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REVIEW ARTICLE

Public Health Implications: A Scoping Review of Opioid Prevention Programs Among Adolescents

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ABSTRACT

This article presents a comprehensive review of the pressing issue of adolescent opioid and fentanyl deaths and overdoses, highlighting the urgent need for effective prevention strategies and educational interventions. The escalating crisis of opioid abuse among adolescents necessitates immediate attention from drug educators, concerned parents, and society as a whole. We examine the alarming rise in adolescent opioid and fentanyl-related fatalities, emphasizing the unique challenges posed by fentanyl's potency and the dangerous allure it holds for young individuals. By analyzing existing harm reduction strategies, we underscore the crucial role they play in mitigating the devastating consequences of opioid use. Moreover, we delve into evidence-based educational interventions, emphasizing the importance of early intervention, accurate information dissemination, and destigmatization efforts. The article strongly emphasizes prevention programs as a key approach to curbing the prevalence of opioid abuse among adolescents. We highlight successful prevention initiatives and the significance of comprehensive and multi-faceted approaches that engage schools, families, healthcare providers, and community organizations. We explore the potential of integrating evidence-based prevention programs into school curricula, fostering supportive family environments, and promoting positive youth development. Lastly, we provide insights into how our society can effectively address this growing concern. By advocating for policy changes, increased access to treatment, and expanded naloxone distribution, we aim to mitigate the devastating impact of opioid abuse on adolescents. We underscore the importance of collaboration among stakeholders, including parents, educators, healthcare professionals, and policymakers, to create a collective response that prioritizes the health and well-being of our youth.

Introduction

Although drug use rates have remained relatively stable over the past decade, there has been a dramatic increase in the number of adolescents fatally overdosing in recent years. According to the Centers for Disease Control, approximately 500 adolescents died annually from 2010 to 2019 as a result of a drug overdose.¹ In 2020, that number surged to 954 – a 94% increase from 2019 to 2020. Adolescent overdose death rates continued to worsen in 2021, totaling 1146 – an increase of 20% from 2020 to 2021.¹ Despite the overall population witnessing increases in overdose death rates (29% from 2019 to 2020 and 11% between 2020 and 2021), the impact on adolescents was significantly more severe. Since 2010, adolescents have experienced a much higher surge in overdose mortality compared to the overall population. Therefore, we must explore why such increases are occurring so that a foundation for creating effective, long-term interventions can ultimately be established.

Many attribute the dramatic increase in overdose deaths to illicitly manufactured opioids, such as fentanyl and fentanyl derivatives.² These synthetic opioids, known to be 50 to 100 times more potent than morphine,³ are commonly sold in illegal drug markets. Originally introduced as a substitute for heroin during periods of drug scarcity,² they have greatly contributed to the current opioid epidemic. Greater supply and availability, less financial cost coupled with having heroin-like properties make synthetic opioids an attractive alternative. However, synthetic opioid use can also prove fatal, particularly among the adolescent population. In 2019, 253 adolescents died as a result of fentanyl-related fatalities. In 2020, that number rose to 680, and in 2021, 884. Of the 884 deaths, 77% were reported to be fentanyl-related drug overdoses.¹

While a comprehensive approach is necessitated, the focus of this article is specifically targeting the adolescent population and the implementation of school-based intervention programs. To affect change and reduce drug-related fatalities, attention should be given to intervention efforts. To ensure that adolescents are educated about the dangers surrounding opioid/synthetic opioid use, it seems logical that one would consider intervention programs that target adolescent opioid use. Given the current landscape of opioid overdose deaths and the degree to which adolescents are affected, it is crucial to establish effective interventions to resolve this crisis.

Recognizing Program Limitations

When educators are utilizing programs within the classroom, the underlying assumption is that such programs work. Though, what exactly is meant when someone states that a program “works”? Does it mean that those receiving the program are more knowledgeable after having gone through the program, demonstrate improved attitudes or perceptions related to the program, intend to change future behaviors as a result of this program, or change unhealthy or deleterious behaviors as a result of having gone through this program? And while it is reasonable to expect all of the above to occur when implementing programs for adolescent populations, all such expectations may be unwarranted unless the program/s have been grounded in research. Now, what specifically does it mean to be grounded in research? What if those going through the program really like the program and say they learn a lot about drugs and/or opioids, is this good enough? If one would like to proclaim the program is recognized as Evidence-Based Program (EBP), then going through rigorous evaluation, which reflects a Random Control Trial (RCT) is necessitated. As such, having several participants receive the program (Intervention Gp.) and a comparable number of individuals not receiving the program (Control Gp.) is step 1, so the evaluation team can compare differences between these two groups. Now, there are several additional steps, including but not limited to; having all participants in both groups take a pre-questionnaire, post-questionnaire, and a follow-up questionnaire approximately one year later to determine long-term impact and/or sustainable outcomes. While changing attitudes, perceptions, increasing knowledge, and behavioral intentions are all important, the true essence of determining whether a program is effective is whether or not immediate (post-questionnaire) and long-term behavioral changes (one-year follow-up) between the intervention group and control group were statistically significant. Then, based on a variety of criteria, one can identify their program as an EAP, and with confidence state that what they are teaching “works”.

As noted within this review, none of the opioid education programs are identified as Evidence-Based, and it appears no such program currently exists which has successfully gone through all such criteria to make such a claim. This does not mean that these programs are not making a difference, however, without a rigorous evaluation and without meeting such behavioral criteria, all such claims may rest on anecdotal reports and/or short-term outcomes. Therefore, going through the necessary steps to identify such a program is

essential so educators, whether in the schools or community, can present such a program with more than a hope that their time is well spent and the adolescents are the beneficiaries of such outcomes.

The Importance of Effective Interventions

The number of opioid, opiate, and opioid derivative-related deaths continue to increase across all age groups. Specifically, the number of fentanyl and opioid-related deaths within the adolescent population has more than tripled within the past three years. As such, it has become abundantly obvious that there is a need for educational intervention and intervention strategies to reduce these preventable deaths. Often individuals may ask such questions as; what more can we do, whatever we are doing is not making a difference, or a common statement is “We do not have time in the curriculum to teach this subject matter”. All of these concerns, questions, and statements are valid, though with this ever-growing issue, it is the responsibility of schools to identify how best to offer the best current solutions and to fit it into the curriculum.

Research has demonstrated that “One Shot” interventions, assemblies, or abridged informational programs have not been successful. On the other hand, where do we find the time to infuse longer, evidence-based or promising programs into a curriculum which is already time challenged? This subject matter falls into the domain of health education/Alcohol, Tobacco/Vaping, and Other Drugs, thus justifiably will be instructed by the Health/Physical Educator in the school setting. While states have their respective State Learning standards which include Comprehensive Health and Physical Education as one of many subject areas, it still comes down to how much time is necessitated and specifically where this time comes from. As with any other subject matter, there will be times when a particular subject matter within a discipline is of higher priority. If there is an issue that surfaces, such as an increased number of adolescent deaths, then it becomes a higher priority within the ATOD unit. At the moment, there is a lack of evidence-based programs within opioid education. Therefore, educators are constrained to utilize the most suitable alternatives at their disposal, while recognizing that positive outcomes are often influenced by the amount of time dedicated to intervention implementation. As such, an exploration of what works best within middle school/high school students is necessary, and any such understanding can only come through taking the first steps in teaching this information to 6-12th graders.

The National School Health Education Standards 3rd Edition (NHES)⁴ represents the

ongoing work of national professional organizations that developed both the National Health Education Standards: Achieving Health Literacy⁵ and National Health Education Standards: Achieving Excellence.⁶ These standards reflect eight areas across the Health Education arena that were created by a variety of experts across many health fields throughout the U.S. and were reviewed by over 500 School Health Educators. While these standards do not offer the same specificity as many state standards, one of the underlying strengths of the NHES is the generalizability of how such standards can easily be transferred across health-related subject areas, including opioid education.

As stated by NHES (2022), “Functional health knowledge is necessary to foster and support health literacy, health beliefs, and safe and healthy behaviors”.^{4,p2} The underlying emphasis reflects functional knowledge, not merely memorizing the bones of the human body or drug classifications. It encompasses understanding the underlying utility of this information and how it can practically be used within the context of everyday living. The mere acquisition of knowledge for the sake of knowing and/or memorizing without application possesses limited value in changing healthy behaviors.⁷ As such, the focus around the NHES (2022) revolves around functional knowledge and skill building, both of which reflect applied knowledge, thus supporting healthier behaviors that influence healthier living and will, in turn, enhance the quality of one’s life. Performance expectations within NHES are purposely broad so that states, school systems, school personnel, and teachers can focus on health issues and priorities that are most important to the needs of their students and communities.^{4,p2}

Specifically, NHES standards 5-8 reflect decision-making skills, goal setting, health and safety, and health advocacy, all of which can be utilized as foundational stepping stones for Opioid Education. While foundational knowledge about opioids and other drugs is necessary, the application of such knowledge is considered to be far more impactful. Understanding the addictive potential of opioids, risks of overdose, fentanyl congeners, and other dangers are all important within the knowledge domain, however teaching children how to engage in healthier decision-making strategies, to focus on future intentions/goal setting, and to advocate for the health and well-being of themselves and the community offers far-reaching opportunities to positively influence adolescent health behaviors.

Even though educational professionals often collaborate with parents and community members to identify adolescent drug trends, nationwide surveys like Monitoring the Future (MTF)

and Youth Risk Behavioral Surveillance Survey (YRBSS) provide crucial information that can impact decision making, particularly in the area of drug prevention programming. Unfortunately, prevention efforts lack uniformity when there is nationwide variability in health education instructional policies.⁸ Surprisingly, the overwhelming majority of school districts report that, at the elementary and middle school level, just one health education topic needs to be taught to satisfy the district's health education instructional policies; of all the potential areas of focus, violence prevention is the most commonly implemented.⁹ Most school districts, however, have established educational policies that identify which health education topics need to be addressed at the secondary level. Even though topics relating to ATOD (i.e., Alcohol, Tobacco, and Other Drugs) are incorporated into the scope and sequence of health education instruction, few address opioid prevention.⁹ Comprehensive, school-based opioid education instruction is limited, despite being in the throes of an ongoing US opioid crisis.¹⁰ To rectify this deficiency, school districts are often compelled to infuse a secondary, more in-depth opioid education program into their principal ATOD curriculum.

At the current time, not a single, independently functioning, evidence-based adolescent opioid prevention program for adolescents exists. Even though Crowley et al. (2014) examined three universal middle school interventions (All Stars, Botvin LifeSkills Training, and Project Alert), they report all but Project Alert influenced prescription opioid misuse in later years.¹¹ The high school version of the All Stars universal program, however, was not evaluated by Crowley et al., and previous studies have not demonstrated significant effects on misuse.¹² While this is promising, middle school prevention interventions are not common and thus, the need for high school interventions exists. Since mental, emotional, and behavioral disorders often emerge during a person's early 20s, effective interventions must be implemented during adolescence and young adulthood, with some suggesting implementation during the early elementary years.¹⁰ Therefore, in hopes to address this significant issue and the need for effective, viable programming, we will explore some of the more recognized adolescent opioid prevention programs and identify how each addresses opioid education, and what limitations, possibilities, and promise these programs offer.

School & Community-Based Interventions

Developed in response to the Ohio House Bill 367, the Health and Opioid Prevention

Education Curriculum (HOPE) provides students in grades k-12 with supplemental prescription opioid abuse instruction during Health Education class. Intended to be delivered in conjunction with the principal health education curriculum, HOPE is based upon the framework of NHES and best practices in health education. Although HOPE identifies itself as an evidence-informed opioid prevention program, research has not been conducted evaluating its ability to deter adolescent opioid use. Most of the 10 High School lessons developed address adolescent skill building (i.e., healthy decision making, developing communication and refusal skills); less focus on drug use/addiction, and the impact opioids can have on an individual, family, and the larger community. The authors report that the lessons are age-appropriate but can be modified according to a student's academic ability. To access the entire curriculum, one must create an account on the HOPE portal. Lessons and corresponding PowerPoints are available free of charge.¹³ Although the HOPE curriculum appears to provide pertinent information regarding opioid prevention, additional exploration is warranted to confirm whether the curriculum is effective at reducing adolescent opioid use.

Operation Prevention, an educational initiative developed in coordination with the Drug Enforcement Agency and Discovery Education, offers no-cost drug prevention resources to parents and educators of students grades 3-12. Two interactive videos filled with graphics and animation that detail addiction, overuse, and misuse while exploring the science behind substance abuse and its effects on our bodies are available to high schoolers. A parent toolkit is also provided that offers general information about opioids and substance abuse, as well as suggestions on how to start the opioid conversation with your child at home, how to identify misuse/abuse, and research-based intervention strategies that could be accessed should your child exhibit a substance abuse issue. This award-winning science-based prevention program is widely recognized but lacks empirical evidence demonstrating its effectiveness.¹⁴

Coined as the first youth-focused prevention program that addresses prescription opioid abuse, This is Not About Drugs (TINAD) is a supplemental program for students in grades 6-12 that focuses on increasing students' awareness of nonprescribed opioid and heroin use. The risks of prescription opioid misuse and how it can lead to heroin use are discussed. Students are taught how to identify drug addiction and what steps need to be taken should they be witnesses to opioid overdosing. There is also an emphasis on prosocial

decision-making regarding their body and more generally, their health.¹⁵ In recent studies, TINAD increased a student's general knowledge of prescription opioids, however, perspectives of adolescent opioid use did not change.¹⁶ Therefore, additional research is needed to determine if the TINAD prevention program impacts the degree to which adolescents misuse prescription opioids.

Project Alert, an evidence-based 7th-8th grade drug prevention curriculum, provides free, classroom-based lessons that target consequences of drug abuse, pressures associated with drug use, developing and implementing resistance skills, understanding prescription opioids, smoking and vaping cessation, and reasons one should resist drug use.¹⁷ Of the fourteen lessons, 11 are taught during 7th grade, and 3 during 8th grade. There is one lesson that focuses on prescription opioids and heroin which focuses on identifying similarities/differences between the two, how both can affect brain functioning, and other options to address pain management.¹⁷ Despite being recognized by the Substance Abuse and Mental Health Services Administration (SAMHSA)'s National Registry of Evidence-Based Programs and Practices (NREPP), research has shown that Project Alert is ineffective at preventing alcohol, cigarette, and marijuana use and demonstrating long-term impact on drug use behaviors.¹⁸ Simply put, educating adolescents with one lesson about opioids does not support this being an evidence-based program as related within the area of opioid education.

Substance use interventions specifically addressing the needs of student-athletes have also been implemented at the secondary level. ATLAS (Athletes Training and Learning to Avoid Steroids) and ATHENA (Athletes Targeting Healthy Exercise & Nutrition Alternatives) are two drug education programs that target substance use issues as they relate to one's gender. Males and females are administered the program separately from one another, which can create challenges with implementation. ATLAS requires implementers to follow a script and is based on a social influence model that uses positive peer pressure to influence healthy choices among teenagers to avoid substance use, including steroids and other performance-enhancing drugs. The curriculum consists of ten 45-minute interactive sessions. Evaluations determined that ATLAS has, at best, only short-term effects on steroids but none are reported on prescription opioid misuse.^{19,20}

The ATLAS companion program, ATHENA, addresses topics of interest among young women including avoiding disordered eating habits and deterring the use of body-shaping substances,

steroids, and performance-enhancing drugs. The curriculum consists of eight 45-minute interactive sessions. Results from a long-term evaluation demonstrate short- and long-term effects on some substances, including short-term effects on athletic-enhancing substances, but effects on prescription opioid misuse were not reported.²¹

Finally, the recently developed Student Athlete Wellness Portal demonstrated promise for reducing prescription opioid misuse and diversion among high school athletes.²² The brief, digital program uses narrative docudrama videos derived from qualitative interviews to teach decision making, risk assessment, and discourage opioid misuse. Preliminary research among a single sample without a control group showed decreased willingness to misuse opioids and increases in their perceptions of opioid risks. These variables are predictors of opioid misuse, but behavioral outcomes were not measured nor was a randomized control trial implemented.

While all of these ATOD programs identified above offer opioid education, it is clear that with most, the primary focus is ATOD with a couple of additional hours of opioid instruction. As such, and as noted above, to date there are no identified evidence-based opioid education programs. One cannot isolate specific opioid education lessons/topics to determine their impact on adolescent attitudes, knowledge, perceptions, or behaviors/behavioral intentions. Are we confident that these "add-on" opioid programs or opioid segments are making a difference? Suffice it to say, we do not know, and until or unless such RCTs are conducted to determine such impact of these programs will such answers be known. And, while it is understood that a couple of hours are better than nothing, the reality is that one cannot even make this claim until or unless before and after changes are evaluated, and any differences are quite literally compared to students who are receiving no intervention or nothing. While it is recognized that there are time constraints in the schools with available time to instruct Health Education and specifically ATOD Education & Prevention, we must take an honest assessment of the ongoing issue related to the current opioid crisis and determine what we are providing students is helping, whether more can be done to favorably impact this issue, or if we continue to offer limited opioid education intervention to high school students with the ever-growing issue if we are willing to accept the forbidding future.

Public awareness and educational campaigns

Existing opioid-specific prevention efforts that target youth public awareness and education

are campaigns such as CDC's *Rx Awareness* and ONDCP's *The Truth About Opioids*, educational interventions such as *Rx for Addiction and Medication Safety (RAMS)*,²² websites such as *NIDA for Teens*, and digital curricula such as *Operation Prevention* – all of which aim to increase youth's awareness that prescription opioids can be addictive and to discourage misuse of these drugs by exposing youth to personal stories about the hardships of addiction, withdrawal, and treatment. However, only a handful of opioid-specific interventions have been evaluated to date. The RAMS program, which offers 9th graders four 3-hour sessions about prescription opioid medication safety, signs and symptoms of opioid misuse and withdrawal, and opioid overdose identification and response was pilot tested with a nonrandomized pre-post study design and reported significant increases in participant knowledge related to opioid misuse, confidence in identifying opioid withdrawal or overdose, and confidence in properly administering naloxone when necessary.²² However, the effects on prescription opioid misuse were not assessed.

A second and related approach to opioid prevention campaigns has been risk awareness (i.e., alerting youth to the potential harms of opioid use). Risk awareness interventions, alone, generally have little, if any, discernible effect on behavior,²³ including prescription opioid misuse.²⁴⁻²⁶ This may be due to adolescents having a false sense of control over their use of opioids,²⁷ but cannot explain why adolescents stigmatize the use of illicit opioids like heroin but the same is not true for prescription opioids.²⁷ In addition, national youth risk surveillance data suggest that most adolescents are already aware of the risks associated with opioid abuse and no longer believe they can easily access prescription opioids,²⁸ which may limit the effectiveness of interventions that educate them about the risk of opioid addiction. Rather, we argue that available interventions may be less effective in preventing prescription opioid misuse and diversion. Yet, we also know from previous evaluations that risk awareness interventions alone have little, if any, discernible effect on behavior,²³ including prescription opioid misuse.^{24,25}

Harm reduction has also been shown to be an effective tool in combatting the opioid crisis^{29,30} through increased access to life-saving reversal drugs (naloxone), fentanyl testing strips, addressing conditions of use, and managing use.³¹ Fischer (2022) conducted a study on school-based harm reduction education for adolescents and found that an increase in knowledge and skills in harm reduction led to a reduction in substance use. Further, this education led students to pass along

information to their classmates, family, and school administrators,³¹ which highlights an ecological systems approach.

As the opioid epidemic continues, harm reduction has become more imperative in saving lives. Adolescence is a critical development time when the risk for substance use can begin to emerge.^{32,33} As research by Hermans et al. (2023) has shown, there has been an increase in unintentional overdose deaths in young people, especially between the ages of 10-19, and at a quicker rate than other age groups, with a 113% increase from 2019-2020.³⁴ Their study highlights the number of years of life lost due to opioid overdoses, 84,179 in 2020, with the largest increase in 13-year-old males (600%).³⁴ Hermans et al. (2023) noted that illicitly manufactured fentanyl and other synthetic opioids were found in 81% of unintentional adolescent overdoses.³⁴ Given these shocking statistics, a module on harm reduction within an opioid education program has proven to be beneficial in the prevention of unintentional overdose fatalities by educating them on behaviors related to harm reduction, how to detect an overdose, and how to advocate for harm reduction policies.³¹

Incorporating Naloxone (Narcan) is a key component in combatting the opioid overdose epidemic.³⁵ Abdelal et al. (2022) conducted a study on the effectiveness of Narcan in the reversal of an opioid overdose. They found that Narcan had a 95% reversal rate, with 78% using ≥ 2 doses and 30% using ≥ 3 doses during overdose events.³⁶ The Centers for Disease Control [CDC] (2022b) propose that the expansion of naloxone and overdose prevention education can help minimize unintentional overdoses.³⁷ Unger et al. (2020) found that adolescents can identify signs of an overdose but are unaware of the accessibility and use of naloxone to reverse an overdose.³⁸ Bruzelius et al. (2023) found that there was no risk of increased opioid or heroin use by educating adolescents on naloxone.²⁹ Since the Food and Drug Administration [FDA] approved over-the-counter sales of Narcan,³⁹ it appears that education about the use and accessibility of naloxone is imperative.

The recent surge in unintentional overdoses involving fentanyl poses a significant threat to public health, particularly for vulnerable populations such as adolescents. However, fentanyl testing strips have emerged as a crucial tool in combating these overdoses and saving lives. This rapid, cost-effective method for detecting even trace amounts of fentanyl offers adolescents a clear indication of its presence when mixed with other drugs. In turn, the strips can then enable individuals

to modify their drug use behavior. Jacka et al. (2020) report that young people would like to know if their drugs have been contaminated with fentanyl and if they received a positive test strip, their using behavior changed.⁴⁰ Therefore, fentanyl testing strips play a crucial role in harm reduction efforts by raising awareness and facilitating informed decisions regarding drug use.

While educating adolescents about alcohol, tobacco, and other drugs is the first line of defense, it is unreasonable and unrealistic to think that primary prevention will be solely successful in combating the current opioid crisis. If education were so easy, then we could quite literally educate away harmful and unwanted behaviors adolescents are engaging in throughout their youth. As such, for those who go on to experiment with opioids, there is a critical secondary line of defense that necessitates the health, safety, and overall well-being of adolescents and beyond. Because we are in need of a safety net and/or secondary prevention, it is essential not only to educate youth about these aforementioned dangers but to help them overcome dangers related to opioid use through the above-mentioned harm reduction intervention. While the hope is that such methods are not necessitated, adolescents may witness an overdose event or have a friend or family member that can benefit from their increased knowledge in harm reduction interventions of the use of fentanyl testing strips and overdose reversal with Narcan.⁴¹

Conclusion

National Health Education Standards (2022), state learning standards, and other school district standards offer a vehicle to justify the teaching of opioid education, however, it is time for schools to take the necessary next steps to adopt and/or expand the teaching of this material. Not spending sufficient time on this critical subject matter, ignoring it all together, or thinking students will get this information elsewhere is not a healthy or proactive strategy. Based on the proliferation of drug-related deaths within the adolescent population, and the rapid increase of Fentanyl/Opioid deaths among adolescents, it is time for ATOD and health educators to embrace this subject matter and begin taking the next steps to offer students applied knowledge that adolescents can use. Providing students with an understanding of these drug dangers, the seriousness of this issue,

and how best to utilize Skill Building Strategies to avoid negative outcomes is critical. In order to have a major impact, we have to utilize evidence-based strategies such as social-emotional learning, particularly in the younger age groups, and social influence strategies, particularly when delivered through narrative messages that avoid didactic or fear-based delivery. And, while programs with proven effectiveness are not available for later adolescence, promising programs such as the Student Athlete Wellness Portal⁴² are available, however, it requires school partnerships for ongoing analyses. In sum, the stigma associated with opioids must not prevent schools from embracing the challenge before more lives are lost.

Addressing adolescent opioid drug use requires a multifaceted approach that encompasses prevention, early intervention, treatment, recovery support, and promoting harm reduction while involving collaboration between educators, school administrators, parents, and community stakeholders. Few promising high school interventions are emerging that require schools to embrace the change of addressing a stigmatized public health opioid crisis, in new and creative ways while meeting the challenges of their educational mission. It is important that they resist the temptation of simplistic or popular solutions, such as having recovering addicts speak at school assemblies or providing limited drug information during a health class; examples such as these are not demonstrated to accomplish the ends of reducing opioid misuse. By selecting and implementing interventions that have a solid evidence base, educational institutions can make significant strides in preventing drug use, promoting student well-being, and creating a supportive and drug-free life.

Conflicts of Interest

None to declare.

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