts in anabolic-androgenic steroids. *The American Journal of Sports Medicine*, 32(2), 534–542. <https://doi.org/10.1177/0363546503262202>
- 20 AlAbedi, G. A. H., & Najj, A. B. (2020). Impact of Physical Activity Program upon Elderly Quality of Life at Al-Amara city/Iraq. *Prof.(Dr) RK Sharma*, 20(3), 6.
- 21 Pope, H. G., Jr, Wood, R. I., Rogol, A., Nyberg, F., Bowers, L., & Bhasin, S. (2014). Adverse health consequences of performance-

- enhancing drugs: An Endocrine Society scientific statement. *Endocrine Reviews*, 35(3), 341–375. [https://doi-org.ezproxy.okcu.edu/10.1210/er.2013-1058](https://doi.org.ezproxy.okcu.edu/10.1210/er.2013-1058)
- 22 AL-Kerity, S. H. F., & Najji, A. B. (2017). Evaluation of Healthcare workers' Practices Concerning Infection Control Measures at Primary Health Care Centers.
- 23 Iyer, R. & Handelsman, D. J. (2017). Testosterone misuse and abuse. In A. Hohl (ed.), *Testosterone* (pp. 375–402). Cham: Springer International Publishing.
- 24 Kanayama, G., Kaufman, M. J., & Pope, H. G., Jr. (2018). Public health impact of androgens. *Current Opinion in Endocrinology & Diabetes and Obesity*, 25(3), 218–223. <https://doi.org/10.1097/med.0000000000000404>
- 25 Baktash, M. Q., & Najji, A. B. (2019). Efficacy of Health Belief Model in Enhancing Exercise Behavior to Preventing Stroke among Geriatrics Homes Residents in Baghdad City. *Indian Journal of Public Health Research & Development*, 10(02).
- 26 Kelley, C. C., Neufeld, J. M., & Musher-Eizenman, D. R. (2010). Drive for thinness and drive for muscularity: Opposite ends of the continuum or separate constructs? *Body Image*, 7(1), 74–77. <https://doi.org/10.1016/j.bodyim.2009.09.008>
- 27 Thumil, A. H., & Bahlol, A. (2016). Effectiveness of Cholera Infection Education Program on Teachers' Knowledge at Secondary Schools in Bagdad City. *International Journal of Scientific and Research Publications*, 5(8), 93-101.
- 28 Kanayama, G., Hudson, J. I., & Pope, H. G., Jr (2020). Anabolic-androgenic steroid use and body image in men: A growing concern for clinicians. *Psychotherapy and Psychosomatics*, 89(2), 65–73. <https://doi.org/10.1159/000505978>
- 29 Kouidi, E. J., Kaltsatou, A., Anifanti, M. A., & Deligiannis, A. P. (2021). Early left ventricular diastolic dysfunction, reduced baroreflex sensitivity, and cardiac autonomic imbalance in anabolic-androgenic steroid users. *International Journal of Environmental Research and Public Health*, 18(13). <https://doi-org.ezproxy.okcu.edu/10.3390/ijerph18136974>
- 30 Ling-ling, Chang, Peng, Xie, Zhu, Bu, Qing, Wang, Sheng-yong, Fu, & Chun-yu, Mu. (2018). Effect of dietary lysine level on performance, egg quality and serum biochemical indices of laying pigeons. *Journal of Applied Poultry Research*, 27(2), 152–158. <https://doi-org.ezproxy.okcu.edu/10.3382/japr/pfx047>
- 31 Mitchell, L., Murray, S. B., Cobley, S., Hackett, D., Gifford, J., Capling, L., & O'Connor, H. (2017). Muscle dysmorphia symptomatology and associated psychological features in bodybuilders and non-bodybuilder resistance trainers: A systematic review and meta-analysis. *Sports Medicine*, 47(2), 233–259. <https://doi.org/10.1007/s40279-016-0564-3>.
- 32 Abd Ali, M. B. (n.d.). Development and testing of the Transtheoretical Model of Change Scales for performance-enhancing behavior. (Unpublished paper).
- 33 Nilsson, S., Baigi, A., & Marklund, B. (2001). The prevalence of the use of androgenic anabolic steroids by adolescents in a county of Sweden. *European Journal of Public Health*, 11(2), 195–197. <https://doi.org/10.1093/eurpub/11.2.195>
- 34 Petersson, A., Bengtsson, J., Voltaire-Carlsson, A., & Thiblin, I. (2010). Substance abusers' motives for using anabolic androgenic steroids. *Drug and Alcohol Dependence*, 111(1–2), 170–172. <https://doi.org/10.1016/j.drugalcdep.2010.04.008>
- 35 Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist*, 47, 1102–1114.
- 36 Abbas, H. K., & Najji, A. B. (2021). Women's Readiness to Conduct Pap Smear Test at Primary Health Care Centers in Baghdad City: The Health Belief Model as A Theoretical Framework. *Medico-Legal Update*, 21(2).
- 37 Riekert, K. A., Ockene, J. K., & Pbert, L. (2014). *The handbook of health behavior change* (4 ed.). New York, NY, USA: Springer Publishing Company, LLC.
- 38 Rogerson, S., Weatherby, R. P., Deakin, G. B., Meir, R. A., Coutts, R. A., Zhou, S., & Marshall-Gradisnik, S. M. (2007). The effect of short-term use of testosterone enanthate on muscular strength and power in healthy young men. *Journal of Strength and Conditioning Research*, 21(2), 354–361. <https://doi.org/10.1519/r-18385.1>
- 39 Ali Basha, A. A., & Najji, A. B. (2019). Processes of Change for Weight Control Behavior among Collegians. *Indian Journal of Public Health Research & Development*, 10(9).
- 40 Sjoqvist, F., Garle, M., & Rane, A. (2008). Use of doping agents, particularly anabolic steroids, in sports and society. *Lancet*, 371(9627), 1872–1882. [https://doi.org/10.1016/s0140-6736\(08\)60801-6](https://doi.org/10.1016/s0140-6736(08)60801-6)