Video games and violence among children and adolescents in the Arab world: a systematic review

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Abstract. *Background and aim:* Video gaming has witnessed tremendous growth in recent years. Video games have been associated with various negative effects on players, such as aggressive behavior and reduced apathy. The present review aims to investigate the association between video games and violence among children and adolescents in the Arab world, while highlighting the influence of the type of video games played, time spent playing, and other possible associated factors. *Methods:* A literature search was performed on PubMed and Web of Science electronic databases. All studies assessing video games and violence among children and adolescents written in English were eligible for inclusion in the review. A total of 9 studies were included in this systematic review. *Results:* Six studies investigated the relationship between video games and aggression, five of which found a significant association. Several factors have been studied to assess their role in mediating the association between the two. A statistically significant association was found between aggression and age and sex of the players, with a predominance among early adolescents and males. Longer durations spent playing video games were found in three studies to be significantly associated with a greater risk of aggression. *Conclusions*: In the Arab world, studies addressing this subject are limited. The discrepancy of reported results between video games and amount of violence could be attributed to the lack of standardization across studies. Therefore, it becomes imperative to further explore the association through conclusive studies with standardized measures.(www.actabiomedica.it)

Key words: video games, violence, aggression, social psychology, Arab world

Introduction

Video games are "interactive electronic games which aim primarily to entertain players by enabling them to access virtual environments, two-dimensional or three-dimensional, within specific rules and conditions." (1). They offer players a wide variety of genres, such as racing/driving, fighting, adventure, action, platform, puzzle, role-playing, simulation, strategy, sports, and shooting (2). Video games have surged in popularity worldwide, becoming an extremely common leisure activity. An estimate reported by Newzoo on the Global Games Market report (2021) had placed the number of global players at 3 billion, 15% of which were in the Middle East and Africa (434 million) (3). On average, players were found to spend 6 hours and 20 minutes every week playing video games (4). Similar to substance abuse, addictive behavior to video games had been established, with longer times spent playing games being associated with aggression (5,6).

Violence is defined by the World Health Organization as "the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in, or has a high likelihood of, resulting in injury, death, psychological harm, maldevelopment or deprivation." (7).

Of note, video games containing violence within their context appear to be a more favorable choice for youth and children (8). Most video game players were found to regularly prefer casual games (63%), followed by action games (39%), shooting games (39%), and racing games (37%) (9). Violent video games can provide players with multiple options of inciting harm to the human visual character such as dismembering, maiming, killing, or sexual assault (10). Exposure to such games is considered a risk factor for increased aggressive cognition, aggressive affect, aggressive behavior, and reduced prosocial behavior and empathy (11).

Recent evidence suggests that playing video games, whether violent or nonviolent, may be implicated in eliciting aggressive behavior in adolescents. A systematic review of 101 studies reported that video games may have minimal effects on aggressive behavior, reduced prosocial behavior, and attention deficit symptoms (12). Adolescents exposed to violence in video games were more likely to show hostile behavior and display physical aggression (13,14). Furthermore, an association was found between duration of playing video games and aggressive behavior (15). Exposure to violence in media is also linked with desensitization in children and adolescents and a decrease in empathy (16). The increase in aggressive behavior, resulting from violent media exposure, can lead to long or short-term effects; academic and occupational problems, traffic violations, substance abuse, depression, spousal abuse, and divorce (17,18).

Video gaming has proven to be an extremely common activity worldwide (3). While exploring the possible role of video games in inciting violent behavior in children and adolescents has been of great interest, a direct association between video games and violence is yet to be established in this age group. To the extent of our knowledge, no study has systematically reviewed the literature exploring the association between video games and violence among children and adolescents in the Arab world. The present systematic review aims to explore the association between video games and violence among children and adolescents in the Arab world while highlighting the influence of the duration spent playing, the genre of video games played, and other possible associated factors.

Methods

In this paper, a systematic search was conducted to review the association of video games and violence among children and adolescents in the Arab world. The first search on PubMed and Web of Science was conducted independently by two researchers on 02 November 2021. An updated search was conducted on 25 June 2022 which identified 11 items from PubMed, 44 items from Web of Science, and 2 items from additional sources, depicted in Tables 1 and 2, and Figure 1. The search string included a combination of keywords related to violence, video games, and Arab countries as shown in Tables 1 and 2. Two researchers had independently reviewed the titles, abstracts, and full texts of the articles to be screened for inclusion, and any discrepancy was resolved by a third researcher. Duplication of the records was eliminated manually.

All related studies published up to the time of the literature search were included. We included studies that assessed the association between video games with any measure of violence among children and adolescents in all populations in the Arab world (Saudi Arabia, Qatar, Algeria, Syria, Bahrain, Comoros, Somalia, Djibouti, Sudan, Egypt, Yemen, Iraq, Jordan, Tunisia, Kuwait, Libya, Morocco, Mauritania, Lebanon, Palestine, United Arab Emirates, and Oman). Such studies written in English were eligible for inclusion in this review (Figure 1). An unpublished manuscript (dissertation) did not meet the inclusion criteria of the present review as it assessed the association between video games and violence among university students whose mean age was 22.42 years (19). Studies that were written in languages other than English were excluded from the review.

A data extraction form was created by two researchers, which was then used to extract relevant data from eligible studies. Data extracted from the studies pertained to the characteristics of the study (authors, year of publication, and setting), study design, tools utilized, study population (including mean age and sex), and results (aggression, association of violence with video games, particular genre of video games, and duration spent playing video games, risk factors, and behavior) (Table 3).

Table 1. Search strategy at PubMed.

PubMed		
Search terms	**Search details**	**Search results**
(Criminal behaviour OR violence OR Aggression OR Violent behaviour OR Aggressive behaviour OR homicidal behaviour) AND (video game OR computer game) AND (Saudi Arabia OR Kingdom of Saudi Arabia OR KSA OR Oman OR Qatar OR Algeria OR Bahrain OR Comoros OR Djibouti OR Egypt OR Iraq OR Jordan OR Kuwait OR Lebanon OR Libya OR Mauritania OR Morocco OR Palestine OR Somalia OR Sudan OR Syria OR Tunisia OR United Arab Emirates OR UAE OR Yemen OR Arab world)	("criminal behavior"[MeSH Terms] OR ("criminal"[All Fields] AND "behavior"[All Fields]) OR "criminal behavior"[All Fields] OR ("criminal"[All Fields] AND "behaviour"[All Fields]) OR "criminal behaviour"[All Fields] OR ("violence"[MeSH Terms] OR "violence"[All Fields] OR "violence s"[All Fields] OR "violences"[All Fields]) OR ("aggress"[All Fields] OR "aggressed"[All Fields] OR "aggressing"[All Fields] OR "aggression"[MeSH Terms] OR "aggression"[All Fields] OR "aggressions"[All Fields] OR "aggressive"[All Fields] OR "aggressiveness"[All Fields] OR "aggressively"[All Fields] OR "aggressivity"[All Fields] OR (("violent"[All Fields] OR "violently"[All Fields] AND ("behavior"[MeSH Terms] OR "behavior"[All Fields] OR "behavioral"[All Fields] OR "behavior s"[All Fields] OR "behaviors"[All Fields] OR "behavioural"[All Fields] OR "behaviourally"[All Fields] OR "behaviours"[All Fields] OR "behaviour"[All Fields] OR "pattern"[All Fields] OR "pattern s"[All Fields] OR "patternability"[All Fields] OR "patterned"[All Fields] OR "patterning"[All Fields] OR "patternings"[All Fields] OR "patterns"[All Fields] AND "behaviour"[All Fields]) OR "aggression"[All Fields] OR ("aggressive"[All Fields] AND "behaviour"[All Fields]) OR "aggressive behaviour"[All Fields]) OR ("homicidal"[All Fields] OR "homicidally"[All Fields] OR "homicide"[MeSH Terms] OR "homicide"[All Fields] OR "homicides"[All Fields] OR (("homicidal"[All Fields] OR "homicidally"[All Fields] OR "homicide"[MeSH Terms] OR "homicide"[All Fields] OR "homicides"[All Fields] OR "homicides"[All Fields]) AND ("behavior"[MeSH Terms] OR "behavior"[All Fields] OR "behavioral"[All Fields] OR "behavior s"[All Fields] OR "behaviors"[All Fields] OR "behavioural"[All Fields] OR "behaviourally"[All Fields] OR "behaviours"[All Fields] OR "behaviour"[All Fields] OR "pattern"[All Fields] OR "pattern s"[All Fields] OR "patternability"[All Fields] OR "patterned"[All Fields] OR "patterning"[All Fields] OR "patternings"[All Fields] OR "patterns"[All Fields])))) AND ("video games"[MeSH Terms] OR ("video"[All Fields] AND "games"[All Fields]) OR "video games"[All Fields] OR ("video"[All Fields] AND "game"[All Fields]) OR "video game"[All Fields] OR ("video"[All Fields] AND "games"[All Fields]) OR "video games"[All Fields] OR ("computer"[All Fields] AND "game"[All Fields]) OR "computer game"[All Fields]) AND ("saudi arabia"[MeSH Terms] OR ("saudi"[All Fields] AND "arabia"[All Fields]) OR "saudi arabia"[All Fields] OR ("saudi"[All Fields] AND "arabia"[All Fields]) OR "saudi arabia"[All Fields] OR ("kingdom"[All Fields] AND "saudi"[All Fields] AND "arabia"[All Fields]) OR "kingdom of saudi arabia"[All Fields]) OR "KSA"[All Fields] OR ("oman"[MeSH Terms] OR "oman"[All Fields]) OR ("qatar"[MeSH Terms] OR "qatar"[All Fields] OR "qatar s"[All Fields]) OR ("algeria"[MeSH Terms] OR "algeria"[All Fields]) OR ("bahrain"[MeSH Terms] OR "bahrain"[All Fields]) OR ("comoros"[MeSH Terms] OR "comoros"[All Fields] OR "comoro"[All Fields]) OR ("djibouti"[MeSH Terms] OR "djibouti"[All Fields]) OR ("egypt"[MeSH Terms] OR "egypt"[All Fields] OR "egypt s"[All Fields]) OR ("iraq"[MeSH Terms] OR "iraq"[All Fields]) OR ("jordan"[MeSH Terms] OR "jordan"[All Fields]) OR ("kuwait"[MeSH Terms] OR "kuwait"[All Fields] OR "kuwait s"[All Fields]) OR ("lebanon"[MeSH Terms] OR "lebanon"[All Fields] OR "lebanon s"[All Fields]) OR ("libya"[MeSH Terms] OR "libya"[All Fields]) OR ("mauritania"[MeSH Terms] OR "mauritania"[All Fields]) OR ("morocco"[MeSH Terms] OR "morocco"[All Fields]) OR ("Palestine"[All Fields]) OR ("somalia"[MeSH Terms] OR "somalia"[All Fields]) OR ("sudan"[MeSH Terms] OR "sudan"[All Fields] OR "sudans"[All Fields] OR "sudan s"[All Fields]) OR ("syria"[MeSH Terms] OR "syria"[All Fields] OR "syria s"[All Fields]) OR ("tunisia"[MeSH Terms] OR "tunisia"[All Fields]) OR ("united arab emirates"[MeSH Terms] OR ("united"[All Fields] AND "arab"[All Fields] AND "emirates"[All Fields]) OR "united arab emirates"[All Fields]) OR "UAE"[All Fields] OR ("yemen"[MeSH Terms] OR "yemen"[All Fields]) OR ("arab world"[MeSH Terms] OR ("arab"[All Fields] AND "world"[All Fields]) OR "arab world"[All Fields]))	11

Table 2. Search strategy at Web of Science.

Web of Science	
Search terms	**Search results**
(Criminal behaviour OR violence OR Aggression OR Violent behaviour OR Aggressive behaviour OR homicide OR homicidal behaviour) AND (video game OR computer game) AND (Saudi Arabia OR Kingdom of Saudi Arabia OR KSA OR Oman OR Qatar OR Algeria OR Bahrain OR Comoros OR Djibouti OR Egypt OR Iraq OR Jordan OR Kuwait OR Lebanon OR Libya OR Mauritania OR Morocco OR Palestine OR Somalia OR Sudan OR Syria OR Tunisia OR United Arab Emirates OR UAE OR Yemen OR Arab world)	44

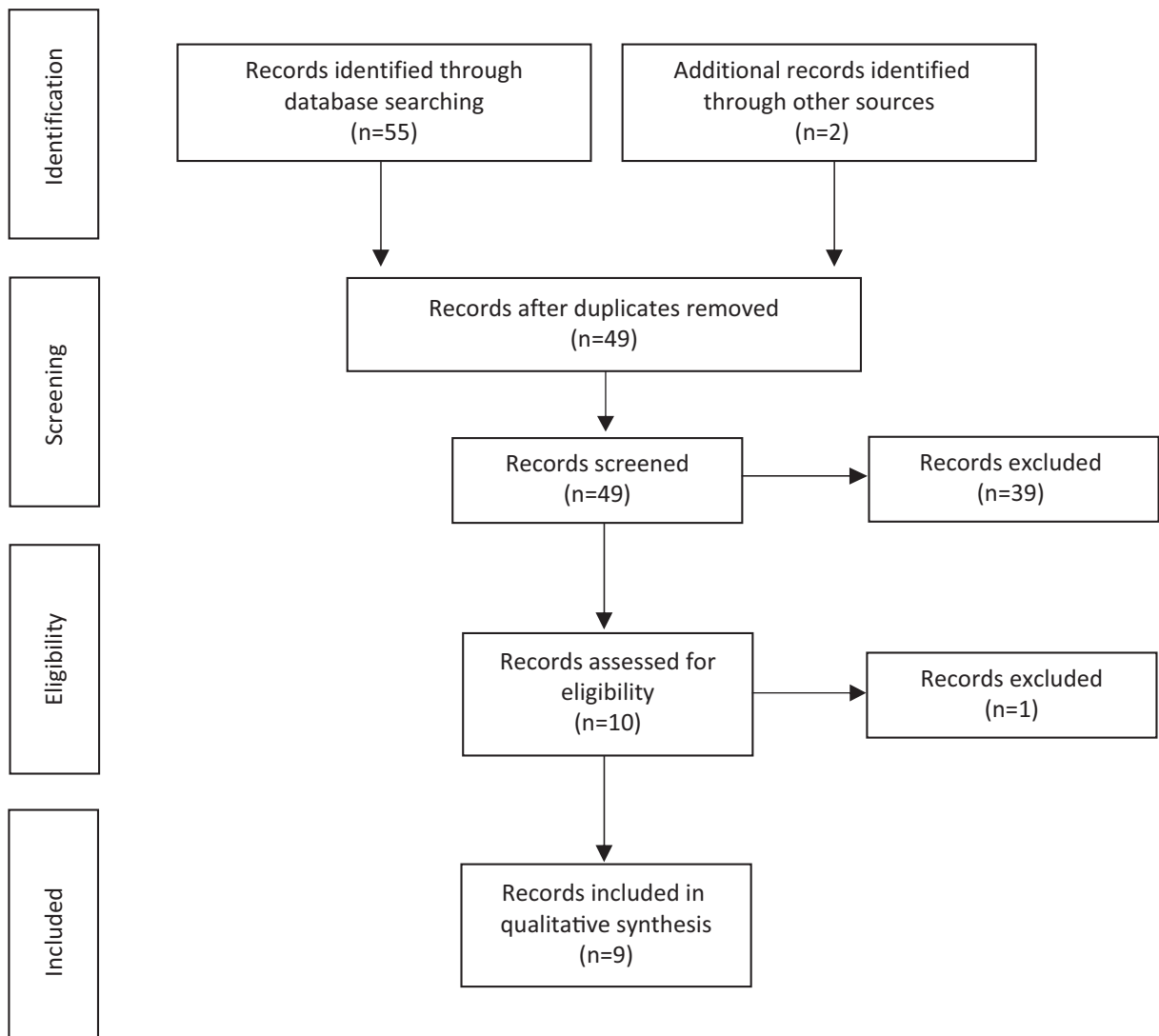

Figure 1. PRISMA chart depicting the selection of articles.

Results

Of the 57 articles identified, nine articles met the inclusion criteria (20-28). All nine articles were cross-sectional studies that utilized questionnaires for their outcome measures. The nine articles included 2,875 participants and were published after 2006. Five studies were conducted in Saudi Arabia (20-24), and

Table 3. Studies that met the inclusion criteria.

Reference	Setting/ Study design	Population	Tools utilized	Association between video games and violence	Factors associated with violence and video games	Behaviors associated with video games
Awadalla et al., 2017 (20)	Abha, Saudi Arabia Cross-sectional study	Secondary school students Mean age is 17.2 (±1.03) years Males: 336 (100%)	1. Self-reported violence perpetration based on Krahé and Möller study 2. History of road traffic crashes and history of traffic rules violation in the previous 6 months	–	Higher verbal violence score was significantly associated with heavy video gaming. Gaming in cybercafes was associated with: • violation of traffic rules • greater scores of total violence • physical violence Playing drift and race games was significantly associated with: • violation of traffic rules • road traffic crashes • violence using firearms • physical violence • sexual harassment	–
Salih et al., 2020 (21)	Albaha city, Saudi Arabia Cross-sectional study	Children and adolescents ages 4-17 years Males: 230 (75.9%) Females: 73 (24.1%)	Development of violence or aggressive behavior	Playing video games was associated with violence and aggressive behavior.	–	–
Dhafar et al., 2018 (22)	Taif, Saudi Arabia Cross-sectional study	Mothers attending the pediatrics clinic with their children ages 4-12 years at Prince Mansour military hospital Females: 197 (52.5%) Males: 178 (47.5%)	Screening questionnaire developed by the Mentor Research Institute	Significant association between playing video games and risk of aggression.	Significant association between the frequency of playing video games and average time spent playing and risk of aggression. Higher risk of aggression was found among: • children aged 10-12 years • using iPad for playing video games • use of Playing with family members • playing adventure/stirring video games	–
Al-Harbi, 2019 (23)	Al-Qurayat Governorate, Saudi Arabia Cross-sectional study	Intermediate school students in Al-Qurayat governorate Females: 255 (51%) Males: 245 (49%)	Aggressive behavior scale	Positive and high correlation between the use of video games and aggressive behavior	Predominance of aggressive behavior among males and higher grade levels	–

Table 3. Studies that met the inclusion criteria. (*Continued*)

Reference	Setting/ Study design	Population	Tools utilized	Association between video games and violence	Factors associated with violence and video games	Behaviors associated with video games
Felemban et al., 2021 (24)	Jeddah, Saudi Arabia Cross-sectional study	Children ages 7-12 years Males: 114 (56.2%) Females: 89 (43.8%)	Self-structured questionnaire		-	Applying or copying the actions seen in video games and wanting to apply them in real life Being angry or frustrated or fighting with friends when losing Being irritated, fighting with siblings, or shouting when stopped from playing video games by their parents
Yousef et al., 2014 (25)	Alain city– United Arab Emirates (UAE) Cross-sectional study	Elementary school students Mean age is 8.7 (±2.1) years. Males: 130 (66%) Females: 67 (34%)	The Child Behavior Checklist (CBCL)	-	Children spending more than 2 hours/day playing video games or watching TV scored significantly higher on aggressive behavior.	-
Tarabah et al., 2015 (26)	Beirut, Lebanon Cross-sectional study	Elementary school students Mean age is 9.58 (± 2.07) years. Males: 116 (56%) Females: 91 (44%)	1. Media preference survey 2. KID-SAVE questionnaire 3. Attitudes Toward Violence Survey–Child Version	Video games were not significantly associated with violence.	-	-
Al-Ali et al., 2018 (27)	Amman, Jordan Cross-sectional study	Parents of children ages 6–11 years Mean age is 7.2 (SD=1.3) years	Children's Social Behavior Scale for Parent	Playing video games was associated with aggressive behavior.	Longer durations spent playing video games was associated with relational aggressive behavior.	-
Ez-Elarab et al., 2007 (28)	Cairo, Egypt Cross-sectional study	Elementary school children	1. Achenback Child Behavior checklist 2. Parent and teacher forms of Strength and Difficulty questionnaires (SDQ) 3. Development-al history of child	Preference for violent video games was a risk factor for violence.	-	-

Table 4. Most commonly played/preferred video games.

Reference	Most commonly played/preferred video game	Percentage
Awadalla et al., 2017 (20) (n=336)	Fighting games	63.4%
	Sport games	55.4%
	Racing games	46.5%
	War games	34.7%
Dhafar et al., 2018 (22) (n=341)	Stirring and adventure games	46.7%
	Sport games	18%
	Violence	14.3%
	Others	21%
Felemban et al., 2021 (24) (n=203)	Fighting games	27.1%
	Racing games	23.2%
	Action games	20.2%
	Puzzle games	16.7%
	Sport games	12.8%

one each in UAE (25), Lebanon (26), Jordan (27), and Egypt (28). Six studies used different tools shown in Table 3 to assist with their research (21,23,25-28).

Overview of video gaming

Video gaming was found to be prevalent among several of the reviewed studies (20-22,27). Awadalla et al. (20), Salih et al. (21), and Dhafar et al. (22) reported a prevalence of 80.7%, 99.3%, and 80%, respectively. Awadalla et al. (20) described the median age of onset of playing video games to be at 10 years. In both studies conducted by Dhafar et al. (22) and Salih et al. (21), almost half of the participants played video games every day. In the former study, 23.7% of children played a few days and 15.3% played twice weekly (22), whereas the latter found that 41% played only at the weekends and 9% played less frequently (21). In a study done by Al-Ali et al. (27), 63.7% of the participating parents noted that their children played video games every day.

The median time spent playing video games, as found by Yousef et al., (25) was 2 h/day, with no significant differences in regard to sex. Salih et al. (21) defined heavy gamers as those who played four hours or more a day and reported a rate of 20.1% with males representing 75.4% (21). In addition, they found that PlayStation was the most frequent device used, accounting

for 30% of devices, followed by smartphones and the iPad (21). On the contrary, Dhafar et al. (22) found the iPad to be the most common followed by smartphones and PlayStation with percentages of 38.7%, 32.3%, and 19%, respectively. The type of video games played varied across the studies (20,22,24). Table 4 summarizes the different types of video games.

Association between video games and aggression

The association between playing video games and players' aggressive behavior has been an area of debate. In this systematic review, six studies investigated the association between aggression and video games (21-23,26-28), with the majority finding an association between the two (21-23,27,28). Dhafar et al. (22) demonstrated that playing video games was significantly associated with a greater risk of aggression. Al-Harbi (23) investigated the association among intermediate school students and found that there was a positive significant correlation. The negative effects of playing video games have been assessed by Salih et al. (21). The study revealed that 25% of players displayed violence and aggressive behavior with males being more predominant than females with percentages of 85.7% and 14.3%, respectively (21). Furthermore, preferring violent video games was identified as a risk factor for violence by Ez-Elarab et al. (28) among elementary

school students. In contrast, Tarabah et al. (26) reported that exposure to violent video games was not significantly associated with proviolence among children.

Behaviors observed among video game players

In this systematic review, aggressive behavior and violence were evaluated mainly in terms of physical and verbal aggression, in addition to other types (20,21,24). Felemban et al. (24) reported that participants experienced frustration or irritation when being stopped from playing video games and after losing a game. As a result of frustration, almost half of participants (43%) were likely to fight with their siblings, and a third of participants fought with their friends when they lost a game (24). The study revealed that approximately half of participants (55.2%) shout as a reaction to anger (24). Regarding applying actions seen in video games to real life, 40.9% envisioned copying these actions while 21.2 % of participants wanted to apply them in real life (24). Moreover, in 47.8% of children, the results of games had shown to have a direct effect on their mood (24). Salih et al. (21) reported that 42.6% of participants felt pleasure while watching violence in video games.

Awadalla et al. (20) illustrated different types of violence that were observed among video game players. They reported increased instances of violation of traffic rules such as crossing the red signal, exceeding speed limits, practicing drift, and an increased frequency of significant road traffic crashes (20). In addition, violence using firearms, physical violence, and sexual harassment were also observed (20).

Factors associated with violence and aggression

Dhafar et al. (22), Al-Harbi (23), and Salih et al. (21) explored the association between personal characteristics of video game players and violence and aggression. Higher levels of violence were reported among males and adolescents (21-23). A statistically significant difference was observed between aggression and age and sex of players (22). An increased risk of aggression was noted among males and participants aged

10 to 12 years (22). Similarly, a significant difference was found between sex and grade level showing predominance among males and higher grade levels (23). In agreement with the aforementioned findings, Salih et al. (21) reported higher rates of aggressive behaviors among males.

Other factors have been linked with aggression and violence among video game players (20,22). Playing video games with other family members, specifically brothers, was significantly associated with a high risk of aggression, while playing alone or with friends was not statistically significant (22). The site of gaming has been taken into consideration by Awadalla et al. (20). A significant association was found between individuals who use cybercafes for gaming and violation of traffic rules and physical violence (20). The preferred leisure time activity and number of hours slept at night were found to be insignificant (22). However, despite being statistically insignificant, children favoring playing video games instead of watching TV, practicing sports or other activities had an extremely high risk of aggression (22).

Duration spent playing video games in relation to aggression

The impact of the amount of time spent playing video games on behavior was evaluated in different studies, with heavy gaming found to be implicated in aggressive behavior (20,22,25,27). As reported by Yousef et al. (25), children playing video games and watching TV for 2 hours or more per day demonstrated aggressive behavior, delinquent behavior, and social problems. Dhafar et al. (22) and Al-Ali et al. (27) revealed that the longer the duration of playing video games, the higher the possibility for individuals to show aggressive behaviors. Verbal aggression was found to be significantly associated with intense video gaming (20).

Genre of video games in relation to aggression

The association between the genre of the video game played and physical aggression was assessed in two studies (20,22). Dhafar et al. (22) reported that

the nature of video games often played was significantly associated with a greater risk of aggression. Participants who preferred stirring/adventure video games were found to be more prone to aggression (22). Awadalla et al. (20) demonstrated that participants who held a preference for playing race and drift games had significantly higher instances of violation of traffic rules, violence using firearms, physical violence, and sexual harassment.

Discussion

The impact of exposure to violence in video games on behavior has been a source of substantial debate in the research field for several decades (29). Therefore, it was not unexpected to observe a contradiction in the findings of the current systematic review. Five of the included studies reported a significant association between playing video games and violence among participants (21-23,27,28). This finding was consistent with a study conducted by Shao and Wang (30) among adolescents and found a significant positive correlation between exposure to violence in video games and aggression in China. Similarly, Zhang et al. (29) reported that brief exposure to violent video games was associated with increased aggression among Chinese children.

In contrast, Tarabah et al. (26) reported a lack of association between violence and video games. Similar findings were observed in two studies (31,32). Ferguson and Wang (31) found that violent video games among youths were not associated with either aggressive behavior or prosocial behavior in Singapore. Consistently, exposure to video games was not a predictor of serious acts of aggression or violence among children (32).

It is to be noted that Tarabah et al. (26) measured the impact of different exposures to violence including video games and media, in addition to war and civil conflicts in Lebanon. Hence, the lack of association could be attributed to the fact that the effect of video games on violence may have been reduced in the presence of community violence, as the latter has a stronger impact on behaviors and attitudes (26).

Several factors were identified to be linked with aggression among video game players (19-23,25,27). A higher risk of aggressive behaviors was found among early adolescents aged between 10 and 14 years (22,23). In accordance with this finding, a meta-analysis conducted by Burkhardt et al. (33) reported that the effects of violent video games on aggression peaked during early adolescence, then declined steadily during adulthood. This could be attributed to the fact that early adolescents have prolonged exposure to violence than younger children, in addition to adolescence being a sensitive period in which adolescents have a tendency to engage in risky behaviors. Males were found to have a higher risk of aggressive behaviors than females (21-23). Similar to this finding, Zhang et al. (29) reported a significant higher accessibility to aggressive cognition and behavior among male players.

Playing video games with others, specifically brothers (23), and gaming in cybercafes (20) were associated with increased risk of aggression. These findings could be explained by the fact that playing with others offers a competitive environment which in turn provides a strong desire to win and a feeling of frustration when losing.

The duration of playing video games is believed to have an impact on aggression (20,22,25,27). Several studies reported an increased risk of aggressive behaviors with a prolonged duration of playing video games (20,22,25,27). In accordance with this finding, in Canada, Willoughby et al. (34) found that aggression was higher among adolescents who played violent video games over several years in high school in comparison to those who played less frequently. In addition, Hastings et al. (11) revealed that longer time spent playing video games was associated with aggression among young children in the US.

The correlation between the genre of video games and aggression has been evaluated (20,22). It was revealed that participants who preferred playing risk-taking games, such as racing, were more likely to participate in risky behaviors including physical violence, violation of traffic rules, and firearm violence (20). Similarly, in the US, Chang et al. (35) found that video games may increase the involvement of children in dangerous behavior around firearms,

including shooting at themselves or others. This can be explained by the social learning theory which proposes that if the observer believes in themselves and that the observed behavior can lead them to their desired results, they will imitate such behavior (19). Therefore, according to the social learning theory, it can be presumed that observing violence in video games may result in aggressive behaviors.

Few studies have evaluated video games and aggression in children and adolescents, and hence the strength of the included studies is that they targeted this underrepresented group. Studies included in this systematic review have four main drawbacks (20-28). These drawbacks include the lack of standardized measures of video game playing and specific content played. Furthermore, some of the studies measured the association between aggression and media in general, such as watching TV, browsing the internet, and playing video games (25-27). Therefore, the outcome measured was not specific to the effect of video games. While studies included in the systematic review found the duration of playing video games to be associated with aggression, none had further explored whether longer durations spent playing violent video games, in particular, was associated with violence. Finally, as all studies included were observational in design, this leaves the possibility of confounding factors.

Limitations and recommendations

The major limitation of this systematic review is that out of 22 countries in the Arab world, studies found were conducted in only five countries, limiting their generalizability. In this systematic review, all studies included were questionnaire-based observational studies risking self-reported and social desirability bias. Long-term longitudinal studies focusing on the effect of video games are necessary to establish a conclusive result since the published studies have reported mixed findings possibly due to lack of controls and imprecise measures. Therefore, the need for implementing standard measures and furthermore experimental and high-quality research on the subject is of utmost importance in the Arab world.

Conclusions

This systematic review reports the data of cross-sectional studies conducted in the Arab world. Studies have shown inconsistent results and thus whether an association exists between video games and violence remains uncertain. Current evidence suggests the presence of factors moderating the effect and therefore their role should not be overlooked. With the expected increase in video gaming globally, it becomes imperative to further explore the association through conclusive studies with standardized measures.

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