Háskólinn á Akureyri

The relationship between organised sport activities and alcohol use in adolescents

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HUG- OG FÉLAGSVÍSINDASVIÐ

Lokaverkefni til

BA gráðu í sálfræði

Sálfræðideild

Maí 2020

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12 eininga lokaverkefni
sem er hluti af
Bachelor of Arts-prófi í Sálfræði

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Sálfræðideild
Hug- og félagsvísindasvið
Háskólinn á Akureyri
Akureyri, maí 2020

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Félagsvísindadeild
Hug- og félagsvísindasvið
Háskólinn á Akureyri
Sólborg, Norðurslóð 2
600 Akureyri

Sími: 460 8000

Skráningarupplýsingar:
Herta Pálmadóttir, 2020, B.A. verkefni, félagsvísindadeild, hug- og félagsvísindasvið, Háskólinn á Akureyri, 31 bls.

Útdráttur

Í þessari rannsókn voru hugsanleg tengsl á milli skipulagðar íþróttaiðkunar og áfengisneyslu unglinga könnuð með samanburði á átta rannsóknum sem allar lutu að framangreindum tengslum. Niðurstöður voru fengnar með ítarlegri greiningu á rannsóknunum. Áðurnefndar rannsóknir voru framkvæmdar á unglingum í Bandaríkjunum, Noregi og Íslandi. Fjallað var um þætti tengda íþróttaiðkun sem allir eiga það sameiginlegt að draga úr líkum á áfengisneyslu og þá sérstaklega líkum á því að iðkendur íþrótta þrói með sér áfengissýki. Greint var frá jákvæðum þáttum sem fylgja íþróttaiðkun barna og unglinga, til dæmis má þar nefna markmiðasetningu, hvöt (*e. motivation*), aukna sjálfsvirðingu og námsárangur, heilbrigð félagsleg tengsl og andlega heilsu. Allt eru þættir sem geta dregið úr líkum á áfengissýki.

Niðurstöður rannsóknarinnar leiddu í ljós að þættir sem að geta dregið úr líkum áfengissýki eru ekki nægjanlegir til þess að draga úr líkum á áfengisneyslu. Þrjár af hverjum fjórum rannsóknum sem greindar voru og bornar saman sýndu fram á jákvætt samband á milli skipulagðrar íþróttaiðkunnar og hærri áfengisneyslu hjá unglingum. Því sýna niðurstöður fram á það að unglingar sem taka þátt í skipulögðu íþróttastarfi eru líklegri til að neyta áfengis en þeir sem taka ekki þátt. Rannsóknirnar sýndu hins vegar fram á kynjamun, mun á mismunandi tegundum íþrótta og mun á milli landa og menningarheima sem er frekar greindur í sérstökum umræðukafla. Ólíkar niðurstöður rannsókna sem gerðar voru í Bandaríkjunum annars vegar og Íslandi og Noregi hins vegar vekja athygli og gefa til kynna að þættir líkt og fyrirkomulag íþróttaiðkunnar og mismunandi skólakerfi skipti miklu máli. Að mati höfundar er þörf á frekari rannsóknum til að dýpka skilning á og greina hvaða þættir tengdir íþróttaiðkun það eru sem gera íþróttaiðkendur líklegri til að neyta áfengis en þá sem stunda þær ekki.

Lykilhugtök: Áfengisneysla, íþróttaiðkunn, skipulagt íþróttastarf, unglingar, áfengissýki

Abstract

The main aim of this thesis was to investigate the relationship between adolescents´ sport participation and alcohol consumption. The investigation involved the analyses of eight studies from the United States of America (USA), Iceland and Norway that all explored this correlation. Factors associated with sport participation were discussed, particularly those that can protect the adolescents and reduce their risk of Alcohol Use Disorder (AUD), and future alcohol use. Examples of the benefits of sport participation, such as improved goal setting, increased motivation and self-esteem, better results in school, healthier friendships and better mental health were identified, all which can reduce the risk for AUD in the future. After exploring the research question alongside these beneficial factors, results show that even though these factors that can be gained through sport can reduce the risk of future AUD, sport participation itself does not reduce the risk of alcohol use. The majority of the studies (75%) showed a significant positive relationship between sport participation and higher levels of alcohol use in adolescents, suggesting that adolescents who participate in sports are more likely to consume alcohol than those who do not participate in any sports. Studies did show differing results between different types of sports, genders and cultures in various countries and are discussed in relation to the topic. The clear discrepancy between countries and the differences on results from USA and Nordic countries are discussed. The inconsistency in those studies suggests that factors such as in what setting the sports are played and the difference in the school systems play a role in the outcomes. Additional research is needed on which factors within sports are the reason for participants being at more risk than non-participants when it comes to alcohol consumption.

Keywords: Alcohol consumption, sport participation, organised sports, adolescence, Alcohol use disorder

Acknowledgements

I want to thank my supervisor Lukas Blinka for his professional guidance, useful critique and his patience towards me. My university experience would not have been the same without my fellow students and friends Halla, Kristrún, Rebekka and Sólborg. Their encouragement meant a lot to me and I want to give my thanks to them. I would like to thank Eleanor Agnew for all the encouragement and support, for helping me keep my sanity and for always being ready to discuss my work at any hour of the day. Finally I want to thank my family for always being there for me, mom, dad and especially my fiancé Lawrence. Thank you for taking such a good care of our daughter whilst I locked myself in the office day and night and believing in me when I needed it the most.

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Introduction

Adolescence is a time for physical, emotional and social growth. While searching for their identity, adolescents often want to experience new things and are more likely to start engaging in more risk-taking behaviours (Caffray and Schneider, 2000). Adolescence often marks the onset of experimentation with alcohol. Youths of that age are strongly influenced by friends they spend the most time with. Their social groups can influence an adolescent´s behaviour and decision making. Such groups are often formed when adolescents participate in sports. Sport participation plays an important role in many adolescents´ lives. In the Oxford English dictionary (2012) sport is defined as "an activity involving physical exertion and skill in which an individual or a team competes against another or others for entertainment". Organised sports – which will be the primary type explored in this investigation, can be played individually or in teams. They are organised by a team, school or other facility, they have structure to their training and are supervised by a coach (Dunton et al., 2012). Sports can be very beneficial for both physical and mental health (Rimmele et al., 2007). If people stay fit and are not under or overweight, they are less likely to develop a so-called lifestyle disease (Must et al., 1999). Sports can have positive effects on some hormones, especially cortisol and the other adrenocortical hormones that can lead to better management of stress and overall better mental health (Rimmele et al., 2007).

Sports can benefit a child's development in multiple ways. It can teach them the value of teamwork and boost their self-belief amongst other benefits (March and Kleitman, 2003; Strean, Bengoechea and Williams, 2004; Kajbafnezhad, Ahadi, Heidarie, Askari and Enayati, 2011). Sports can teach more than just the rules and skills of the sport itself. Partaking in sporting activities can impart valuable lessons that can transferred to other areas of life. Those skills can follow the children into their adulthood, therefore to some extent it isn't the physical activity but the experience the children have with the sport that may have positive outcomes regarding new life skills (Strean et al., 2004). It is these learned life skills that have been associated with sports, among other factors, that have been proven helpful towards alcohol use (Botvin and Griffin, 2004).

Alcohol is a psychoactive drug that is usually consumed as a beverage. It has many harmful side effects and has been deemed one of the biggest current risks to public health by the World Health Organization (2018). In America, Europe and the Western Pacific

more than half of the whole population over the age of 15 consumes alcohol (World Health Organization, 2018). Even though some people can enjoy alcohol without any harm to the quality of their health or life in general, others cannot and can end up misusing it (World Health Organization, 2018). Alcohol misuse can have multiple health implications, including sexual dysfunction and an increased risk of cancer amongst others (Cargiulo, 2007). It can cause both serious psychiatric and physical problems and can even be fatal (Cargiulo, 2007) with the World Health Organization (2018) stating that alcohol-related deaths made up 5.3% of all deaths in the world in 2018. Not only does alcohol cause problems for people´s health, but also often leads to more aggression which then can lead to antisocial behaviour (Wells and Graham, 2002). When alcohol consumption has become a severe problem, it is often called Alcohol Use Disorder (AUD) (American Psychiatric Association, 2013). The definition of AUD will be explored in more depth in the following under chapter. An American survey by the Substance Abuse and Mental Health Services Administration (2018) stated that more than 5.8% of Americans over the age of 18 had an AUD. In 2018, the World Health Organization (2018) showed similar findings on a global scale, stating that 5.1% of the world population over 15 years old had an AUD. In Europe, prevalence was even higher, with 8.8% of the population over 15 years old having AUD (the World Health Organization, 2018). The World Health Organization (2018) stated that over 26.5% adolescents aged 15-19 were current drinkers in 2018. In Europe 43.8% of adolescents in the same age group are current drinkers with the percentage of adolescents who consume alcohol in America being 38.2% (World Health Organization, 2018). Alcohol consumption amongst adolescents has been a common field of study in recent years, with Grant and Dawsons´ (1997) study suggesting that when adolescents consume alcohol, they are at increased risk of developing AUD.

Alcohol consumption developing into a problem – Alcohol Use Disorder

Alcohol abuse is a common, widespread problem that exists all over the world amongst different socioeconomics groups and ages (Cargiulo, 2007). Depending on culture and the zeitgeist, countries and even smaller regions have different ideas as to what defines alcohol abuse. Whilst it might be commonplace to have two glasses of wine with dinner in Italy, those from other nations might frown upon the same level of consumption (Mandelbaum, 1979). That is one of the reasons why it is hard to define what exactly alcohol abuse is, depending on where in the world you are (Mandelbaum, 1979).

According to the Diagnostic and Statistical Manual of Mental Disorders V (DSM 5) if drinking becomes a severe problem it can be diagnosed as Alcohol Use Disorder, or AUD (American Psychiatric Association, 2013). The national institute on Alcohol Abuse and Alcoholism (n.d.) describes AUD as "a chronic relapsing brain disease characterized by compulsive alcohol use, loss of control over alcohol intake, and a negative emotional state when not using".

In the Tenth Revision of the International Classification of Diseases (ICD-10), alcohol dependence syndrome is a diagnosis (World Health Organization, 1992). The diagnostic criteria for it is that the person craves alcohol, they are not able to control their alcohol use, they have built up a tolerance for it and get withdrawal symptoms if they do not drink. The criteria also states that the alcohol takes over their life, they are neglecting pleasures or previous interests because of the alcohol use and overall, they keep on using it despite it harming their health and quality of life (World Health Organization, 1992). This diagnosis is not dissimilar to the diagnoses of alcohol dependence in the Diagnostic and Statistical Manual of Mental Disorders IV (DSM-4) (Saunders, Degenhard, Reed and Poznyak, 2019). However, in the Diagnostic and Statistical Manual of Mental Disorders V (DSM-5) this criteria has been integrated into AUD with three sub-classifications of mild, medium and severe (American Psychiatric Association, 2013). In DSM-5 a person has to show at least two symptoms out of 11. Their particular case is then classified from mild to severe based on the number of symptoms displayed (American Psychiatric Association, 2013). The Eleventh Revision of the International Classification of Diseases (ICD-11) highlights the key criteria for AUD with the consumption criteria being higher than in the DSM-5 (Saunders et al., 2019). This has created a large variation in classification that can be problematic for professionals (Rehm, Heilig and Gual, 2019). However, in all of them, AUD is a disorder that reduces the quality of people´s lives.

The roots of alcohol misuse

It is very important to combat alcohol misuse before it even starts and researchers have been studying people that are at higher risk for misusing alcohol. Nature versus nurture is a phrase often heard when it comes to establishing the root cause of problematic behaviour, psychological diseases and substance abuse. Researchers have been trying to establish which has the greatest impact on propensity for substance abuse, but it is often contested. Some studies show that genes play an important role when it comes to alcohol and drugs (Sartor et al., 2010) while others say that environmental factors have a greater

impact, as demonstrated by Bandura's (1977) social learning theory that posits that we behave a certain way after observing role models.

There is a certain period in people´s lives where the onset of alcohol use is more likely. The mid to late teenage years are the riskiest period (Degenhardt et al., 2008). Results in Grant and Dawson´s (1997) study suggest that every year not drinking in the life of an adolescent counts. They found that if the person had their first alcoholic drink at the age of 13 the chances of battling with alcohol dependence at some point in their life was very high or 47.3% (Grant and Dawson, 1997). The percentage decreases each year after that, being as low as 9.5% if they have their first drink when they are 22 (Grant and Dawson, 1997). There is an exception however, with the chances going up again at the age of 23 and 24. (Grant and Dawson, 1997). This shows how important it is to try to keep young people away from alcohol for as long as possible, to decrease the risk of alcohol dependence.

During this period it is important for children to feel confident and have hobbies. Some hobbies have better outcomes when it comes to improving levels of self-esteem in adolescents. Furthermore, some hobbies more than others are more strongly linked to a reduced risk of those adolescents consuming alcohol (Vicary, Smith, Caldwell and Swisher, 1998). There are some children, however, that struggle to establish their sense of self, so they end up behaving in a pseudomature fashion, trying to impress their peers with their behaviour (Allen, Schad, Oudekerk and Chango, 2014). This behaviour is most likely to occur when the teenagers do not feel confident that they will manage to 'fit in' with their peers due to it being a hard developmental challenge for them (Cicchetti and Rogosch, 2002). Pseudomature behaviour in the teenage years was found to be a big predictor for alcohol use in the future (Allen et al., 2014).

The aim of this investigation

Factors that have been associated with sports participation have been shown to reduce the risk of adolescents developing Alcohol Use Disorder in future (Walitzer and Sher, 1996). The aim of this study is to investigate the relationship between sport participation and alcohol consumption in adolescents and explore whether the results are comparable to prior studies that suggest factors associated with sports can indeed reduce the risk of harmful alcohol use (Walitzer and Sher, 1996; Strean et al., 2004). Systematic reviews that have been published previously and show a relationship between sport participation and

higher alcohol consumption have been limited to the USA (Kwan, Bobko, Faulkner and Donnelly, 2014; Piazza-Gardner and Barry, 2012). Kwan et al. (2014) did a systematic review of 17 longitudinal studies that all focused on the relationship between sport participation and alcohol use in adolescents. 16 out of 17 were studies done on adolescents from the USA (Kwan et al., 2014). Results were clear, with fourteen out of seventeen studies showing a positive relationship between those two factors and with none of the studies showing a protective effect of the adolescents participating in a sport on them consuming alcohol (Kwan et al., 2014). These results show that sport participation amongst adolescents could be a risk factor for alcohol consumption (Kwan et al., 2014). Piazza-Gardner and Barry (2012) also summarized 17 peer reviewed studies that all included results on the relationship between alcohol consumption and physical activity (Piazza-Gardner and Barry, 2012). The studies they analysed included youths, university students and the general population. Their overall findings indicated that there is a positive relationship between higher alcohol consumption and physical activity across all ages (Piazza-Gardner and Barry, 2012). The majority of the studies used in these systematic reviews came from the USA. In this investigation more countries will be taken into consideration to see whether results, both in the USA and beyond, support previous findings.

Methods

Selection of studies

With the aim of establishing a wide and multidisciplinary analysis of the relationship between sports participation and alcohol use, and which factors could indicate correlation between sport participation and later AUD, I searched the following electronic databases: Web of Science; PubMed; Scopus; and ScienceDirect. To widen the search, grey literature was included and Google Scholar was used to complete the search for that. The keywords that were used on the aforementioned databases were: "*alcohol*"; "*Alcohol Use Disorder*"; "*alcohol misuse*"; "*alcohol addiction*"; "*sports*"; "*sport participation*";" *physical activity*"; "*organized sports*"; "*team sports*"; and "*individual sports*". Firstly, the title was inspected to see whether it was suitable for the research and if it was, the abstract was read to see further if the data was appropriate. Data that was written and published in English or Icelandic was used. For the first question, single case studies were excluded and quantitative empirical studies were used. After narrowing the search down to data that was

thought to be appropriate to the analysis, the articles were read to detect which factors were relevant. The databases were then searched again with new keywords that were thought to provide a bigger picture of the subject. The new keywords that were used were "*life skills*"; *protective factors*"; and "*sport type*". After reading through the studies, further relevant studies were located through the bibliographies of those studies. Overall there were twenty-nine studies that matched the criteria and were used in this thesis to answer the research question. To compare to recent findings, systematic reviews done by Piazza-Gardner and Barry (2012) and Kwan et al. (2014) were used.

Studies

The studies that were used were all connected to the subject of this thesis. To answer the research question, eight studies were included with the question whether there is a relationship between sport participation or physical activity and alcohol consumption (Eitle, D., Turner, and Eitle, M., 2004; Wichstrøm, T. and Wichstrøm, L., 2009; Halldorsson, Thorlindsson and Sigfusdottir, 2013; VanKim, Laska, Ehlinger, Lust and Story, 2010; Leichliter, Meilman, Presley and Cashin, 1998; Martinsen and Sundgot-Borgen, 2014; Nelson and Wechsler, 2001; and Aaron et al., 1995). Characteristics of these studies are presented in *Table 1*. Other studies were used to broaden the discussion, with ten studies relating to alcohol in some way (Degenhardt et al., 2008; Allen et al., 2014; Thorlindsson, Bjarnason and Sigfusdottir, 2007; Dvorak et al., 2014; Checinski and Farmer, 1996; Kost and Smyth, 2008; Brook, S., Brook, W., Gordon, Whiteman and Cohen, 1990; Grant and Dawson, 1997; Balsa, Giuliano and French, 2011; Drake and Mueser, 1996), four regarding life skills (Botvin and Griffin, 2004; Strean et al., 2004; Kajbafnezhad et al., 2011; Papacharisis, Goudas, Danish and Theodorakis, 2005) and five regarding sports (Stefansen, Smette, and Strandbu, 2018; Yang, Telama and Laakso, 1996; Vilhjalmsson and Thorlindsson, 1998; Perrotta, 2010; Martens, Watson II and Beck, 2006). The studies were used firstly to establish whether there is a correlation between sport participation and a reduction in alcohol consumption and secondly to put together information about factors that could influence both sport participation and alcohol consumption leading to AUD.

Table 1

Studies done on the relationship between sport participation and alcohol consumption and their findings.

Study	Sample	Measures	Primary findings
Understanding young adult physical activity, alcohol and tobacco use in community colleges and four-year post-secondary institutions: A cross-sectional analysis of epidemiological surveillance data (VanKim et al., 2010).	9,931 students at colleges and universities in the USA.	Participants filled out either an online survey or a pencil and paper survey.	Those who participated in higher levels of physical activity were at more risk of alcohol consumption but lower risk of smoking than those who did not participate in any sport.
The Deterrence Hypothesis Reexamined: Sports Participation and Substance Use among Young Adults (Eitle et al., 2003).	1,230 students at the age 18-23 (74% males) in South Florida.	Longitudinal data was collected from interviews taken when the students were around 18-23 years old and compared to interviews that were taken 5-10 years earlier.	White males were more likely to consume alcohol if they participated in sports whilst sport participation was a protective factor for black men.
Alcohol use and related consequences among students with varying levels of involvement in college athletics (Leichliter et al., 1998).	51,483 students at 125 different institutions.	Participants filled in a questionnaire about sport participation and alcohol and drug use.	Students (Both males and females) that participated in sports were at more risk of consuming more alcohol weekly as well as binge drinking more often and to suffer more serious consequences in relation to their drinking.
Does sports participation during adolescence prevent later alcohol, tobacco and cannabis use? (Wichstrøm, T. and Wichstrøm, L., 2009)	3,251 Norwegian high school students aged 13-19.	Participants filled in a questionnaire and were followed up 2, 7 and 14 years later.	Students that participated in sports were more at risk of consuming alcohol than those who did not participate in sports. There was found a difference in risk when different types of sport were compared.

Table 1 *(continued)*

Study	Sample	Measures	Primary findings
Alcohol and college athletes (Nelson and Wechsler, 2001)	12,777 college students in the USA where everyone over 24 years old were excluded.	Participants filled in questionnaire where they were asked about drinking behaviour and sport participation.	Students that participated in sports were more at risk of consuming more alcohol, more likely to take part in binge drinking but were also more likely to try to limit their alcohol consumption.
Physical activity and the initiation of high-risk health behaviors in adolescents (Aaron et al., 1995)	1,245 students aged 12–16.	A three-year prospective study where students filled out questionnaires.	Males that participated in competitive sports were more at risk than those who did not participate in sports of consuming alcohol (44% vs 17%).
Adolescent elite athletes' cigarette smoking, use of snus, and alcohol (Martinsen and Sundgot-Borgen, 2014).	956 athletes and a control group of non-athletes in Norwegian high schools.	Students filled out a questionnaire where they were asked about substance use and sport participation.	Non-athletes were at more risk of consuming alcohol, smoking and use snus. Female athletes were more at risk than male athletes of consuming alcohol.
Adolescent sport participation and alcohol use: The importance of sport organization and the wider social context (Halldorsson et al., 2013).	10,992 students in Iceland aged 13-16.	Students filled out questionnaires about substance use and sport participation.	Students that participated in formally organized sport were less likely to consume alcohol than those who did not participate in sports. However, those who participated in informal sports were more at risk for alcohol consumption.

Results

There are discrepancies between research regarding alcohol and sports. While some studies say that sport participation reduces the risk of alcohol consumption (Halldorsson et al., 2013; Martinsen and Sundgot-Borgen, 2014) others show the opposite (VanKim et al., 2010; Eitle et al., 2003; Leichliter et al., 1998; Martens et al., 2006; Aaron et al., 1995; Nelson and Wechsler, 2001).

Van Kim et al. (2010) studied 9,931 students at colleges and universities in the USA. The students filled out surveys regarding substance use and physical activity (Van Kim et al., 2010). Results suggested that those who did participate in higher levels of moderate physical activity were at much higher risk of engaging in binge drinking or heavy episodic drinking than those who did not participate in as much physical activity (Van Kim et al., 2010).

Eitle et al. (2003) studied 1,230 students in South Florida. The students were at the age 18-23 years old. The results suggested that when youths participate in sports it does not reduce the risk of them developing AUD but rather puts them at higher risk (Eitle et al., 2003). However, there was an exception as black students who took part in sport were at less risk of alcohol consumption than black students who did not participate in sports (Eitle et al., 2003).

Nelson and Wechsler (2001) studied 12,777 college students in the USA and results suggested that youths that participated in sports whilst studying in university were more likely to drink alcohol than those who did not participate in sports. Not only were they more likely to consume alcohol but also more likely to binge drink, use more alcohol and were more likely to suffer drink-related harm (Nelson and Wechsler, 2001).

A study by Leichliter et al. (1998) showed remarkably similar results. They studied 51,483 students at 125 different institutions (Leichliter et al., 1998). Their results suggested that youths that play sports in universities are more likely to binge drink, have more units of alcohol per week and were more likely to suffer more harmful consequences, such as injuries, from alcohol consumption (Leichliter et al., 1998). Male team leaders were at greatest risk of consuming alcohol, of binge drinking and of suffering more harmful consequences from drinking (Leichliter et al., 1998).

Aaron et al. (1995) studied 1,245 students aged 12–16 in the USA. Results suggested that male students that participated in competitive sports were more at risk of using alcohol than those who did not participate in sports (44% vs 17%). They did not find a relationship between females´ sport participation and alcohol consumption (Aaron et al., 1995).

Wichstrøm, T. and Wichstrøm, L. (2009) studied 3,251 Norwegian high school students aged 13-19. Their results suggested that students that participated in sports were more at risk of consuming alcohol than those who did not participate in sports (Wichstrøm, T. and Wichstrøm, L., 2009). Those who participated in team sports were at higher risk of alcohol intoxication later on in life, when compared to participants in technical or strength sports (Wichstrøm, T. and Wichstrøm, L., 2009). Those participating in endurance sports were at lower risk than those in technical or strength sports for alcohol intoxication later in life.

These aforementioned studies all show consistency. However, others did not support their results.

Halldosson et al. (2013) studied 10,992 students in Iceland aged 13-16. Their results showed a difference between formally organized sports and informal sports (Halldosson et al., 2013). Students that participated in formal sports were less likely to consume alcohol than those who did not participate in sports, whilst sport participation in informal sports was not found as a protective factor for alcohol consumption (Halldosson et al., 2013). Results also suggested that adolescents who came from broken families or had low parental monitoring and were therefore already at greater risk of alcohol consumption, would see that risk decrease with participation in formal sports (Halldosson et al., 2013).

Martinsen and Sundgot-Borgen (2014) studied 956 athletes and a control group of non-athletes in Norwegian high schools. Their results suggested that students that participated in sports were less likely to consume alcohol than those who did not participate in sports (Martinsen and Sundgot-Borgen, 2014). They found gender difference and girls that participated in sports were more likely to consume alcohol than boys that participated in sports (Martinsen and Sundgot-Borgen, 2014).

Discussion

The main question in this investigation was whether sport participation in youths would protect them against future Alcohol Use Disorder. Current studies that have been done around this topic have demonstrated inconsistencies between countries, making it hard to ascertain accurate results. Studies that were analysed in this investigation suggest that in the USA there is a consistent, positive relationship between adolescents' sport participation and higher alcohol consumption. These results are consistent to other systematic reviews that have been done on this topic (Piazza-Gardner and Barry, 2012; Kwan et al., 2014). Studies done in Scandinavia are more inconsistent and whilst the majority of them suggest that sport participation is a protective factor for alcohol consumption (Martinsen and Sundgot-Borgen, 2014; Halldosson et al., 2013) others suggested that it is not a protective factor (Wichstrøm, T. and Wichstrøm, L., 2009). There are a few reasons that could explain that and the main one is that sports are being played in completely different settings in those countries. With the Icelandic government focusing on increasing sport participation as a protective factor for alcohol consumption for the youths of Iceland, some positive results have been seen (Kristjansson et al., 2015).

These studies either show a relationship between sport participation and alcohol consumption, or not. But they do not investigate what factors are causing the relationship, other than the sport itself. There are multiple factors which could have an impact on any correlation between sport participation and alcohol consumption, which will be explored here.

Nature versus nurture

Researchers have shown that certain genes can make alcohol have different impacts on the body and brain (Reich et al., 1998; Wall, Shea, Chan and Carr, 2001; Grant et al., 2015). There is evidence to suggest that some people have linkage with a loci on the chromosomes that is more sensitive to alcohol dependence. When those people consume alcohol, it affects the body in such a way as to cause the person to get a positive feeling (Reich et al., 1998). ALDH2 is a gene that is often found in the Asian population that can make consuming alcohol an unpleasant experience with them being more likely to feel nauseous which makes it less likely for them to abuse alcohol or even drink again (Wall et al., 2001). Even though some genes can make people more vulnerable to alcohol or drugs, environment and upbringing can also impact a person's future, especially regarding their

use of alcohol. Parents or guardians are in most cases the first people that children look up to. They are usually the child´s strongest influencers in their first years of life and research shows that the habits of the parents or guardians are likely to affect the child´s life and their actions (Vardavas et al., 2007; Yperman and Vermeersch, 1979). According to the Convention on the Rights of the Child, it is the parents/guardians job to make sure the children are safe and as ready as they can be when they go into their adulthood (Laws for Convention on the Rights of the Child no. 14/1989).

The involvement of the family

It would be impossible to suggest that if a person plays a sport they eradicate all chance of becoming dependent on alcohol. However, we can hypothesise that all the factors that come with playing a sport in the adolescent years plus the factors that were already there when the children started the sport can, in some way, help towards reducing the risk of AUD in the future.

It all begins with the reason why children start playing the sport in first place, with parental involvement being an important factor. There are factors that increase the chances of participation in sports and studies show that youths coming from lower class families are less likely to participate in an organised sport (Birchwood, Roberts and Pollock, 2008; Wheeler, Green and Thurston, 2017). In a study done by Yang et al. (1996), findings showed that girls who had fathers with high status were more likely to participate in sports than girls of fathers with low status in society. Life chances of children that are brought up in poverty are worse than their more economically fortunate counterparts (Kost and Smyth, 2008). They are also less likely to finish university (Duncan, Yeung, Brooks-Gunn and Smith, 1998). A study done by Kost and Smyth (2008) suggested that young adults that grow up in poverty and with an alcoholic relative are more likely to develop problems with alcohol use and more likely to have lower incomes themselves than people that did not grow up in similar situations. However, for the risk to be increased the individual had to have lived at least six years in poverty and for a minimum of nine years with an alcoholic relative (Kost and Smyth, 2008). When parents abuse alcohol, they are more likely to be emotionally distant, less likely to monitor what their children are up to and are often more accepting of their child´s alcohol use (Windle, 1996).

The previous studies show how a parents' alcohol problems can become a drawback for the adolescents (Kost and Smyth, 2008; Windle, 1996). But Halldorsson et al. (2013) show

in their study on Icelandic adolescents that higher levels of sport can counteract this, making the factors that usually would increase the risk of alcohol use weaker.

Research has shown that there is a positive relationship between physically active family members and physically active youths (Vilhjalmsson and Thorlindsson, 1998; Yang et al., 1996; Welk, Wood and Morss, 2003; Moore et al., 1991). A study by Vilhjalmsson and Thorlindsson (1998) of adolescents in Iceland suggests that having a physically active male family member increases the chance of the adolescent being physically active. A study by Moore et al. (1991) showed similar results to previous studies, finding that children that had two active parents were 5.8 times more likely to be active than the children with two inactive parents. Similar findings were seen by Yang et al. (1996) in a follow up study that showed that there was a relationship between two active parents and the child still being active 12 years later. Parents play an important role when it comes to youth participation in sports and research has shown that the parents' behaviour regarding their own physical activity and their beliefs and behaviour toward their children's participation can be an influence on the child (Bois, Sarrazin, Brustad, Trouilloud and Cury, 2005; Sánchez-Miguel, Leo, Sánchez-Oliva, Amado and García-Calvo, 2013). Sánchez-Miguel et al. (2013) showed a positive relationship between parents being supportive of their child´s sport and the child´s enjoyment of the sport and with the appropriate participation of the parent - with positivity and medium pressure - it has a positive impact on the child´s enjoyment and motivation. When parents' involvement in their child´s participation in sport is positive and supportive, emotional closeness is often involved (Stefansen et al., 2018). Emotional closeness is an important factor for adolescents. They need emotional support from their parents/guardians and Brook et al. (1990) suggested that more parental nurturance and warmth resulted in lower levels of alcohol use and more positive general wellbeing.

Life lessons learnt through sports

Botvin and Griffin´s (2004) study regarding the Life Skills Training (LST) program showed how learned life skills had a positive impact on adolescents regarding alcohol and drug use. The LST program is a prevention program that teaches students self-management, social skills and facts and figures about substance use with the purpose of educating students about the dangers associated with it (Botvin and Griffin, 2004). There is a difference between general life skills learned through sports and the LST program.

The LST program has the goal of reducing substance use, focusing on how to achieve that through teaching specific life skills. The aim of sport is not to impart life skills, but to achieve in the sport, with the life skills being an additional benefit (Botvin and Griffin, 2004). That means that it is hard to compare whether life skills learned through sports have a similar positive relationship with adolescent drinking behaviours that the LST program has.

Studies relating to sports played by youths showed that sports generally had positive outcomes on self-esteem (March and Kleitman, 2003; Slutzky and Simpkins, 2009; Richman and Shaffer, 2006). Self-esteem can help a person develop as an individual but having low self-esteem can have negative effects on people´s lives. Studies have shown that there is a correlation between low self-esteem and AUD, especially amongst women (Walitzer and Sher, 1996).

One of the life lessons that can be gained through sports is that athletes sometimes need to cope with negative emotions. They must learn how to deal with those feelings and fight them so they will not affect their performance (Kajbafnezhad et al., 2011). This is a skill that can be utilised in other life situations by making the individual more resilient to life's challenges. If people do not have the requisite skills to deal with the situation, the problem could get worse and in some cases the person tries to suppress the problem by consuming alcohol (Dvorak et al., 2014).

Locke and Latham (2002) provided the goal-setting theory of motivation. The theory is based on many studies and states that specific, well thought goals can lead to better task-performance and overall more success in life (Locke and Latham, 2002). Goal setting, along with time management and teamwork, are few of the life skills that can be learned through sports participation and transferred into other life sets (Papacharisis et al., 2005).

Education as a protective factor

Research done by March and Kleitman (2013) suggests that students that play sports have showed better results in their education and academic outcomes. That leads us to other research done by Balsa et al. (2011) which suggests that youths that get higher grades in school are less likely to develop AUD in the future when compared to youths that get worse grades. A study done on American Indian students and dropouts in the years 1975-1994 showed that drug use was more significant amongst the dropouts than the students (Bealuvais, 1996). Zenic et al. (2019) results showed that sixteen-year-old youths in

Bosnia-Herzegovina that did poorly in school, had poor behaviour, grades and high absence numbers were at more risk of engaging in harmful alcohol drinking two years later. The results above highlight how education and being successful at school can reduce the risk for future alcohol problems.
However, a study by Degenhardt et al. (2008) showed that education had a positive relationship on alcohol use. There has also been found a correlation between youths that had one parent absent from home or parents with a lower educational level and the youth consuming more alcohol (Thorlindsson et al., 2007).

Friendship groups in sports and mental health

Another factor is the culture surrounding sport, and friendships among sporting groups. Often the people that play sports together are likeminded people that end up communicating outside of the sport.

Friendships and social communication are an important factor when it comes to happiness and mental health in general. Studies show that adolescents with higher levels of integration are less likely to have symptoms of depression where the feeling of belonging is a strong factor (Ueno, 2005). It is important that the adolescents integrate with the right group of people and if youths have poor relationships, they are at greater risk of having social incompetence in the future (Reisman, 1985). The adolescents that participate in sports together are most often at the same age and same gender. Wichstrøm (2001) suggested that youths that fraternize with people older than them are at more risk of alcohol intoxication amongst other risky behaviours.

People struggling with mental disorders are more likely to abuse alcohol, with AUD being the most common co-occurring disorder amongst people with severe mental disorders (Drake and Mueser, 1996). However, sports can be a benefit. Sanders, Field, Diego and Kaplan´s (2000) study done on American high school seniors suggested that moderate involvement in sports lowers the risk of depression in adolescents with other studies supporting those findings (Vilhjalmsson and Thorlindsson, 1998; Perrotta, 2010).

Results showing a difference between groups

When considering whether sport participation can reduce the risk of alcohol misuse or AUD, it is important to contemplate the variables and to see if the aforementioned factors apply. Stark variations in results are seen in the discrepancies between different groups of sports - especially individual sports and team sports - as well as between boys and girls

and most of all, the difference between cultures, with studies showing a complete contrast between some countries.

Difference between team sports and individual sports and different groups of sports

Research has shown that there is a difference between the life skills that children learn and use in individual sports and team sports (March and Kleitman, 2003). Research by Kajbafnezhad et al. (2011) on 400 male athletes that either played organised team sports or an organised individual sport suggested that there is a significant difference in these two groups. The biggest difference was that the team sport participants scored higher in the variable "positivity" while the individual team sport group scored higher on mental skills (Kajbafnezhad et al., 2011).

March and Kleitman (2003) conducted a study where results suggested that team sports had better life skills outcomes and overall more positive effects than individual sports. Despite the results showing that some individuals could be gaining more life skills than others, it does not necessarily indicate that the same individuals are less likely abuse alcohol in the future. Studies have suggested that team and endurance sports have a significant positive relationship with alcohol intoxication, especially when compared to technical or strength sports (Wichstrøm, T. and Wichstrøm, L., 2009).

Martens et al. (2006) study indicated that there was a large difference in alcohol consumption across individuals who took part in different groups of sports. Results suggested that swimming and diving had the highest prevalence of alcohol consumption (Martens et al., 2006).

Gender difference

Results in research done on alcohol consumption, sport participation and self-esteem have one thing in common; a difference between genders. A few years ago, boys were more likely to participate in sports than girls although the ratio between girls and boys playing sports is more equal today (Sabo, 2009). There are other areas that highlight a discrepancy amongst the genders when it comes to sports. Research carried out in the USA shows how boys that participate in sports tend to drink more alcohol than both boys that do not take part in physical activity and girls that both take part and do not take part in physical activities (VanKim et al., 2010; Eitle et al., 2003). A study done on Norwegian youths showed the opposite results, with girls being more likely to consume alcohol than boys (Martinsen and Sundgot-Borgen, 2014)

Self-esteem and confidence are two factors where there has been found a difference in the genders (Frost and McKelvie, 2004). When it comes to adolescents and sport participation, studies have showed that sport participation can help with boosting females' self-esteem (Richman and Shaffer, 2006), with an increased likelihood of a positive body image (Richman and Shaffer, 2006). Sport participation can also boost male self-esteem but more studies have been done on girls which show clearer results (Bowker, Gadbois and Cornock, 2003). Walitzer and Sher (1996) showed with their results that when it comes to women, low self-esteem is a risk factor for AUD. Gullone, Moore, Moss and Boyd (2000) conducted a review of 925 adolescents who took part in the Adolescent Risk-Taking Questionnaire (ARQ). They found that boys were more likely to take part in risky behaviours, such as thrill-seeking behaviours, reckless behaviours, antisocial behaviours and perceptions of reckless behaviours (Gullone et al., 2000). Boys were also more likely to view those risky behaviours as less hazardous than the girls viewed them (Gullone et al., 2000). Alcohol use and alcohol intoxication are two of those risky behaviours. Studies often concentrate on genders but Bowker et al. (2003) did not only examine the role of gender but also gender orientation. Their findings showed a relationship between individuals that had more feminine features and participated in competitive sports and having lower levels of confidence in their sporting ability and overall lower self-worth (Bowker et al., 2003).

When it comes to traumatic experience in childhood, women are found more at risk of developing post-traumatic stress disorder (PTSD) and adapting to behaviour that can lead to alcohol abuse (Olff, 2017). Individuals that suffer from PTSD are more likely to develop AUD than those who do not suffer (Ralevski et al., 2016). All these factors have an impact on the differing vulnerability of the genders. To summarize the gender difference, boys that play sports are more likely to drink alcohol during the adolescent years and more likely to take part in any risky behaviour (Gullone et al., 2000). They also seem to be more sensitive to physiological and social changes which can put them at more risk in developing AUD (Shulte, Ramo and Brown, 2009). Girls, however, are more likely to develop traits and disorders through bad life experience (Olff, 2017), putting them at higher risk for developing AUD later in life (Ralevski et al., 2016).

Difference in countries and cultures

Most of the studies regarding sport participation and alcohol that were used to analyse and answer the research question show a positive relationship between adolescents playing sports or taking part in physical activity and higher levels of alcohol consumed. There are some exceptions and there was one country that showed almost opposite results to the other studies. Studies done on Icelandic adolescents showed that sport participation was a protective factor for alcohol use in both girls and boys (Halldorsson et al., 2013; Kristjansson et al, 2015; Thorlindsson et al., 2007). Kristjansson et al. (2015) analysed primary prevention variables, such as organized sports and parents monitoring reduced the numbers of substance use on Icelandic adolescents. Results showed that with primary prevention factors getting stronger, the adolescents´ alcohol use decreased drastically in those seventeen years analysed in the study (Kristjansson et al, 2015). In 1997, 29.6% of adolescents reported that they had been drunk in the last 30 days whilst the percentage had fallen to 3.6% in 2014 (Kristjansson et al, 2015). Ungt fólk (*e. Young people*) are studies that have been done for the Icelandic Ministry of Education, Science and Culture (Rannsóknir og Greining, n. d.). The Icelandic Centre for Social Research and Analysis (ICSRA) has been collecting data and carrying out studies on Icelandic adolescents both in high schools and colleges (Rannsóknir og Greining, n. d.). A 2018 study done on youths in 8^{th}-10^{th} grade, which include children from the age thirteen to sixteen, showed that a high percentage participated in a sport but only a low percentage had drunk alcohol in the past 30 days (Rannsóknir og Greining, 2018). Even though this shows that more people play sports than drink alcohol, it does not show the correlation between those two factors. That does not mean that there is no relationship between these factors and Thorlindsson et al. (2007) found that sport participation reduced the risk of alcohol consumption amongst Icelandic youths. Even though findings in Iceland have been completely different from similar studies elsewhere, particularly in the USA, Iceland's results are not unique. Similar results were found in other Scandinavian studies that focused on sport participation and substance use (Martinsen and Sundgot-Borgen, 2014; Hellandsjø Bu, Watten, Foxcroft, Ingebrigtsen and Relling, 2002). Martinsen and Sundgot-Borgen (2014) studied Norwegian high school students and found non-athletes were more likely to consume alcohol than the athletes, although female athletes were at more risk than male athletes. Hellandsjø Bu et al. (2002) also studied Norwegian teenagers and their findings showed that organised sport participation might delay the onset of alcohol consumption in adolescents.

There are a few potential reasons for the inconsistency between Iceland and the USA. Firstly, sports in Iceland are run by independent clubs outside of the school whilst in the USA, sports are mostly run by the schools (Halldorsson et al., 2013). This big difference makes it hard to compare those countries to each other on this issue.

Secondly, Iceland has undergone a complete transition in its fight against adolescent drinking. In 1990 the numbers for alcohol consumption in Icelandic adolescents were one of the highest in Europe (Hibell et al., 1997). The government decided to focus on getting those numbers down through primary prevention. They introduced new laws on evening curfew that meant that children and youths were legally not allowed to stay out beyond a certain time. More focus was put on educating parents about the importance of monitoring their children and more effort was put into educating the youths about alcohol and the danger of other substance use. Sport participation was an important factor they focused on and they tried to get more youths into joining a sports club. According to studies done in Iceland years later, these few measures made an enormous difference (Kristjansson, James, Allegrante, Sigfusdottir and Helgason, 2010). The rates of alcohol use amongst youths dropped drastically whilst numbers for sport participation went up (Kristjansson et al., 2010).

Conclusion

Results show that the majority of studies (75%) done on the research question show a positive relationship between sport participation and alcohol use in adolescents. The two studies that suggest that sport participation is a protective factor for alcohol use come from the Nordic countries Iceland and Norway, where sports are typically played in different settings than in the USA. There is a gender difference and in most of the studies, boys that played sports seemed to be more at risk than girls that played sports. Difference was found amongst different types of sports but participants in team sports seemed to be at greatest risk to consume alcohol when compared to other sports.

If we put these opposing studies aside and look at the other factors inspected, we see some indication that it is not the sport participation itself but the factors that are associated with sports participation that can reduce the risk on AUD. Firstly, not everyone is fortunate enough to get the opportunity to play sports. Youths that come from wealthier families are more likely to play sports but also are at less at risk of abusing alcohol in the future than those who grow up in a poor home (Kost and Smyth, 2008). This could indicate that the

youths that never got the chance to play sports were already at more risk of developing AUD. Secondly there is a correlation between sport participation and better grades, with those who get better grades being less likely to develop AUD. In addition, youths that participate in sports were found more likely to gain life skills such as goal setting, motivation, better self-esteem, and were more able to manage their feelings and emotions. These life skills can all reduce the risk of future AUD. Last to mention is one of the main reasons for Iceland´s turnover in adolescent drinking; parental involvement. Youths that have supportive parents are more likely to enjoy the sport that they play and when parents give their children emotional support and warmth, the youths are less at risk to develop AUD. All these factors show a relationship between each other but not a direct relationship between sport participation and AUD. If the life skills gained through sports is such a protective factor, what is it in sports that makes it such an increased risk factor for alcohol consumption?

Limitations and Future directions

There were limitations to this investigation. There are thousands of studies regarding this topic but only a small number were used due to time and resourcing restraints. The investigator strived for optimum accuracy, however most studies that were analysed came from the USA or the Nordic countries. Whilst the studies used for the research question were about the relationship between sport participation and current alcohol use amongst adolescents, studies that were used to widen the discussion mostly showed how factors associated with sports could have impact on future alcohol use and AUD.

Despite the inconsistency in results in the studies, overall the studies have several common limitations. Not many studies are based on longitudinal data, especially outside of the USA, and most of them have analysed the relationship between current alcohol consumption and whether the participants take part in any sports. The participants in most of the studies are also over the age of twelve and closer to adulthood. Most of the studies are based on self-report which can lead to the results being biased as there is no way of telling whether the adolescents are being accurate or over or under reporting their alcohol use.

This topic needs further study, especially using longitudinal data outside of the USA that could explore the long-term relationship between sport participation and alcohol use in adolescents. There is a gap in the literature concerning adolescents and children younger

than 12 and whether sport participation at younger age reduces the risk of alcohol consumption later in life. More research is necessary on which factors put adolescents who participate in sports at more risk of alcohol consumption, by outweighing the factors associated with sports that reduce the risk.

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