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& Developmental Adolescent Health

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& Developmental Adolescent Health

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When the authors are up to 6 they are all listed. If there are seven or more, list the first 6 and add et al. Journal names are listed in the listed in the abbreviated form with the style used

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List the name of the author(s), title, followed by In: name of editor(s), edition, place of publication, publisher, date and pages. Example:

Jameson JL, Kopp P. Principles of human genetics. In: Kasper DL, Braunwald E, Fauci AS, Hauser SL, Longo DL, Jameson JL, editors. Harrison's principles of internal medicine. 16th ed. New York: McGraw-Hill; 2005. pp. 359-379.

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Figure 1. Diagrams describing the height of the participating adolescents, (a) boys, (b) girls

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Editorial

Dear colleagues,

a sixth issue of The Journal of Developmental and Adolescent Health (JDAH) is now available, and it presents an array of valuable information related to the health and development of youth. This journal is particularly aimed at healthcare professionals, researchers, and educators who focus on the well-being and development of adolescents. It serves as a resource for those looking to stay updated on the latest findings and best practices in youth health.

Among the main topics covered are mental health challenges faced by adolescents in in relation to the adolescent journey into sexuality and sexual identity, the impact of social media on youth behavior, and innovative approaches to pediatric healthcare and public health issues. One key article explores the response to school intervention programs and the need to inform the community about adolescent vaccinations. The findings are crucial for parents, educators, and policymakers who are working to create healthier online environments for youth.

The present edition will be a great experience for you. Staying updated helps in advocating for policies that promote healthier environments both online and offline, ultimately contributing to the well-being of the younger generation.

On behalf of the editorial team and content management of JDAH,

Artemis K. Tsitsika MD, PhD
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Editor in Chief of the Journal of Developmental & Adolescent Health (JDAH)

Asexual Aromantic Youth

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ABSTRACT

PURPOSE: Sexuality in humans has drawn scientific interest increasingly, and its thorough approach has revealed various patterns of expression. Being asexual or/and aromantic is an aspect neither fully investigated nor acknowledged. Sexual expression effects people's personality, their life choices, their health and their place into society, making it not an individual's matter but affects society as well.

MATERIAL-METHODS: Articles were searched in the international literature, in reputable websites such as Pub Med, Google Scholar, but also other internet resources, using key words "asexuality, aromantic, adolescents, young adults, sexual identity, sexual orientation".

RESULTS: studies, reviews and social networks around asexuality showed that it is a different sexual expression not much investigated but seems to claim prevalence almost the same as other sexual minorities. Asexual doesn't need to be aromantic as well, or feel distress because of it, differentiating this behavior from sexual or psychiatric disorders. Many factors may contribute to the formation of this sexual expression like gender, age, religiosity, cultural background, health issues and socioeconomic status.

CONCLUSIONS: sexual identity is a complex issue and must be seen through the needs and beliefs of people involved to better understand it and accept it. No safe conclusions can be retrieved from typical investigations who do not consider as many shades as possible of this sensitive human expression, especially when it concerns the young.

KEY WORDS: asexuality, aromantic, adolescents, young adults, sexual identity, sexual orientation

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Introduction

Today, more than ever, it has become evident the need to acknowledge fluidity in human sexuality. Society evolves, matures and through the remarkable expansion of internet communication networks, almost all people can express their inner beliefs, needs and ways of relating with each other.

The complexity of human sexuality relies to the fact that many different factors must be taken into account, such as the gender of people to whom one might feel attracted to, the gender of people to whom one engages in sexual activity and finally how people describe their sexuality (1).

Social relationships, sexual orientation and identity issues, are matters of great importance in adolescence and early adulthood, which are the age milestones in people's lives characterized for extended exploration of the world and at the same time self -awareness, self-determination and identification.

Although a lot of literature has been dedicated to LGBT people, very few articles deal with asexouality as a way of living, choice and expression. In the present study, there is going to be an approach to this entity which seems to claim almost the same rates as the rest of the other sexual minorities and academic interest for it increases over the years (2).

Sexuality is not the only vague issue that scientists argue about, but puberty itself has not accurate definitions, age limits, clarified relationship between pubertal development and sexual activity as well as other interactions (3). While entering adolescence, young people seek knowledge and skills to transform them to complete adults who, apart from other responsibilities, rights and roles they undertake, are also getting engaged in romantic and sexual relationships (4). Even sexual behavior needs to be specified, for instance if it means only sexual intercourse (vaginal or other), or noncoital sexual behavior such as petting, kissing, caressing and oral sex (3).

In the present study, there is going to be an approach to describing and shaping asexuality in adolescence and young adulthood, which means people aged 10-24 years old, and such an approach, serves not only the scientific and public curiosity about another sexual minority, but since sexual expression defines the life choises, (e.g. create a family and obtain ancestors) and might affect or be part of the mental and physical health of a person, it is clear that it is something that affects community as a whole (5).

Definitions

More and more studies are trying to set the right definition of the term asexuality. It was first mentioned by Alfred Kinsley et al in 1948 who described it as "bipolar, unidimensional continuum from heterosexuality to homosexuality with bisexuality in between", by Storms in 1980 who proposed a "two-dimensional map of erotic orientation categories: homosexual, bisexual, heterosexual and asexual" , but it was Bogaert in 2004 that started investigating in depth this sexual minority in the resent years, and since then the original definitions of asexuality have been changed to be broad enough and as un umbrella to cover as much as possible relative situations and expressions (6, 7).

Bogaert in 2004 prescribed asexuality as "the state of having no sexual attraction for either sex", but even Bogaert himself admitted that this statement doesn't include all possible aspects, for example sexual behavior and sexual identification are imperfectly correlated, and of course sexual attraction doesn't include arousal experiences like masturbation, fantasy and sexual activity (8). Finally, asexuality the way it was first mentioned, doesn't consider chronic or debilitating health conditions that may lead to low or not at all sexual functioning and/or activity (e.g. spinal cord injuries or psychiatric conditions) (8).

Brotto et al in 2007, questioned if current definitions of asexuality did indeed fulfill what self-identified asexuals feel for themselves (9). In 2001, an American college student, David Jay, driven by his exasperation due to the misunderstanding of community towards asexuality, he created a small page on his university account that grew rapidly into the wide Asexuality Visibility and Education Network (AVEN) (10). The founder of AVEN proposes that asexuality could be a "label that people use to figure themselves out" and that asexual people "have the same emotional needs as anyone else and like in the sexual community they do vary widely in how they fulfil those needs" (11). Thus, in AVEN definition "an asexual is someone who does not experience sexual attraction. Unlike celibacy, which people choose, asexuality is an intrinsic part of who we are. Asexuality doesn't make our lives any worse or any better, we just face a different set of challenges than most sexual people. There is considerable diversity among the asexual community;

each asexual person experiences things like relationships, attraction and arousal somewhat differently" (12).
It is quite clear, that the academic definitions of asexuality, do not describe the romantic aspect of the relating process. Suleiman et al explore the impact of cognitive and social-affective development in adolescents that can lead them to experiment and learn through romantic and sexual experiences (4). Young people associate with peers, and by this prosses they discover sexualized feelings of attraction and so can motivate relationship-facilitating behaviors. One very significant devolution happening in puberty is the stimulus and willingness to experience romantic love (4). New feelings, new emotions and new inner forces are being experienced from adolescents, who are not always able to distinguish between platonic, romantic, sexual attraction and relationship (4). Almost all academic definitions of asexuality do not consider the puzzled emotions of the young person and in contrast, make the AVEN definition more appropriate. In other words, it seems that being asexual does not equal aromantic.
Though there seems to be a lack of an official/scholar categorization of people who identify themselves as asexoual and/or aromantic, there are very few studies and reports , mainly from asexouals/aromantics themselves, who describe the asexual spectrum as three subcategories: a) asexual persons as the ones who have none or very little sexual attraction (7), b) grey sexual as the ones who experience rare or occasional sexual attraction (10) and c) demisexual as the ones who experience sexual attraction only when they create a strong emotional bond with the other part (7,10,13). Aromantic people, don't express romantic attraction and could be divided in a) aromantic who can't feel any romantic attraction or very little (8, 14), b) grey aromantic who experience rare or occasional romantic attraction (14) and c) demi-aromantic who experience romantic attraction only when they create a strong emotional bond with the other part (8,14). As it was mentioned above, asexual and aromantic identity can co-exist or can be independent entities (7,15,16,17).
Nowadays, it is clear enough, that asexuality as it was discussed above, must not be confused with asexual aversion disorder and hypoactive sexual desire disorder (HSDD) where there is an aversion toward partners of either or both genders, but also an aversion for genital contact with these partners or even minimum sexual desire for them, plus feelings of extreme anxiety and stress at their partners' presence (8, 17).

Prevalence

Antony Bogart in 2004, was probably the first to study, in a scientifically organized way, asexuality's prevalence, by using data from a very large national sample (n>18,000) of British residents, 16-59 years of age. He came up with the estimation that asexual represent approximately 1% of the sample though he found many limitations to his study (8). Ten years later the same author, investigated a new sample of people aged 16-49 years old using a different approach than before, and he found that asexuals represented the 0,5% of the sample (5). The new prevalence was attributed to the method used and because the sample included younger persons (5). Some years earlier, a National Survey in the United States by Poston et al, in 2010, referred to people aged 15-44 years old, who reported not being sure whether they have ever felt any sexual attraction the 0,8% of the male and the 0,7% of the female sample (18). 5% of the females and 6% of the males of the same sample, answered that they had never had sex.
Brotto et al, conducted a study recruiting their sample from the AVEN community, and to their surprise 80% of men and 73% of women labeled themselves as asexual when presented with a forced choice question about their sexual orientation and not all of them as expected (9). Maybe this can be due to the language used to self-identify, and that asexuals and other poelpe in general, do not label and conceptualize themselves and their relating patterns in the fixed terms a scientific survey may use (9).
It is clear though, that most of the studies do not refer to adolescents solely or at least until the age of 24 (young adults), and this must be taken seriously under consideration since many persons under the age of 24 may lack experience in relating at an emotional or sexual level due to many reasons (developmental, ethnic etc) (6). Bogart in 2004 stated that people of young age could be described as "presexuals" because of the above, and this is something that can change as the grow up (8). Priebe et al, conducted a national survey of 3.432 late adolescents (high school seniors) in Sweden, where four measures of sexual orientation were included, and asexual or mostly asexual emotional or

sexual attraction was reported in 0.5% (6). The authors underlined that "the use of romantic attraction or sexual behavior cannot be recommended as the only measure of sexual orientation in a study. Researchers need to carefully choose, depending on the context of the survey and the research questions under investigation, which dimensions of sexual orientation, and which measures they wish to include in their survey" especially with youth.

Demographic and other characteristics

Sexual identity and in particular asexuality have certain relationships with demographic characteristics. Taking in mind that adolescents and youngsters, since they lack experience in romantic and sexual relations, it is understandable that asexual people are usual older than sexual. Also, men are fewer than women and they are less likely to be cisgender (8,2). As expected, asexual people have fewer sexual partners, and less frequently sexual activity (8). A significant minority of asexual could be in a long-term relationship or even in a marriage or cohabiting (8,2). There is some evidence that they declare to be more religious than sexual people (8). Their socioeconomic status is more often low and are less educated than the sexual individuals (8). There are many chances to be self-defined as queer or transexuals and most of them belong to a gender minority (19,20, 21). Being assigned female gender at birth and being in some health distress is more possible in asexual youth (22). Differences based on racial-ethnic identity showed that Black or Hispanic/Latino, are more possible not to identify themselves as asexual. No other noteworthy differences involving their caregivers' educational status, geographic region and age were found (22). Simon et al, verified previous research in adult population where a link was found between disability and asexuality. The same authors found that compared to asexual cisgenders, transgender asexual youth exhibit more depression, think less of themselves, lack more often family and social support in general, explaining why they feel insecure about their safety in school environment (22). In contrast, they report capability in managing stressful situations and they declare supported by their family and social environment regarding their sexuality choices and their sexuality in general (22). Cisgender asexual youth had poorer outcomes compared to cisgender non-asexual peers, regarding internal stressors, depressive symptoms, lower self- esteem, sense of being safe at school, and felt less supported from family and social milieu in general as well as due to their sexuality (22).

Thus, all asexual youngsters, are more likely to experience mental health problems. Given the complexity of the results, authors believe that more research is needed with more balanced and qualitative questions that can approach more accurately the true facts and feelings of the people asked, overcoming stereotypes, stigmatization and racist perceptions.

Asexual youth and society

Asexual people, as part of the society, don't feel accepted for who they are and experience complex stigma and marginalization in a highly sexualized dominant culture (23).
It is very usual for all subjects who do not fulfill sexual norms to be pathologized and especially asexual people are treated as if they are invisible despite the increasing recognition of the rest of the LGBTQ community, since that even there, they are underrepresented (24,25).
It is not rare, that situations like the ones described above, are being formatted by the so-called important others. Family members, classmates, teachers and friends, have limited knowledge about asexuality, and most probably think negative of it, resulting in putting pressure for comforting to more traditional expectations for sexual behavior, attraction and expression (26,27,28).
Asexual people, especially the young, face self-stigma, internalization of society's negative attitudes around asexuality and they develop mental and psychological health problems in accordance with strong feelings of shame (29,30). Surprisingly, though they exhibit high prevalence of depression and somatic pain, they show less possibility of committing suicide or alcohol, marihuana and smoke abuse (29,30,31).
Their health issues, grow bigger and left untreated, due to the unsatisfying health services they receive, because most of the health care workers, have stereotype approach to sexual behavior, do not understand asexuality as a variant but as a pathological expression maybe part of a psychiatric disorder, and asexual people cannot communicate honestly with them (20,13). Mclnroy et al found that only 17% of asexual people have revealed their sexual identity to a doctor or a health care worker in general (20).

Asexual people in Greece

In Greece, there has never been any official, scholar national survey about asexual behavior more specifically for the asexual/aromantic youth. As expected nowadays, internet societies are more advanced than academic, traditional ones and in

2011, a LGBTQ + community was established in Greece, embracing all sexual expressions, trying to sensitize society and to support their members through weekly open meetings, legal assistance for violence victims and psychological support for all (32).

Conclusions

Although sexual expression and differentiation is better acknowledged and accepted the last decades and LGBT community has gained rights, fair and equitable treatment, asexual people on the other hand, are still understudied and feel as if they are invisible. This sexual minority, that has prevalence most probably the same as the rest, is much less recognized in adolescents and young adults. Their marginalization from family, important others and society in general, stigmatize and pathologize their feelings and way of living, leading them to develop inner shame, anxiety, distress, mental and psychological problems, and difficulty to admit their diversity even to health care workers.

Studies so far, fail to fully conceptualize all aspects of the asexual/aromantic personality and investigators admit that they need to overcome the limitations at their studies by better understanding and forming questionaries that are more wide, take into account demographic parameters such as family, cultural, educational, socioeconomic, religion background, mental and somatic health status, and exploratory questions about gender, mating needs and feelings as if they could see through their subjects' eyes and self-identification.

It is not only a matter of justice and human rights. Society's future is better when all its members are visible and accepted, despite their differences, and when their needs are met to maintain health for themselves and for healthier relationships in all sectors.

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Review

Gender Fluidity: Consequences for Youth's mental health and important protective factors

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ABSTRACT

Introduction: This review aims to delineate and analyze the acceptance of gender fluidity which refers to an individual's gender identity being flexible and not confined to traditional binary gender categories of male and female. Important differences in various terms that may or may not fall under the term gender fluidity such as 'Genderqueer' and 'Non-binary' etc. will be discussed.

Methods: After presenting the definition, the important differences and the historical background of the concept, data from various studies will follow. The survey data are mainly from the USA, Canada and Greece and cover the period 2009 to 2023. Very often the exact words of people with gender non-conforming are quoted.

Discussion: Evidence is recorded on the mental health consequences for gender fluid young people due to non-acceptance by family, school and friends. Negative mental health consequences for young people lead to a model of minority anxiety about the health of sexual minorities. Instead, attempts of acceptance by the family and school lead to a supportive framework. For example, the Genders & Sexualities Alliances (GSA program operating in Canada will be mentioned and its results will be presented. Finally, there is a reference to the international legislation and that of Greece in particular, and the governmental treatment of gender fluid people.

Conclusion: The negative consequences on mental health as a consequence of the non-acceptance of gender fluidity make evident the need for direct intervention and recognition of young people who want to express themselves in this way.

Keywords: Gender Fluidity, youth, mental health, family, school

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Introduction

Gender fluidity is a concept that refers to an individual's gender identity being flexible and not confined to traditional binary gender categories of male and female[1,2].In many literature surveys it seems that there is a large amount of young people who are wondering about their gender and sexuality and that the term «gender fluidity» has captured the attention of young people. The non-acceptance of this situation by the school, their families and professionals leads to negative consequences for the mental health and well-being of young people. For this reason, ways and initiatives are presented where the young people's environment can help them and reduce the stress and negative emotions they may feel due to non-acceptance.

Historical Retrospective

Gender fluidity is mentioned for the first time by Robert Stoller. In his book Sex and Gender, he states that gender was not fixed and can vary over time and stresses the difference between biological sex and gender expression[3]. Those who identify as gender fluid often express themselves in a way that is not stereotypically associated with their birth sex, and may present as masculine, feminine, or androgynous at different times or a combination of these. This identity is different from genderqueer or non-binary, which are umbrella terms that encompass a wide range of gender identities that fall outside of the binary[1]. More detailed, in the 1990s, the term "genderqueer" was used by some activists and scholars to describe people who rejected traditional gender categories[4]. This term has since been adopted by many people who are not binary and do not conform to gender as a way of affirming their identity in recent decades in Western countries. In contrast, it seems that in many indigenous cultures around the world, gender has traditionally been considered more fluid and less binary than in Western societies[7]. For example, in Native Americans, people who embody both an androgynous and a feminine characteristic are called 'two-spirit people'[8].

Significant differences in similar terms

To avoid confusion regarding terminology, important differences in terms are listed. "Androgynous" is a gender expression that combines masculine and feminine characteristics. "Mixed Gender" or "Pangender" incorporate both male and female aspects and refers to a gender identity where a person experiences or identifies with multiple genders. A "Gender Fluid" person varies between different gender identities and may change over time. Also, "Bisexual" defines as a romantic or sexual attraction to both males and females and "Pansexual" defines as a romantic or sexual attraction to all genders or regardless of gender "Gender", "Gender neutral", "non-Gendered", "Genderless", "Neuter" or "Neutrois", do not have sex[5]. Therefore, taking all the above into account, we could say that because gender is culturally and historically specific, internally contradictory and subject to change[6], the restriction of gender to only two options creates discrimination against people who do not identify with either of them and this raises serious moral concerns. These ethical concerns even apply to the research part. For example, a 2020 survey in the UK wanted to examine whether questions about sexual orientation and gender fluidity (SOGI) in surveys represent sexual minorities. It was found that the questions were vague and failed to account for the fluidity and complexity of identity, resulting in the exclusion and under-representation of people with gender fluidity[5]. An African-American transgender from the survey says "When you ask a person their identity, I think instead of giving them boxes and labels to choose from, the nicer thing would be to draw a line and let the person put in what they want for themselves"[5].

In the Western world today, it has become an important part of the debates during the feminist movements of the 60s and 70s[9] and it seems that today gender fluidity has great acceptance among young people[10]. In a 2015 US study of more than 22,000 gender diverse adults, 2/3 described themselves as transgender, while 1/3 described themselves as non-binary, fluid, or genderqueer[11]. These proportions were reversed in a study of adolescents, with 2/3 describing themselves as non-binary and 1/3 describing themselves as transgender[12].

Youth and Gender Fluidity

Based on the theory of mind development[13], children in middle childhood (6-12 years) begin to understand that individuals have unique beliefs, intentions, feelings, situations and perspectives. These relate to their cognitive developments, which are in turn influenced by the social context in which they grow up. Often, children's social environment has a binary view of gender and this leads to gender categorization also through clothing, toys, toilets, hairstyles, etc. Thus, some adolescents

adolescents internalize this binary view and adopt it throughout their lives. Others may also experiment as they are at an age of exploring and structuring their personality but still end up with a fixed expression of their gender. But there are some other adolescents for whom exploration and experimentation continue indefinitely and become part of their life experience with gender[14].

It seems that one of the reasons why the percentage of young people who do not want to express themselves in a binary way has increased[15] is because of social media, which has allowed young people from all over the world to get in touch with gender fluidity and ask themselves if it is reflected in their personality. Thus, there is a need for understanding and acceptance of this new reality by all adults who interact with young people to reduce the negative effects on their mental health.

Consequences on the mental health of TGD (Transgender and gender diverse) youth research conducted in 2020 in Chicago showed[16] high rates of negative health outcomes in TGD youth compared to cisgender peers. TGD youth experienced high rates of negative psychosocial experiences, including lack of social support, victimization, and violence. TGD youth reported receiving the least support from families compared to friends and significant others. Another survey conducted by the Youth Risk Behaviour Survey in 2015 on LGBTQ+ (Lesbian, Gay, Bisexual, Transgender and Queer) community at school showed that[17] over 60% of the LGBTQ youth community have long experienced feelings of powerlessness compared to 25% of heterosexuals. Also, 67% have heard homophobic comments from their peers, 58% have felt unsafe because of their sexual orientation and 43% have felt unsafe because of their gender identity and expression. Only 12% of the LGBTQ community reported teacher intervention.

The Gay Lesbian Straight Educational Network National Survey (GLSN) is an international organization focused on creating safe schools. One of the largest surveys has been conducted by GLSN in the U.S. in 2011[18]. The researchers try to examine how common it is for non-binary gender offensive language to be used in school, the degree of victimization of those people, the impact on their academic performance and mental well-being, and the interventions that can mitigate the negative effects. The results in terms of negative comments show that 84.9% of students heard “gay” used in a negative way (e.g., “that’s so gay”) frequently or often at school, and 91.4% reported that they felt distressed because of this language.

Concerning safety and victimization at school it seems that 63.5% felt unsafe because of their sexual orientation, and 43.9% because of their gender expression. This led to poor well-being because as it seems students who experienced higher levels of victimization based on their sexual orientation or gender expression had higher levels of depression than those who reported lower levels of those types of victimization[18]. As for the teacher’s intervention about half (53.1 %) of students who had many (six or more) supportive staff at their school felt unsafe in school because of their sexual orientation, compared to nearly three-fourths (76.9%) of students with no supportive staff. For example, some student statements will be mentioned. “I just felt scared, alone, and if I told them, what would they think?” (Student 14/15 years old), “I thought it was always better to ignore them because I thought that maybe if I didn’t pay attention to them, they would stop” (Student,12/13 years old).

On the other hand, there is the parental context. Research shows that the mental health of young people who do not accept their gender binary is positively affected when their parents accept and affirm their gender identity and help them access supportive resources[19]. Conversely, unsupportive parents are a significant aggravating factor.

Another factor considered is the role of the medical community concerning gender fluidity. There seems to be a lack of knowledge among doctors and psychologists about bisexual and non-binary identities. This may hinder their ability to provide appropriate care[20]. A survey of members of the Adolescent Health Society and the Paediatric Endocrine Society in the USA[21] confirms that 62% of specialists felt comfortable providing medical care to trans young. But of those only 47% felt completely confident in their ability to do so. So apart from the lack of knowledge and the absence of proper training of specialists, it seems that there are many disagreements within the medical community, such as the safety of hormonal treatments [22]. More specifically, there seems to be a great division in the medical community about whether it is ethical and medically beneficial for someone to undergo a sex change and whether there is finally an appropriate age to take responsibility for oneself. As regards Gender Identity Conversion Efforts (GICE) in the European Union (EU), four Member States - Malta, Germany, France and Greece - have banned these practices, while several regions of Spain have imposed administrative bans[23]. However, the conclusion is that no literature can suggest when it is the right time to undertake gender reassignment efforts. To be able to have more evidence about

the appropriate time, we need more research.

So, exposure to stressors factors such as stigmatization, rejection, violence, and discrimination leads to an accumulation of psychological stress and, by extension, to a deterioration of the mental and physical well-being of gender minorities. This is the Minority stress model of sexual minority health (Meyer, 2003) [24], which is important to understand if we want to help young people who struggle with acceptance of their identity.

What could be done?

In Canada, there is a program that takes place in schools. It involves organizations led by non-binary or gender fluid students along with other supportive youth to build community and advocate for issues that affect them in and out of schools. This is the GSA (Genders & Sexualities Alliances) program[25]. So, it seems that GSA provides a safe space for LGBTQ youth in middle and high schools. This program addresses broader social justice issues related to gender and education. Research has therefore shown that the presence of a GSA has a positive and lasting impact on the health, well-being and academic performance of students. It also protects against discrimination based on sexual orientation or gender identity. Research conducted in 2015 in Canada showed that many young adults reported that eventually through the program they had supportive friends who helped them overcome their difficulties when before they thought they were marginalized[26].

A major systematic review conducted in 2022[15] found some appropriate interventions that can be made to help young people who are struggling with gender issues or who feel helpless. First and foremost, the introduction of a curriculum that includes perspectives on accepting children of different sexual orientations is needed and will lead to a reduction in victimization. A parental system that will provide social support for young people. Also, peer support enhances the sense of security and a positive environment. Very important is for principals and teachers who have the power to take action and raise awareness of students and parents for example through community events (e.g. community art gallery). Finally, of vital importance is the need to recognize a “hidden curriculum” that operates outside the formal academic courses. There is a strong emphasis on completing the curriculum while children have not yet learned basic rules of behaviour and respect for their peers regardless of gender. This could be done through various games and role plays depending on the grade level and clearly by introducing and acknowledging the role of psychologists and their huge contribution to the school environment.

In the eastern world marriage is allowed and it seems that the rights of homosexuals are more recognized than in the member states of the European Union. More specifically, in Western/Northern Europe it seems that marriage is allowed compared to Southern/Western Europe where there are still many restrictions on the expression and acceptance of these people[30].

What is happening in Greece regarding the rights of LGBTQ+ people?

As far as Greece is concerned, on the one hand, there has been an improvement in both social views and institutional attitudes. The cohabitation pacts are legally recognized. In 2015, civil partnerships are also legalized for same-sex couples. In 2017, a new law was enacted concerning the change of legal gender. In 2014 comprehensive laws were enacted to punish hate speech and crimes against LGBTQ+ people. Mental health services such as individual and group Psychotherapy and counseling are offered. Examples of associations where these services are offered are the helpline - 11528, the Rainbow Therapists groups, the Colorful School and the Bisexual Support Association[27].

On the other hand, however, there are shortcomings in the areas of mental health[27] and in the knowledge of specialists[28]. There are no guidelines and codes of conduct for psychologists and therapists. There are even specialists who not only do not accept gender fluidity but encourage gender reorientation as they interpret it as a pathology. There is a lack of access to certain categories of LGBTQ+ people in the labor market due to negative stereotypes and social prejudices. And most importantly, while the constitution has had anti-discrimination laws in place since 2005, there is insufficient access to the social security system and health services[29].

Conclusions

The high percentage of young people who are now experimenting with their gender is evident. If families, schools and society in general do not accept the way young people want to express themselves, the negative consequences for health, education and well-being are evident. The role of experts in particular is to explain to young people who are wondering about their gender, exactly what gender fluidity is and why they do not need to feel unaccepted.

But no matter how hard they try, if society does not fully recognize their rights and allow them to express themselves by reducing the level of oppression, nothing will change. I would like to conclude this paper by quoting the words of Alexandra Vassiliou, scientific manager of the Orlando LGBTQ+ team in Greece. "I have met many therapists, young and new to the profession, but also experienced ones, with years of practice in the profession, who have all the good intentions and will to support people in their right to self-determination and a life with dignity. That is, professionals who are not homophobic/transphobic 'in opinion'. Unconsciously, however, operating within the homophobic and transphobic mental health field, which is dominant in Greece, they unknowingly reproduce views and positions that are not only unscientific but also deeply abusive [27]."

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Brief Review

Toxic Influencers on Social Media: Impact on Children and Adolescents. A Brief Review

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ABSTRACT

As the advancement of technology increases, the use of social media by children and teenagers is becoming more and more common. These young age groups tend to spend their time interacting with online friends and seem to follow famous people, influenced by the content on their screens. Influencers are people who have become widely known through the promotion of themselves and their lifestyle on social media. They often work with commercial companies aiming to influence users to consume the products they promote. The negative effects of toxic influencers on children and adolescents are widespread and widely accepted. This brief review demonstrates high rates of addictive and risky behaviors, over-consumption patterns, eating disorders and negative body image in children and adolescents due to the negative influence of content promoted by toxic influencers on social media. In these circumstances, both scientists working with the young population and parents should act as a shield against the risk of disruption to children's physical and mental health.

Key Words: toxic influencers, adolescents, children, social media, review

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Introduction

Social media is nowadays used by billions of users around the world, making it highly attractive. Therefore, through social media new leadership figures, influencers, are emerging. Influencers are people whose careers depend heavily on social media.[1] For most of them, being involved on the internet is not only a profession but also a way of life. They are recognized by many as opinion leaders as they shape public attitudes and persuade their followers.[2] They are powerful individuals who have a remarkable number of followers who follow their posts on a regular basis.

Influencers use social media almost daily to gain fame, glory, and money.[3] As experts in modern marketing, they approach topics related to health, fashion, beauty, sports, or other social issues.

Influencers are divided into categories based on the social media through which they address their audience. Therefore, an influencer who posts content on a blog is then considered a blogger.[4] If he creates videos on YouTube, then he belongs to the category of youtubers.[5] If he creates content on Instagram, he is considered an instagrammer.[5] Finally, if he conducts challenges on TikTok, then he is a TikToker.[5]

The influencer in question enhances his appeal to the world if he shows his personal life, has experience in using social media, fame, attractive physical appearance and unique yet extravagant content to post.[4]

However, in order to be able to receive the status of an influencer, one must first and foremost spark the interest of his audience, have a significant number of followers as well as likes and comments on his posts. Finally, it is essential that he or she leads a significant number of people to make decisions based on his or her recommendations or to change their consumption habits because he or she has suggested it to them.[6]

The dynamic presence of influencers online has increased in recent years with children and adolescents being the main contributors. Despite the opportunities for children and adolescents to easily access data and information provided by influencers, their influence has often been considered toxic (toxic influencers). Consequently, issues of depression, anxiety and other emotional disorders, distorted body image, adoption of unhealthy or even addictive behaviors and risky actions have been reported. Toxic influencers therefore play a leading role in the negative impact on the physical and mental health of children and adolescents.

Method

This brief review was performed under the recommended reference framework and the PRISMA guidelines. It was conducted in the following databases: Pubmed, Google Scholar, SCOPUS, JSTOR and PsycInfo, up to 14 April, 2023. The algorithm used for the research is the following: (Teenagers OR teenager OR adolescents OR adolescent OR adolescence OR youth OR young people OR young person OR youngster OR teens OR teen OR puberty OR pubescent OR youth OR minors OR minor OR children OR child OR kid OR kids) AND (Toxic influencer OR toxic influencers OR bad influencer OR bad influencers OR negative influencer OR negative influencers OR greek influencer OR greek influencers OR toxic instagrammers OR toxic instagrammer OR bad instagrammer OR bad instagrammers OR negative instagrammer OR negative instagrammers OR toxic blogger OR toxic bloggers OR bad blogger OR bad bloggers OR negative blogger OR negative bloggers OR toxic youtuber OR toxic youtubers OR bad youtuber OR bad youtubers OR negative youtuber OR negative youtubers OR toxic Tiktoker OR toxic Tiktokers OR bad Tiktoker OR bad Tiktokers OR negative Tiktoker OR negative Tiktokers) AND (Negative effect OR negative effects OR negative impact OR negative impacts OR bad effect OR bad effects OR bad impact OR bad impacts OR toxic effect OR toxic effects OR toxic impact OR toxic impacts). The review focused on the effects of toxic influencers on children and adolescents aged 4-18 years. There was flexibility in the eligibility of research studies. The review included empirical studies, case studies or reviews.

Addictive behaviors/Smoking

According to the prevailing view, exposure to more social media posts with e-cigarette content results in more positive attitudes towards e-cigarettes among children and adolescents. As a typical example, adolescents in 2019 from California and Canada who made heavy use of social media were more willing to consume e-cigarettes as they did not understand the risks of smoking.[7] Indeed, it has been accepted that the influence of e-cigarette content did not depend on whether the content appeared to come from a peer or adult influencer or an advertising company.[7]At the same time, e-cigarette use among US teens increased in 2020.For example, in a survey of 1047 US teenagers, 55% were playing tricks with cigarette vapour while watching TikTok videos and 21% were using flavoured e-cigarettes.[8]Case in point, the lungs of 16 year old Ewan Fisher where after 6 months of playing tricks with cigarette smoke he resembled the lungs of an 80 year old lifelong smoker.

Risky tobacco use behaviors were therefore associated with e-cigarette flavors and tobacco tricks.[8] More specifically, in 2020 Asian influencers were dominant, followed by Americans and Europeans as they had 3 times more engaging content.[9] In fact, Asian and American influencers had 6 times more followers under the age of 18 compared to Europeans.[9]

Addictive behaviors/Alcohol

Minors are also exposed to a large number of alcohol posts by influencers on a regular basis. More specifically,a survey in the Netherlands in 2019showedthat 63.5% of influencers (n=178) recently made alcohol-related posts, which were perceived by minors in a positive way as they depicted people laughing or drinking with others.[10] In fact,75 of the 384 alcohol posts showed pure brand alcohol which suggests that the alcohol industry has found a way to circumvent the law and reach minors.[10] Incidentally, when influencers disclosed that they were advertising an alcohol brand they had fewer likes and comments than when they did not make such a disclosure.[10] Additionally,8 out of 25 posts did not have the slogan “no alcohol under 18” as recommended.[10] In addition, adolescents preferred to emulate lifestyle influencers more in the context of alcohol consumption. Typical examples of the strong influence influencers have in the context of alcohol consumption include a TikTok challenge that trended for teens and garnered over 800+ million views where you had to pose for a virtual photo shoot with a beer brand and Jason Derulo, who is the 15th most followed person on TikTok and posted 9 videos promoting Bedlam Vodka with a total of 88700000 views, 10228000 likes, 64251 comments and 42109 shares.[11]

Overconsumption tendencies

In general, in childhood and adolescence there is a strong difficulty in recognizing hidden advertising in social media, while at the same time, consumption habits develop in these ages. These consumption habits, especially of preschool children, are influenced by influencers of the same age or slightly older than them.[12] By way of example, we could mention that teenagers in Romania demonstrate that even when Instagram ads are in the native language, this recognition of the ads does not lead to a critical evaluation of their purchases.[13] Meanwhile, 81% of American parents let their children under 11 years old watchYouTube and are exposed to thousands of ads before the video.[12]

Of particular interest was a related survey conducted among Greek 18 years old on purchasing attitudes. These teens (n=920) followed influencers related to fashion, beauty, food, and entertainment and were heavily influenced in their buying habits. Initially, 60% used Instagram quite a bit to a lot while 68.6% followed influencers on Instagram that promoted products.[14] Indeed, this research confirms the influence of influencers on the consumption habits of Greek 18 years old since 47.93% preferred to buy from Instagram.[14] As an illustrative example, there is also a children’s YouTube channel, Ryan’s Word, aimed at children aged 2-6 years old, where a young boy promotes products and toys, shaping the preferences of thousands of children.[12]

Risky Behavior

To gain attention, influencers mostly share dangerous selfies (mostly altitude-related) to gain attention, but they have claimed 137 lives around the world between March 2014 and December 2016.[15] In fact, India is the country with the most fatalities from selfies.[15] Most of the selfie-takers are aged between 15-18 years and hence, they are individuals who take dangerous selfies and post them on social media influencing their followers to take similar ones.[16] Also, apart from dangerous selfies, it is crucial to note risky challenges that have become widely known on social media. To begin with, the KIKI CHALLENGE involves people dancing to the lyrics of the song “Kiki, Do you love me?” and filming themselves while a car drives down the street.[17] There have been reported cases of car accidents, injuries, accidents, crashes and even deaths of young people. Case in point, Will Smith performing the Kiki challenge dance encouraging his 77 million followers to do the same.[17] Also, Shane Dawson is a popular YouTuber with more than 20 million subscribers where he publicized the BLUE WHALE CHALLENGE.[18] In 2015 two teenage girls from Russia (Angelina Davydova and Diana Kuznetsova) after watching well-known influencers publicizing the challenge, participated in it, which cost them their lives as they fell from high floors of apartment buildings in order to complete it successfully.[18] Furthermore, Slender Man’s story began to spread in videos of well-known influencers, such as Willytube, which thousands of children watched.[18] Thus, on 31 May 2014, two 12-year-old girls in the US (Anissa Weier and Morgan Geyser) tricked their friend in the woods and stabbed her nineteen times to show their devotion to this

creature.[18] Finally, in July 2018, YouTuber ReignBot, made a video explaining the Momo Challenge aimed at children as young as 8 years old.[18] It's about a creature that sends messages and commands and asks children to perform violent acts such as cutting themselves, harming others, and taking their own lives. The first recorded victim was a 12-year-old girl in July 2018 who was found hanged in the backyard of her family's home near Buenos Aires.

Eating disorders/Body image

The effects of toxic influencer on children and adolescents have also been strong in terms of eating habits and behaviors. Recent research is indicative of the toxic influence on the intake of unhealthy foods in children and adolescents.[19] Many studies have emphasized the influence of TikTok trends, where famous influencers promote themselves by challenging children and young adolescents to participate in high food intake challenges or rigorous exercise in order to lose weight. The results predict risk of obesity, unhealthy food intake or excessively low food consumption with concern for anorexia.[20-21]In particular, a 32.6% risk of obesity and a 6.7% risk of bulimia in children and adolescents (mean age 16.4 years) participating in the Nutella Challenge was found (n=373).[22]This trend was widely promoted by popular social media influencers and aimed to consume a jar of Nutella chocolate in just two minutes. Negative effects on food intake have been accepted to have a strong impact on the body image perception. Children and adolescents show a tendency to compare themselves to the photographs and videos of toxic influencers in social media and form a negative perception of their body image.[23] In fact, many adolescents experience anxiety, low self-esteem and depressive symptoms as a result of negative body image.[24]

Conclusion

Toxic influencers have a strong negative effect on children and adolescents, affecting their daily life and actions. Children and adolescents often engage in addictive (e.g. smoking, alcohol) or risky behaviors, over-consumption habits, exhibit abnormalities in diet and food intake, and at the same time seem to constantly compare themselves to the influencers by constructing a negative body image. Because of these significant effects on physical and mental wellbeing, scientists working with the child and adolescent population are called upon to build a shield against the toxic content. At the same time, parental mediation plays a significant role since parents are the gatekeepers of children and adolescents' negative exposure to online persuasive messages.

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Original Research

Prevalence and distribution of human papillomavirus (HPV) serotypes of the anogenital region in adolescent boys and young men: a systematic review

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ABSTRACT

The objective of this study is to investigate the impact of HPV vaccinations on the prevalence of HPV serotypes on adolescent boys and young men through a systematic review. The search aimed for clinical studies in English up to 2022 concerning HPV serotyping of samples from randomly selected, non-high risk male participants, aged 11-25 with no underlying pathologies. The search resulted in 18 eligible articles among which 15 concerned un-vaccinated and 3 concerned vaccinated young males. In 4 articles the participants were homosexual/bisexual, in 4 they were heterosexual while in the rest of the publications the sexual orientation of participants was mixed or unspecified. In about half of the articles, sample collection predated the initiation of national HPV vaccination programs for girls in the respective countries. In the selected articles, HPV seroprevalence varied significantly depending on vaccination rates and variability in methodology. Overall HPV prevalence was found to be high in most studies. Significant reduction of HPV vaccine-type prevalence was detected only in directly vaccinated adolescent boys and young men.

Key Words: HPV; adolescent boys; HPV vaccine; seroprevalence

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Introduction

The Human Papilloma Virus (HPV) is the most widespread sexually transmitted infectious agent, which is responsible for causing a variety of skin and epithelial lesions in the anogenital area of males and females, including precancerous lesions and carcinogenesis (1). The HPVs are categorized in high- or low-risk types based on their tumorigenicity. Types 6, 11, 40, 42, 43, 44, 54, 61, 72, 81 are considered low-risk, non-oncogenic types and are usually responsible for low-grade histological lesions such as papillomas and warts. Among the high-risk oncogenic types are types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 73, 82 which can potentially cause high-grade histological lesions leading to cancers such as cervical and other procto-genital cancers as well as oropharyngeal cancers (2). It is estimated that 4.5% of all new cancer diagnoses are related to HPV infection. Cervical cancer constitutes 83% of these cases, while the largest percentage concerns women in low-income countries (3). Considering these findings, increased surveillance of HPV infections and systematic research on prevention strategies including the enhancement of vaccination programs are imperative.

Despite the availability of approved HPV vaccines since 2006-7 and their inclusion in national vaccination programs in over 107 of the 194 WHO member states as of June 2020, global vaccination coverage still remains low (4). However, even in countries where vaccination coverage does not exceed 50%, it has been found that vaccinations appear to reduce the prevalence of HPV and the rates of HPV-related neoplasms (5). In particular, according to the recent Cochrane systematic review on the efficacy and safety of vaccination of adolescent girls and young women up to 26 years of age, HPV vaccines were found to be highly effective in preventing cervical precancerous lesions (6). Therefore, the systematic investigation of vaccination protocols for their optimization as well as the identification of factors that may inhibit vaccination coverage is necessary.

The available prophylactic vaccines against HPV are the bivalent vaccine targeting HPV types 16, 18, the quadrivalent vaccine against types 6, 11, 16, 18 and the ninevalent vaccine against types 6, 11, 16, 18, 31, 33, 45, 52, 58 (7). According to the original WHO guidelines and protocols, national vaccination programs primarily targeted adolescent girls who are at 10 times higher risk of malignancy due to HPV infection than boys, while protection to boys should incur through herd immunity (8). Herd immunity effects though, have been detected only in countries with very high vaccination coverage of women (9). Therefore, current studies on the effectiveness of herd immunity tend to emphasize on the need to expand vaccination programs so that they also include boys (9). Another argument for the need of a pangender vaccination approach is that even if herd immunity is developed, vaccinating women does not offer any protection to homosexual men (10). Moreover, the prevalence of HPV-related head and neck cancers is much higher in men than in women although the HPV types that are associated with the development of such cancers are included in the available vaccines (11). In several countries vaccination programs that also include adolescent boys are already implemented (12), while further systematic research on the necessity of pangender vaccinations in order to reduce the risk of HPV-related neoplasms, especially in males, is deemed necessary (13).

Considering the aforementioned, the need for systematic research on the restructuring and promotion of HPV vaccination programs that ensure adequate coverage of the male population is imperative. In this context, the main purpose of this systematic review is to investigate the effect of vaccination programs on the prevalence of different HPV types in adolescent boys and young men. The ultimate goal of this study is to evaluate the prevalence of HPV in the male population as well as the degree of protection provided to them through herd immunity due to the vaccination of girls. The results of the review will be discussed with a view to assessing the need to include adolescent males in national HPV vaccination programs.

Materials and Methods

The main aim of this systematic review was to investigate the effect of current vaccination programs on the prevalence of the various HPV types in adolescent boys and young men, emphasizing on the vaccine types. More specifically, the present study aimed to investigate fluctuations in the overall prevalence and distribution of HPV subtypes in males aged 11 to 25 years. The search for relevant articles was performed without a time limit until 12/2022 in order to select articles before and after 2006, when global HPV vaccination programs initiated. Possible changes in the distribution of HPV subtypes were examined in relation to the time of initiation of nation-

al vaccination programs in the country where each selected study was conducted, but also in relation to the age and sexual orientation of the participants. The main research question in this study is whether herd immunity resulting from vaccination of females also protects the male population or whether direct vaccination of boys is necessary. It is a research hypothesis that in studies conducted in countries where national vaccination programs for girls were implemented prior to the time of the study, the prevalence of HPV may also be different in men compared to studies conducted in unvaccinated female populations. Another research hypothesis is that the overall prevalence in male populations should show a decreasing trend in order to consider that vaccination programs so far have offered some degree of protection to males.

The search and selection of articles for this systematic review was performed in accordance with the PRISMA guidelines (14). Articles were searched through the international database PubMed based on the algorithm (HPV OR "human papilloma virus") AND (adolescent OR teens) AND (serotypes OR types) AND (boys OR men OR male). According to the advanced search options of this database, only articles in the English language were retrieved. The eligibility of the retrieved articles was assessed in accordance to specific inclusion criteria. According to these criteria, eligible articles should exclusively include studies in a human model (cohort, observational, cross-sectional, etc.) and be conceptually compatible with the purpose of the study. The articles should concern male participants aged 11 to 25 years without diagnosed underlying pathological or infectious diseases such as neoplasms or HIV. Moreover, articles should concern randomly selected participants and not high-risk groups for HPV such as people with dermatological lesions and warts or people whose partners have been diagnosed with HPV. Finally, articles should present quantitative HPV serotyping data using the PCR method on anogenital swab samples or from urine samples. The references of the selected articles were also assessed for eligibility.

Results

The initial search through the PubMed database yielded 1133 which were then assessed against the aforementioned selection criteria according to the PRISMA specifications. As presented in the flow chart in figure 1, 642 articles were excluded due to obvious inconsistency with the objective of the study or for comprising literature reviews, meta-analyses, *in vitro* studies or studies in a non-human model. A further 473 articles were excluded as they did not refer to males or the required age group or concerned high-risk participants or their sampling and serotyping methods were not compatible to the inclusion criteria of this study. The final number of selected articles that met the selection criteria was 18 (Figure 1). After examining the references of the selected articles, no additional articles were identified as the articles that met the search criteria were duplicates of those already selected during the initial search.

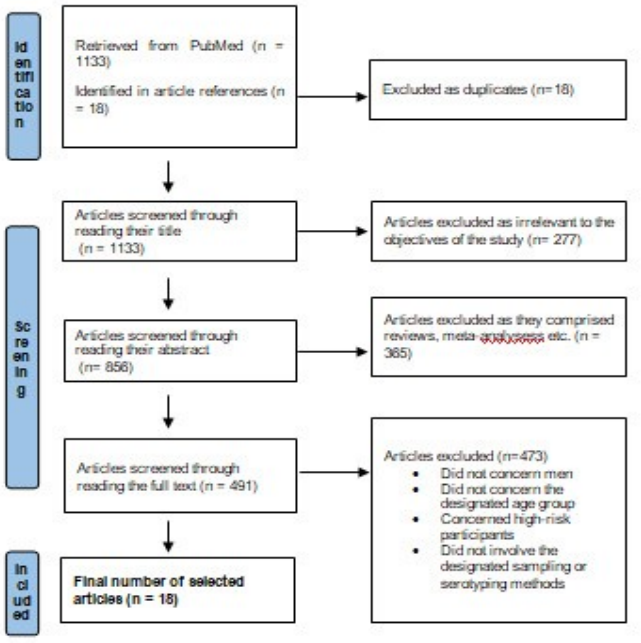

Figure 1. Flow chart of article selection according to PRISMA guidelines

The 18 selected articles included 4 cross-sectional studies, 11 observational studies, 1 randomized clinical trial and 2 cohort studies (Table 1). The studies in the selected articles date from 2004 to 2021 as no earlier studies were found that met the selection criteria. The selected studies involve participants from geographical areas of all continents. Regarding the purpose of τηε them aim to evaluate the prevalence of HPV and the factors that increase the risk of HPV infection. Among the selected studies, 10 exclusively examined HPV prevalence in male participants and 8 in male and female populations. The majority of studies (15) involved unvaccinated participants, 1 study involved vaccinated participants (15) while 2 studies included both vaccinated and unvaccinated participants(16; 17). In the majority of studies, the sexual orientation of the participants is not mentioned or considered, while 4 studies specifically examine men who have sex with men and 4 specifically examine heterosexual men (Table 2). Concerning sampling methods, in

5 studies HPV serotypes were identified in urine samples (17; 18; 19; 20; 21) while in the remaining 13 swab samples from the anogenital region were used. Another observation is that in 9 studies the start of the national vaccination program for girls in the country where the study was conducted was contemporary or later than the time of the study while in the other 9 it was earlier (Tables 3, 4).

An initial observation regarding the results of the studies is that in the studies where HPV serotypes were identified in a urine sample the range of rate values recorded was approximately sub-tenfold of the rates identified from anogenital swabs (Figure 2). It is therefore questionable whether the two sampling methods have comparable sensitivity as current literature suggests that HPV detection in men's urine is not as effective as detection in anogenital swabs (22). Regarding the age of the participants in the selected articles, it ranges from 11 to 25 years. In the context of this systematic review, it was considered appropriate to investigate the prevalence of HPV in this age range, considering the fact that the initiation of sexual activity in adolescence significantly increases the prevalence of HPV, while the maximum effects of this increase are detected in early adolescence (23).

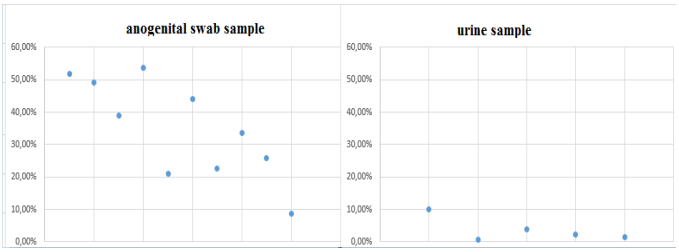

Figure 2 Indicative values of total HPV prevalence from the selected articles in anogenital swab and urine samples

Among the selected articles, examining overall HPV prevalence and high- and low-risk subtypes separately for adolescent and early adolescent age groups, Sonnenberg *et al.*, (2013) (19) and Gargano *et al.*, (2017) (15) detected significant increase in early adolescence. In addition, Sonnenberg et al., (2013) (19) point out that in men this increase remains constant while in women it decreases, an observation consistent with the fact that the virus has different behavior and resistance between the two sexes (24). Similar conclusions are reached by O'leary *et al.*, (2011) (21), according to which the prevalence of the virus is significantly higher in the age group of 15-18 years compared to the age group of 11-14 years, so the proposed age to start vaccination she should be younger than 15 years old. Accordingly, Hussain *et al.*, (2012) (20) and Bianchi *et al.*, (2013) (18), estimate that the prevalence of HPV in boys under 13 years is minimal. A safe conclusion that is consistent with the current literature is that the optimum vaccination age of boys should be early adolescence in order to prevent an increase in the prevalence of the virus in adolescence and post-adolescence with the onset of sexual activity (23).

Regarding studies that included vaccinated participants (15; 16; 17), although limited, they conclude that direct vaccination of boys significantly reduces HPV prevalence . These findings clearly demonstrate the effectiveness of direct vaccination of young boys in reducing HPV infections as seen in current studies conducted in countries implementing widespread or pilot vaccination programs in men who have sex with men (25) but also in random populations of males (26). According to the same studies, however, these programs should be expanded in order to offer adequate protection to boys and young men. Regarding the sexual orientation of the participants, as mentioned above 4 studies specifically examine men who have sexual contacts with men as the population of these men has a higher HPV prevalence than heterosexual men (27). Both Chow *et al.*, (2021) (16) and Zou et al. (2016) (28) found a significantly higher prevalence of low-risk vaccine subtypes (6, 11) than high-risk subtypes (16, 18) possibly related to differences in subtype prevalence by site of infection as in anal HPV infections low-risk types are more common in men who have sex with men (28). Zou *et al.*, (2014) (28) detect a high prevalence of both high- and low-risk subtypes included in the 4v vaccine and highlight the need for prophylactic vaccinations at a fairly young age as the increase in viral prevalence is rapid with the onset of sexual activity of MSM boys.

Nyitray *et al.*, (2011) (29) also found that HPV prevalence is higher in men who have sex with both women and men compared to exclusively gay and heterosexual men. They further pointed out that the distribution of subtypes and the factors influencing the prevalence of oncogenic types are different for heterosexual men (30). Regarding the selected articles that deal exclusively with heterosexual men, HPV prevalence is also high while Partridge et al. (2007) (31) also pointed out that the rate of occurrence is higher than in women, a fact that should be taken into account when planning vaccination programs. Accordingly, Vardas et al. (2011) (32) in an observational study of heterosexual

Table 1: Methodology and results of selected articles

	article	#participants	age	vaccination status	sampling method	total HPV prevalence	prevalence of high risk types	prevalence of low risk types (6, 11)	16 or 18	4v HPV 6, 11, 16, 18	[illegible]
1	Chow et al., 2021	177	[illegible]	no	anogenital swab			10,17%	3,39%	11,86%	
	Chow et al., 2021	139	[illegible]	yes	anogenital swab			4,47%	[illegible]	[illegible]	[illegible]
2	Wendland et al., 2020	1130	[illegible]	no	anogenital swab	[illegible]	[illegible]				[illegible]
3	Wittawatmongkol et al., 2019	47	[illegible]	no	anogenital swab	49%	[illegible]				[illegible]
4	Lehtinen et al., 2017	[illegible]	18	yes	urine	4,10%	[illegible]	0,80%	0%		[illegible]
	Lehtinen et al., 2017	[illegible]	18	no	urine	10,10%	[illegible]	3,40%	2,10%		
5	Gargano et al., 2017	[illegible]	14-19 y, 20-24 y	yes	anogenital swab	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
6	Zou et al., 2016	200	16 to 20	no	anogenital swab			18,50%	8,50%		[illegible]
7	Zou et al., 2014	200	16 to 20	no	anogenital swab	39%	31%	30,50%			[illegible]
8	Bianchi et al., 2013	[illegible]	[illegible]	no	urine	[illegible]					[illegible]
9	Sonnenberg et al., 2013	[illegible]	[illegible]	no	urine		[illegible]		[illegible]		[illegible]
10	Vriend et al., 2012	[illegible]	16 to 24	no	anogenital swab	[illegible]	[illegible]	[illegible]			[illegible]
11	Hussain et al., 2012	[illegible]	[illegible]	no	urine	[illegible]	0				[illegible]
12	O'Leary et al., 2011	[illegible]	11 to 18	no	urine	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
13	Vardas et al., 2011	[illegible]	[illegible]	no	anogenital swab	[illegible]		3,30%	5,60%	[illegible]	[illegible]
14	Nyitray et al., 2011	[illegible]	18-24	no	anogenital swab	[illegible]	[illegible]				[illegible]
	Nyitray et al., 2011	[illegible]	18-24	no	anogenital swab	[illegible]	[illegible]				
15	Parada et al., 2010	[illegible]	18-24	no	anogenital swab	[illegible]					[illegible]
16	Giuliano et al., 2008	[illegible]	18-20, 21-28	no	anogenital swab	[illegible]	[illegible]	[illegible]			[illegible]
17	Partridge et al., 2007	240	18-20	no	anogenital swab	[illegible]	[illegible]	[illegible]			[illegible]
18	Shin et al., 2004	[illegible]	median 22	no	anogenital swab	8,70%	[illegible]	[illegible]			[illegible]

Table 2: Sexual orientation of participants in each study

	article	sexual orientation
1	Chow et al., 2021	MSM
2	Wendland et al., 2020	
3	Wittawatmongkol et al., 2019	
4	Lehtinen et al., 2017	
5	Gargano et al., 2017	
6	Zou et al., 2016	MSM
7	Zou et al., 2014	MSM
8	Bianchi et al., 2013	
9	Sonnenberg et al., 2013	
10	Vriend et al., 2012	
11	Hussain et al., 2012	
12	O'Leary et al., 2011	
13	Vardas et al., 2011	MSW
14	Nyitray et al., 2011	MSW
	Nyitray et al., 2011	MSM
15	Parada et al., 2010	MSW
16	Giuliano et al., 2008	
17	Partridge et al., 2007	MSW
18	Shin et al., 2004	

Table 3: Studies conducted prior to the initiation of a national vaccination program

article	study conducted in:	initiation of national vaccination program in:
Wittawatmongkol et al., 2019	2013 - 2014	2017
Vriend et al., 2012	2009	2010
Hussain et al., 2012	2011??	2016
Vardas et al., 2011	<2011	>2011
Nyitray et al., 2011	2005-2009	2006,2012,2014
Nyitray et al., 2011	2005-2009	2006,2012,2014
Parada et al., 2010	2002-2003	2012
Giuliano et al., 2008	2003-2005	2006
Partridge et al., 2007	2003-2006	2006
Shin et al., 2004	2002	2016

Table 4: Studies conducted after the start of a national vaccination program

article	study conducted in:	initiation of national vaccination program in:
Chow et al., 2021	2010-2012	2007
Chow et al., 2021	2010-2012	2007
Wendland et al., 2020	2016-2017	2014
Lehtinen et al., 2017	2010 - 2014	2007-2009
Lehtinen et al., 2017	2010 - 2014	2007-2009
Gargano et al., 2017	2013-2014	2006
Zou et al., 2016	2010-2012	2007
Zou et al., 2014	2010-2012	2007
Bianchi et al., 2013	2009-2010	2007-2008
Sonnenberg et al., 2013	2010-2012	2008
O'Leary et al., 2011	2008	2008

men on 5 continents found a high prevalence of all HPV types while pointing out that the prevalence of the virus did not seem to be affected by condom use or circumcision.

Likewise, Parada et al. (2010) (33) found the HPV prevalence of heterosexual young men in Mexico to be high and directly related to the prevalence in women, while the number of sexual partners was considered to be the main factor increasing the risk of HPV infection. A high prevalence was also observed in studies involving a random population of boys and young men selected regardless their sexual behavior. Thus, Wendland *et al.*, (2020)(34) και Wittawatmongkol *et al.*, (2019) (35) estimated an overall HPV prevalence of approximately 50% while the prevalence of high-risk types was approximately 30%. Wendland et al. (2020) (34) also detected a different distribution of the 4v vaccine subtypes between men and women, which does not support the theory of herd immunity. Giuliano *et al.*, (2008) (36) also pointed out that in young men the rate of infection and clearance is faster than in women. These results are consistent with international studies according to which the prevalence of HPV in men, the persistence of infection and the immune responses vary according to their sexual behavior (30).

Regarding the analysis of results in relation to the vaccination coverage of women, the prevalence of the high- and low-risk subtypes included in the vaccines did not appear to differ significantly in studies where the initiation of the national girls' vaccination program in the study country preceded the study comparing to studies that were implemented prior to the initiation of the respective vaccination programs. Moreover, across all the selected articles, the overall prevalence of HPV remains high among young sexually active men, regardless of women's vaccination coverage. The direct vaccination of young boys seems to have a significant effect on the prevalence of oncogenic and non-oncogenic HPV subtypes, while the design of unified national vaccination programs regardless of gender and sexual orientation may be the most effective approach to limiting HPV infections and their effects.

Discussion

Most of the studies on HPV in the current literature concern the diagnosis, treatment, and prevention of HPV infections in women. Accordingly, most health programs for the epidemiological control and prevention of HPV focus on women, while the role of men in the epidemiology of the virus tends to be overlooked. Consequently, studies focusing on the epidemiology and prevention of HPV in young men are limited and their results inconclusive. In addition, a large percentage of research on the epidemiology of HPV in men specifically concerns men who have sex with/and with men as they are a population group with a high prevalence of HPV that does not benefit from possible herd immunity due to vaccination of girls (10). Given the fairly high prevalence of the virus in men as well as the fact that men are often asymptomatic carriers and contribute to the spread of the virus by increasing the burden of the consequences of HPV infections in women, further systematic investigation of the epidemiology of HPV in men is deemed imperative (37).

According to this systematic review, it is concluded that the prevalence of the virus in adolescent and young male populations worldwide remains high. No changes in the prevalence of the HPV subtypes included in the vaccines were observed, which would imply herd immunity effects, while a significant reduction in overall virus prevalence was observed only in studies that included directly vaccinated boys (15;16;17). This observation is consistent with relevant recent studies confirming the reduction of HPV infection rates in vaccinated young boys which advocate the need to include young boys in national vaccination programs (10). Moreover, according to the relevant literature, reduction in the prevalence of high-risk HPV types in men has only been observed in countries with particularly high vaccination coverage of women (9;38). For example, according to a study in Britain where the vaccination coverage of girls exceeds 80%, a significant reduction was also observed in the rates of HPV infections of the oropharynx in men as a result of herd immunity (39).However, in the majority of studies on the effectiveness of herd immunity, it is found that it does not provide sufficient protection while the need to expand vaccination programs to young boys is highly emphasized (40).

Another observation to be discussed in this systematic review concerns the age of boys at which HPV prevalence increases rapidly as a result of the initiation of sexual activity and which should be the age limit for immunizing young boys. According to the results of the selected articles, an increase in the prevalence of the virus is observed in the age groups above 14 years, while in boys up to 13 years the prevalence of HPV is particularly low (20;21). Consequently, the ideal age for boys to be immunized is earlier than 13-14 years whi

which is consistent with the World Health Organization guidelines that health providers should encourage the initiation of vaccination at age 9- 12 (1). Moreover, it has been reported that men who have sex with men do not seem to benefit at all from the herd immunity that to some extent is provided to heterosexual men by the vaccination of girls (41) while MSM also present higher rates of warts of the anogenital area and rectal cancer associated with HPV infection (41). Therefore, regarding the design of vaccination programs, the epidemiological specificities of all adolescents should be taken into account, regardless of gender and sexual behavior.

A general observation in this systematic review concerned the large discrepancy in HPV prevalence rates between urine and swab samples. As mentioned before, the range of values recorded from urine samples was approximately ten times lower than the value rates from swab samples. Consequently, the two sampling methods do not appear to have comparable sensitivity. According to related studies, the detection of HPV DNA in the urine of women using the PCR method appears to have a similar sensitivity to the detection of genetic material of the virus in cervical smears. Furthermore, urine sampling is practically easier for women and is an important alternative approach for women who do not have easy access to gynecological services (42). It is possible, however, that the detection of viral DNA in urine is not as effective in men compared to swabs of the anogenital area due to their anatomical differences and the fact that the prevalence of different subtypes of the virus, viral resistance and type of lesions differ significantly between men and women. Therefore, further investigation is needed regarding the sensitivity and effectiveness of the detection of viral genetic material in male urine (22).

One of the main limitations of this study was the limited number of publications involving non-high-risk male participants, that is, adolescents and young men without symptoms or a history of HPV infections. Moreover, the majority of studies in the current relevant literature concern women, while even in many studies that included men, the data regarding the prevalence of the virus, their age group or their medical history was not clear. Another limitation was the heterogeneity in reported data on overall HPV prevalence and individual subtypes. Thus, some studies report overall prevalence data for both high- or low-risk types while others report data for specific groups of subtypes, such as subtypes included in vaccines, or individual subtypes. As a result, statistical comparison of study results is very difficult and meta-analysis of their data is not feasible.

In general, heterogeneity in the design and methodology of the available studies is a major limitation and more specifically the heterogeneity of the participants' age, sexual orientation and socio-cultural characteristics.

Conclusions

The conclusion of this study is that the prevalence of HPV remains high among teenagers and young men, a fact that requires the immediate redesign of virus prevention activities such as vaccination programs. The results of the analyzed studies and the relevant literature clearly demonstrate the effectiveness of direct vaccinations of young boys in comparison to herd immunity which requires particularly high rates of vaccination coverage of girls. Thus, the majority of studies converge on the need for universal vaccination programs that will involve all young people and adolescents regardless their gender and sexual behavior. These programs should target immunization during preadolescence to ensure that the increase in viral prevalence with the initiation of sexual activity during adolescence and post-adolescence is limited. Finally, the need for further systematic investigation of the epidemiology and physiology of HPV in males through randomized clinical trials is emphasized in order to collect data for the design of improved surveillance and prevention approaches. The full impact of vaccination against HPV is yet to be determined although pan-gender vaccination programs of adolescents would contribute significantly to the prevention of HPV-related disease.

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Brief Review

Educational intervention concerning vaccination In Greek pre-adolescents: a study protocol

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ABSTRACT

Objective: Vaccines stand as a cornerstone of modern medicine, pivotal in bolstering public health. However, skepticism and controversy have led to declining public confidence, contributing to suboptimal vaccination rates, particularly among Greek adolescents. The study presents a comprehensive educational intervention targeting pre-adolescents and their parents, encompassing both hard copy and web-based community materials.

Method: 125 pre-adolescents-parents recruited from 7 primary schools in Athens. Questioners were used in two phases, before and after the intervention. Intervention used brochures, website content, youth involvement, parent academies, and peer discussions in order to seek to fortify beliefs in vaccinations and elevate immunization rates. The study also delved into socio-economic factors influencing vaccination uptake and was approved by the Ministry of Education of Greece.

Results: Preliminary findings underscore the significance of Greek nationality and parental employment in vaccine compliance. The study aims to bridge gaps in vaccination knowledge and uptake, laying a foundation for future public health initiatives.

Conclusion: The adolescent vaccination intervention program was well received by the parents of the participating children. The students showed great interest in the subject of vaccinations and their willingness to get involved in matters concerning their health was evident. Students who attended the intervention reported that they are positive about completing their immunizations with the adolescent vaccines, according to the National Child and Adolescent Immunization Program.

Key Words: *adolesence, vaccination, school-based intervention program*

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Introduction

Vaccines are considered to be one of the greatest achievements of medical science, a fundamental factor of our public health system (1). Impressive outcomes of vaccine intervention have been incidence reduction of potentially severe infectious diseases in immunized population, but also the result of herd-immunity, the ability to indirectly protect non-vaccinated individuals against infections (1,2). According to WHO, more than 20 life -threating diseases and 3.5 - 5 million deaths can be prevented due to vaccines. Yet, due to COVID-19 pandemic vaccinations rates were extremely low, with 25 million children missing out on vaccination in 2021 (3). Nevertheless, vaccines have always been a field of controversy and skepticism, leading in a decline in public confidence. Lately, anti- vaccination movement effects, have unfortunately resulted to the reappearance of certain «left behind» illnesses (1). Vaccination rates for measles, mumps and rubella, diphtheria, tetanus, pertussis and polio have decreased in many countries (1,2,4). According to a Greek study conducted in Patras 2020 (n=1227) approximately one - third of parents (33.5%) believed that may be a relationship between vaccines and autism (5). Doubts about new vaccines were expressed by parents in another Greek survey, in which approximately 30.4% were confused because of contradictory physicians' opinion and 60.3% believed that economic profit was the reason that new vaccines were developed (6). In order to maintain the full potential of national vaccination programs, health care providers can be willing to inform, create awareness, discuss with the community and also develop youth information channels (7,8). In Greece, the compliance with vaccination national recommendations in adolescence has not yet been sufficiently registered. According to a study conducted by the Adolescent Health Unit in 2011 (9), lower rates were shown for the booster dose of tetanus/diphtheria/pertussis (39.6%) and among girls for the human papillomavirus vaccine (11.9%). Only 22.7% of study participants were fully vaccinated according to criteria employed. Additionally, the vaccination rate for meningococcal serogroup C (Men C) was significantly higher for pre-adolescents, compared to children aged over 14 years old. According to a limited number of studies, the vaccination rate in Greek adolescents is considered to be suboptimal, thus an informative model in this group along with better documentation is clearly needed. Socioeconomic factors seem to play a key role in vaccination coverage. More specifically according to a number of studies, Greek nationality and older age range of the parent were associated with higher vaccination uptake (5,10). A multiple logistic regression analysis, showed that parents being employed and of Greek nationality were elements having a relation with PCV vaccination uptake with four doses. A multiple linear regression analysis indicated that lack of employment and Greek nationality were elements that affected the total number of PCV doses given (10). According to a study conducted in Patras in 2020, 44% of the study participants believe that unvaccinated children could attend school whereas 56% support the opposite view. A further comparative was performed between these two parental groups (Chi-Square test) and was found that Greek parents versus non-Greek (p =.013) and those living in urban area versus semi-urban area of Patras (p= .04) were more likely to believe that unvaccinated children should not attend school) (5). There is evidence in the available literature that school-based interventions generally increase adolescent vaccination rates (1). Most practice - and community -based interventions have only addressed to HPV vaccination (7,8,11) influenza (12,13). Although public health benefits of immunizing adolescents should be well known, recent measles outbreaks, vaccine refusals and anti-vaccination movement have increased the need of immunization information systems and additional research (14,15). According to the available literature, strategies which have led to improvement of vaccination rates are provider feedback, immunization information systems and school-based immunization programs (14,16). A recent cohort study in Texas, USA involving 2307 middle school students, showed that school with vaccination events and community-based education had a higher adolescent HPV vaccination rate compared to schools that received community-based education only (11).

The goal of the present intervention was to develop hard copy and internet web community-based material for pre-adolescents and their parents, concerning vaccination and prevention of infectious diseases. The intervention included brochures, website material, youth participation, parent academy and meetings with peer-to-peer material and relevant discussions. To our knowledge this has been the first time a school educational program concerning all vaccines of adolescent applied in Greece. Until now, only programs about HPV and influenza exist especially in certain countries (1,8,9,11-13). These studies have recorded increase in vaccination rates after the educational programs. Our goal was to investigate whether such an intervention would lead to a general increase in all vaccination rates and would improve and enrich family knowledge and beliefs in vaccines.

Material and methods

The first component of our study was to investigate the level of information on vaccinations in pre-adolescent's and their parents from seven public schools (125 pupils and their parents). For this purpose, parents were asked to fill a pre-intervention relevant questionnaire, and to provide personal vaccination booklet information. All parents were asked to written consent before intervention starting point.

The intervention performed after pre-questionnaire testing and parent consent to the program. Our main purpose was to develop an information community-based educational model about the importance of vaccinations in adolescents that will enhance their beliefs in vaccines and elevate the immunization rates amongst teenagers. Intervention included brochures, website material, youth participation, parent academy and meetings with peer-to-peer material and relevant discussions. There were also contests and student awards which gave a lot of motivation to teens, being concrete thinkers and living on present tense. Intervention was based on vaccination timeline suggested by the National Vaccination Program- vaccines against meningococcal disease (subtypes A, C, Y, W-135 and B), influenza, diphtheria, tetanus, pertussis and HPV) - and included real life scenarios, multimedia and role-playing material, under the guidance of experienced and specially trained personnel. Parents of neighbor schools were served as a control group and were not bene subjected to educational material, only vaccination registry.

The second phase of the study took place one year later, when the parents that received, the intervention were asked to fill a second form, concerning the vaccination status of their children afterwards, in order to examine the impact of the intervention of this informative model on the vaccination status of their children.

Finally, all the questionnaires and forms subjected to statistical analysis. Demographic data will be collected, including sex and age. All data collected from the questionnaires before and after the intervention and data that emerged between intervention and control-group schools, were compared using chi-square tests and their means using t-tests. Vaccination completion rates at baseline and at follow-up dates were stratified by intervention group and sex and were compared using t-tests. We estimated the statistical difference in vaccination rate between the comparison schools ($p<0.05$) after the intervention. Logistic regression was calculated for vaccine uptake to test for differences in odds of vaccination rates between the intervention and comparison schools. The dependent variables in the statistical analysis models included indicators for adolescents who initiated or completed their vaccinations after our program's first period. The independent variables included whether the student is from the intervention or comparison schools and pupils' age and sex.

Results

The questionnaires from the first phase showed that more than 90% of the participants had completed the required childhood vaccinations for the following diseases: tetanus-pertussis-diphtheria (91.2%), chickenpox (92.44%), measles (96.95%), hepatitis A (93.49%) and hepatitis B (92.31%). A lower percentage was recorded for the completion of polio vaccinations (91.2%) and meningitis B (83.72%), while only 56.76% had completed vaccination for meningitis C (3rd dose). Regarding the repeat dose for tetanus-pertussis-diphtheria carried out at puberty (11-12 years) and for vaccination for meningococcal A, C, Y, W-135 (11-12 years), the rates were quite low, namely: TdaP 52.38% and meningococcal A, C, Y, W-135 (71.43%).

A small percentage of respondents had also received HPV vaccinations - 1st dose 8.60% and 2nd dose 7.53%. However, the questionnaires administered after the intervention showed that the information provided had positive results, as 88.00% of the respondents indicated intention to vaccinate with the vaccines that had not been carried out (Diphtheria-Tetanus-Pertussis, Meningitis B, HPV, Meningococcal A, C, Y, W-135) or completion of vaccinations. Also, a high percentage reported that important questions were resolved by the intervention (94.85%), while 86.47% were positive about similar updates. This is particularly important, as one of the main reasons stated for avoiding vaccinations was inadequate information.

92% of students found the subject of the intervention interesting and >95% were happy with the accompanying material (presentation and book). Almost 95% of students had the opportunity to have their questions about vaccines solved by a specialist certified health professional, while over 86% were positive about a similar presentation in the future.

According to the literature, vaccination rates among children and adolescents are declining, and there is strong concern in the medical community about the delay in vaccination and the impact this may have on Public Health. Although some intervention programs have been implemented worldwide, in Greece there is still no corre-

sponding program from a central health organization or university institution, to our knowledge. Vaccination information usually concerns younger ages and parents, and the agencies that organize educational programs are local health centers. 88% of students who attended the intervention reported that they are positive about completing their immunizations with the adolescent vaccines, according to the National Child and Adolescent Immunization Program. Almost 95% of students had the opportunity to have their questions about vaccines solved by a specialist certified health professional, while over 86% were positive about a similar presentation in the future.

Discussion

Adolescent vaccination rates remain a persistent challenge in public health, with many young individuals still under immunized against diseases that could cause morbidity. This gap is particularly concerning as vaccine-preventable illnesses can have serious consequences during adolescence. To address this issue, school-based interventions offer a promising avenue to boost vaccination coverage among this population. One key factor contributing to suboptimal adolescent vaccination is the shift in vaccination decision-making from parents to the adolescents themselves. Adolescents may face various barriers to vaccination, including concerns about vaccine safety, perceived lack of necessity, and discomfort with the vaccination process School-based programs can help overcome these barriers by providing a trusted setting for vaccine education, addressing adolescent-specific concerns, and facilitating access to vaccination services. Our achieved goal was to make pre-adolescents and parents well informed on the importance and need of vaccinations after the informative lessons and leaflets. We consider that pre-adolescents understand how necessary vaccines are and will discuss about them with their parents. Also, we believe that the whole program helped parents understand the positive effects of vaccines, changed their attitude in case they have doubts and second thoughts and lead them to schedule their children's vaccinations. Thus, the primary outcome of our research was to increase vaccination knowledge/beliefs and furthermore vaccination rates. The adolescent vaccination intervention program was well received by the parents of the participating children. The students showed great interest in the subject of vaccinations and their willingness to get involved in matters concerning their health was evident. 92% of students found the subject of the intervention interesting and >95% were happy with the accompanying material (presentation and book). 88% of students who attended the intervention reported that they are positive about completing their immunizations with the adolescent vaccines, according to the National Child and Adolescent Immunization Program.

We expect that our informative model will be widely accepted and adopted for application to practice in other Greek schools. The present study highlighted the need for the creation of more educational programs and interventions on health issues in Greek schools, given the significant lack of such training.

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