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INTERÉS Y UTILIZACIÓN DE PELÍCULAS Y SERIES TELEVISIVAS PARA LA EDUCACIÓN PARA LA SALUD EN LA ESCUELA SECUNDARIA

Interest and use of films and TV series for health education in high school

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Resumen

La educación para la salud tiene un papel clave en la adquisición de las habilidades necesarias para tomar decisiones que afectan a la salud personal o comunitaria. Por esta razón se debería garantizar en la educación obligatoria. Teniendo en cuenta que las películas y series pueden facilitar el aprendizaje de conceptos complejos, se diseñó un cuestionario para identificar los filmes relacionados con las ciencias de la salud que ven los estudiantes de secundaria de manera voluntaria y explorar su uso en las aulas

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para trabajar la alfabetización en salud. Participaron 237 estudiantes de España. El 54,85% afirmó que suele ver estos filmes en su vida cotidiana, siendo las series médicas las más vistas; sin embargo, el 57,38% indicó que no se utilizan estos recursos en las clases. El estudio sugiere un uso potencial de los materiales audiovisuales para trabajar los objetivos de educación para la salud, aunque debe ser fomentado sistemáticamente.

Palabras clave: cine, educación y salud, educación media, educación para la salud, aprendizaje activo, materiales audiovisuales, materiales didácticos

Abstract

Health education plays a key role in acquiring the skills necessary to make decisions affecting personal or community health and should be guaranteed in compulsory education. Since films and series can facilitate the learning of complex concepts, a questionnaire was designed to inquire whether secondary school students view films related to health sciences on a voluntary basis, and whether they are used in classrooms to work key concepts of health literacy. 237 students from Spain have participated. 54.85% stated that they usually view these films in their daily lives, with medical series being the most watched; however, 57.38% indicated that these resources are not used in the classroom. The study suggests a potential use of films and series to work on health education goals, although it should be systematically encouraged.

Keywords: Cinema, education and health, secondary education, health education, active learning, audiovisual materials, teaching materials

1. INTRODUCTION

Health care involves a series of representations and practices for health promotion and disease prevention. Although it may seem that we have at our fingertips all the information necessary to take care of our health, it is necessary to have tools so that we can understand, process and apply these resources in a productive way (Romero and Ruiz Cabello, 2016).

It is important that learning about health takes place during childhood and youth, as this period corresponds to the period of greatest learning and acquisition of the main healthy habits (Gavidia Catalán et al., 2019). Furthermore, health behaviours established during adolescence tend to persist into adulthood (Bruselius-Jensen et al., 2017; Manganello, 2008).

For this reason, it is necessary to establish and promote knowledge that improves the health of citizens, and several organisations have defined health education standards (Nutbeam et al., 2018), among which those proposed in the United States by the Centers for Disease Control and Prevention (CDC, 2004) stand out for their comprehensiveness. They provide a conceptual framework for teachers and educational

leaders to progressively work on health education objectives and expectations at different educational stages, from primary to secondary school. The standards include: 1) understanding concepts related to health promotion and disease prevention, 2) analysing the influence of family, peers, cultural background, media, technology and other factors on health-related behaviours, 3) accessing reliable health-enhancing information, products and services, 4) communicating effectively about health, 5) making healthy choices, 6) setting goals to improve health, 7) developing healthy habits and 8) promoting personal, family and community health.

In Spain, secondary education includes compulsory secondary education (ESO, 4 years, from 12 to 16 years old) and baccalaureate (2 years, from 16 to 18 years old). Its official curriculum is oriented towards the acquisition of competences, but it does not include a specific health competence or a subject to develop it. It can be integrated into other basic competences such as "knowledge and interaction with the physical world" or "social and citizenship" (BOE, Royal Decree 126/2014; BOE, Royal Decree 1105/2014) and work transversally in different subjects such as biology, physical education or ethics and citizenship. However, the fact that it is not specified and defined in the curriculum hinders the development of the health education that young people should acquire at school. Fortunately, there are recent proposals on developing health competences during compulsory education that can serve as a reference for planning health education activities (Gavidia et al., 2019).

On the other hand, pedagogical proposals on health education in secondary school should be focused on interdisciplinary strategies and with a comprehensive vision that allows students to consider their family, community and social context (Rodríguez Torres et al., 2017; Machado, Oliveira and Manica, 2013) and in turn promote the development of knowledge, skills and abilities for self-care and the prevention of risk behaviours (De Lellis et al., 2014).

It is an avenue of action for health promotion, and encompasses educational interventions and activities aimed at improving people's health literacy (Gavidia et al., 2019). This process is defined as:

'general literacy encompasses people's motivations, knowledge and competencies to access, understand, evaluate and apply health information in making decisions about health care and attention, disease prevention and health promotion to maintain and improve quality of life throughout life' (Sørensen et al., 2012, p. 3).

Several studies establish that school plays a key role in promoting health literacy (Wager et al., 2020; Salvador and Suelves, 2009; WHO, 1990) and that it serves to improve individual and community health (WHO, 1986). Other evidence also shows that health literacy can be successfully developed in the classroom (Bruselius-Jensen, 2017; Nutbeam, 2000).

1.1. Film and series in health education

Film has always dealt with health issues as it reflects and in turn produces the culture and representations of a given society (Brigidi, 2016; Úbeda-Carulla, 2016). Films offer opportunities for us to revisit representations of health sciences - and of the people involved in science, doctors, scientists, etc. - while also facilitating reflection and debate about them (Petit and Solbes, 2012, 2015, 2016). Since the beginnings of cinema, films have been made about hospitals, diseases, research with human beings. For this reason they have been used in educational contexts in secondary schools and universities (D'Ottavio et al., 2019; Farré 2013).

The images and stories told in films and series are triggers that generate enthusiasm in the audience, while broadening conceptual knowledge and fostering critical skills. In fact, various studies highlight their motivational nature and the facilities they offer as educational tools, not only because they reach a large number of people, but also because of the possibility of exposing the most interesting (or controversial) areas of knowledge (García Borrás 2009; Mateus 2017; Petit and Solbes 2012).

Numerous studies have shown that the use of commercial films in the classroom is favourable, showing learning that provides the ability to critically analyse problems, to reason scientific situations from various points of view, as well as the facility to construct and consolidate new knowledge (Arroio, 2010; Baños and Pérez, 2005). In addition, film has a sensory and emotional impact that involves educational reinforcement and facilitates memorisation and association of complex concepts (Fresnadillo Martínez et al., 2005).

However, most of the previous studies focus on university teaching of health sciences (Icart Isern, Garrido-Aguilar, Miguel-Cañas, 2013; Baños and Bosch, 2015) and no studies were found that directly relate the use of these resources to health education and health literacy in secondary schools.

On the other hand, series are currently considered the replacement of cinema for large audiences. Every day, millions of people follow series of different genres and formats (from the traditional sitcom to miniseries of few episodes, with a format similar to that of films) from the screen of their mobile phone, tablet or notebook (Cambra Badii and Baños, 2020; Lobato, 2018; Correa Romero et al., 2015). In a recent research conducted with health science students, series are the preferred audiovisual format (Cambra Badii et al., 2020).

Within the universe of series, those dealing with medical issues are a widely consumed and disseminated product, especially among health science students (Williams, Re and Ozakinci, 2014; Weaver and Wilson, 2011; Czarny 2008). These series feature health professionals in the care of different hospital services: surgery, obstetrics, emergency care, etc. The factors that motivate students to watch medical series are mainly entertainment and information about medical issues, which is in line

with one of the definitions of medical series: an entertainment-education tool (Law et al., 2015; O'Connor, 1998).

Although films and series on health issues have been around for a long time, a change has recently emerged regarding the vision of doctors (Cambra Badii, Guardiola and Baños 2020; Tapper, 2010; Chory-Assad and Tamborini 2001) and scientists (Kirby, 2017). In the past, these characters could be more 'fictional' where they were interpreted as heroes in the case of the former, or as mad and evil in the case of the latter. Nowadays, there is a tendency to give a more realistic and objective view, showing both the virtues and the mistakes and difficulties or not that they have when carrying out their work (Cambra Badii, 2020).

Bearing in mind that the use of films and series show very effective results in science education and that the figure of the teacher is important when analysing these resources to help understand the scientific content in the real context (Arroio 2010), it could be deduced that the series and films related to health sciences that adolescents watch may have a potential use for working on the objectives of health education in secondary education classes. Therefore, the objectives of this paper are 1) to identify which films and series related to health sciences are watched by secondary school students in Spain, 2) to identify which health education objectives are addressed in these films and series and, finally, 3) to find out what use is currently made of these audiovisual resources in the classroom.

2. METHODOLOGY

2.1. Design

This research can be framed within educational research (McMillan and Schumacher, 2005) as it seeks to provide knowledge on the possible use of films and series for health education in secondary schools. The design, descriptive in nature, follows the bases of qualitative methodology, understanding the importance of the informants' perspective (Creswell, 1998; Vasilachis de Gialdino, 2006). In order to achieve the objectives, both quantitative and qualitative methods are used. The former allow us to describe the socio-demographic profiles of the research participants and to analyse in terms of frequencies the variables of viewing health science films and series, the health education objectives articulated by these films, and their use in secondary schools. Qualitative methods make it possible to categorise the films and series most identified by the students according to the main themes of their narratives and to analyse all the data as a whole, with the aim of exploring their didactic purposes.

2.2. Participants

Secondary school students in Spain (12-18 years old) participated in this research. The sample is composed of 237 adolescent students of ESO (Compulsory Secondary Education) or Bachillerato who answered the Google Forms questionnaire disseminated

online through contacts and social networks (Facebook, Instagram, Twitter and WhatsApp) during the second half of May 2020 (**Table 1**).

Table 1. *Representation of the sample*

Gender	
Female	160 (67,51%)
Male	76 (32,07%)
Other	1 (0,42%)
School Year	
1º ESO (12-13 years old)	23 (9,70%)
2º ESO (13-14 years old)	14 (5,91%)
3º ESO (14-15 years old)	25 (10,55%)
4º ESO (15-16 years old)	53 (22,36%)
1º Bachillerato (16-17 years old)	64 (27%)
2º Bachillerato (17-18 years old)	58 (24,47%)
Autonomous Community	
Cataluña	182 (76,79%)
Others	55 (23,21%)

Source: *own elaboration*

2.3. Data collection techniques and instruments

For data collection, a Google forms online questionnaire has been designed (**Annex 1**). This has been developed in Spanish in order to reach students from all over Spain. It has been divided into three dimensions where different aspects necessary to achieve the objectives of the work are analysed (**Table 2**).

Table 2. *Design of the questionnaire: dimensions, data collected and question typology*

Dimensions of the questionnaire	Data collected	Typology of questions
1. Student profile	Personal characteristics	Multiple choice
2. Impact of films and series on the daily lives of students	Health-related films and series viewed voluntarily by students	Open
	Motivation for health science learning generated by these audiovisual materials.	Likert scale of 1-5 with 1 being "strongly disagree" and 5 being "strongly agree".
	Health education objectives addressed in the audio-visual materials viewed by students. The questions are based on the health standards in the National Health Education Standards (CDC, 2004).	
3. Use of films and series in academia	Current use of audio-visual materials in secondary education classrooms	Dichotomous (yes/no)
	Didactic purpose of their use	Likert scale of 1-5 with 1 being "strongly disagree" and 5 being "strongly agree".
	Motivational factors for the use of audio-visual materials in education	
	Current use of audiovisual materials to address health education objectives, based on the National Health Education Standards (CDC, 2004).	

Source: *own elaboration*

2.4. Data analysis

In order to carry out the descriptive analysis in a comprehensive manner, a Microsoft Excel file has been created, where all the data obtained from the questionnaire has been exported in order to make a count and, subsequently, to be able to be analysed by means of tables and graphs.

2.4.1. Quantitative analysis

For the analysis of the questions assessed with the Likert scale, both the arithmetic mean ($\bar{x}$) per question and the standard deviation (σ) of these data were calculated.

The percentage of scores from 1 to 5 for each answer was also taken into account. For the dichotomous response questions, the analysis was carried out on the basis of percentages.

2.4.2. Qualitative analysis

In order to analyse and count what kind of films and series related to health sciences are watched by students, the answers to the open-ended question "Cite the films or series you remember watching recently in the field of health sciences" were categorised inductively and according to the subject matter of the films, always taking into account that health issues are part of the central plot.

For this work, a data collection sheet was designed and two researchers identified the different categories. Two sessions were then held to review the proposed categories and unify the categories (with the third researcher) to ensure validity, reliability and reproducibility (Krippendorff, 1997).

The following categories have been identified: (i) Evolution, cloning, genetic engineering and human experimentation, (ii) Epidemics and plagues, (iii) Hospitals, (iv) Specific diseases, and (v) Sex education, drugs and adolescents.

With all the responses obtained, the series and films identified were categorised, as well as the frequency with which each was mentioned and the total number of mentions per category.

Fifty-one mentions of films and series (12.56% of the total) were discarded because the responses were not significant, either because the audiovisual materials were not related to health issues or because they did not refer to fictional resources.

2.5. Ethical implications

Participation was completely voluntary and anonymous.

Before starting the questionnaire, participants were informed of the aims of the research and of their right to refuse to participate or to drop out of the questionnaire at any time. Participants gave their consent to participate in the study by completing and submitting the questionnaires anonymously. The study was conducted in accordance with the principles of the Declaration of Helsinki, which guarantees the safeguarding of

individuals through informed consent and the confidentiality of their responses to the study.

3. RESULTS

3.1. The impact of films and series on everyday life

After analysing the questionnaire, we obtain that, of the 237 students surveyed, 130 report that they usually watch films and series related to the field of health sciences (54.85%). On the other hand, 107 responded that they do not usually watch such resources (45.15%).

When asked which films or series they remember watching recently in this field, there is a variety of answers. Understanding as a mention each time a different student names a film or series, we obtained 406 useful mentions of 86 different audiovisual materials (35 series and 51 films). These data have been categorised into the categories described in the Methodology. **Table 3** presents them in order of most to least mentioned and the frequency and percentage of mentions for each category.

Table 3. Audio-visual materials on health that students view on a voluntary basis

Category	Most mentioned audiovisuals	Audiovisual material	Frequency and percentage of category mentions
Hospitals	<i>The Good Doctor</i> (ABC, United States, 2017-)	Series	226 (55,67%)
	<i>Grey's Anatomy</i> (ABC, United States, 2005-)	Series	
	<i>House MD</i> (Fox, United States, 2004-2012)	Series	
	<i>Polseres Vermelles</i> (TV3, Spain, 2012-2013)	Series	
	<i>Centro Médico</i> (Televisión Española, Spain, 2015-2019)	Series	
	<i>Hospital Central</i> (Mediaset, Spain, 2000-2012)	Series	
	<i>Chicago Med</i> (NBC, United States, 2015-)	Series	
	<i>The Resident</i> (Fox, United States, 2018-)	Series	

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	<i>Der Medicus</i> (UFA Cinema, Germany, 2013)	Film	
Evolution, cloning, genetic engineering and human experimentation	<i>Gattaca</i> (Columbia Pictures, United States, 1997)	Film	100 (24,63%)
	<i>The island</i> (Parkes/MacDonald, United States, 2005)	Film	
	<i>Stranger Things</i> (Netflix, United States, 2016-)	Series	
	<i>Orphan Black</i> (BBC, United States, 2013-2017)	Series	
	<i>The 100</i> (The CW, United States, 2014-)	Series	
	<i>Lucy</i> (Europacorp, France, 2014)	Film	
	<i>Jurassic World</i> (Legendary Pictures, United States, 2015)	Film	
	<i>Jurassic Park</i> (Amblin Entertainment, United States, 1993)	Film	
	<i>Gemini Man</i> (Jerry Bruckheimer Films, United States, 2019)	Film	
Epidemics and plagues	<i>The Flu</i> (iFilm Corp., South Korea, 2013)	Film	48 (11,82%)
	<i>Contagion</i> (Warner Bros, United States, 2011)	Film	
	<i>World War Z</i> (Skydance Productions, United Kingdom, 2013)	Film	
	<i>The Rain</i> (Netflix, Denmark, 2018-)	Series	
	<i>Resident Evil</i> (Netflix, United States, 2020-)	Series	
	<i>Twelve Monkeys</i> (Universal Pictures, United States, 1995)	Film	
	<i>I Am Legend</i> (Warner Bros, United States, 2007)	Film	
Specific diseases	<i>Five feet apart</i> (CBS Films, United States, 2019)	Film	23 (5,67%)
	<i>Brain on fire</i> (Broad Green Pictures, United States, 2016)	Film	
	<i>To the bone</i> (Netflix, United States, 2017)	Film	

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Sex education, drugs and adolescents	<i>Sex Education</i> (Netflix, United Kingdom, 2019-)	Series	9 (2,22%)
	<i>Euphoria</i> (HBO, United States, 2019-)	Series	

Source: own elaboration

The next most prominent category is Evolution, cloning, genetic engineering and experimentation on human beings, where the films *Gattaca* and *The Island* stand out with 19 responses for the former and 10 for the latter. It is worth mentioning that despite having more mentions in the area of hospitals, 22 different films/series have been obtained, while in the category of evolution, cloning, etc. 33 different ones have been identified.

Another category identified is epidemics and plagues, where 13 different films/series were identified. The film that stands out the most is the Korean film *The Flu*, with a total of 13 mentions. Finally, more minority categories are Specific diseases and Sex education, drugs and adolescents.

When asked whether these resources provoke motivation towards health science-related topics, the mean (̄) Likert scale score is 3.46 out of 5 with a standard deviation (σ) of 1.09, with 54.01% of students agreeing or strongly agreeing with this statement.

3.2. Identification of the health education objectives addressing

After identifying which films and series related to health sciences students watch, it is analysed which topics they remember showing health-related topics (**Figure 1**).

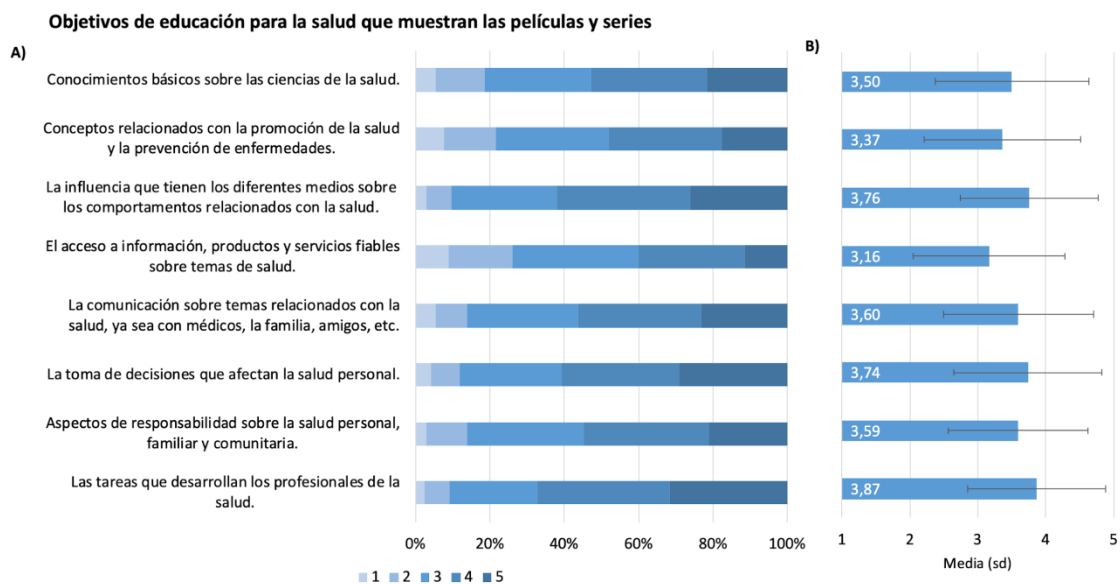


Figure 1. Health education objectives shown in films and series that students usually watch on a voluntary basis (N=237). **1A)** percentage of mentions, **1B)** mean of responses with standard deviation (sd) for each item.

Source: *own elaboration*

52.74% of respondents responded that they agreed or strongly agreed that basic knowledge of health sciences was presented, obtaining an average of 3.50 out of 5 ($\sigma=1.13$) on the Likert scale. As for whether they consider that these audiovisual materials present concepts related to health promotion and disease prevention, the average agreement was 3.37 out of 5 ($\sigma=1.15$). When asked about concepts such as the influence of family, peers or the media or about access to reliable information and services on health-related behaviours, we obtain an average of 3.76 out of 5 ($\sigma=1.01$) and 3.16 ($\sigma=1.12$), respectively.

56.12% of the students agree or strongly agree that, in these resources, communication is shown, either with doctors, family or friends on health-related topics ($=3.60$; $\sigma=1.10$). Aspects related to decision-making that affect personal health also appear, with 60.76% ($=3.74$; $\sigma=1.09$) agreeing or strongly agreeing; as well as responsibility for personal, family and community health, with 54.85% ($=3.59$; $\sigma=1.03$). Finally, 67.09% ($=3.87$; $\sigma=1.02$) agree or strongly agree that these films and/or series show the tasks carried out by health professionals, with 31.65% strongly agreeing.

3.3. Use of films and series in academia

In the analysis of the use of audiovisual materials related to health sciences in the classroom, 57.38% of the respondents (136 students) responded that these resources are not used in their schools. However, 42.62% of the respondents (101) said that they do teach using films. Among those who responded that they do use these resources, the motivation and the purpose for which they are used in their classes are valued (**Figure 2**).

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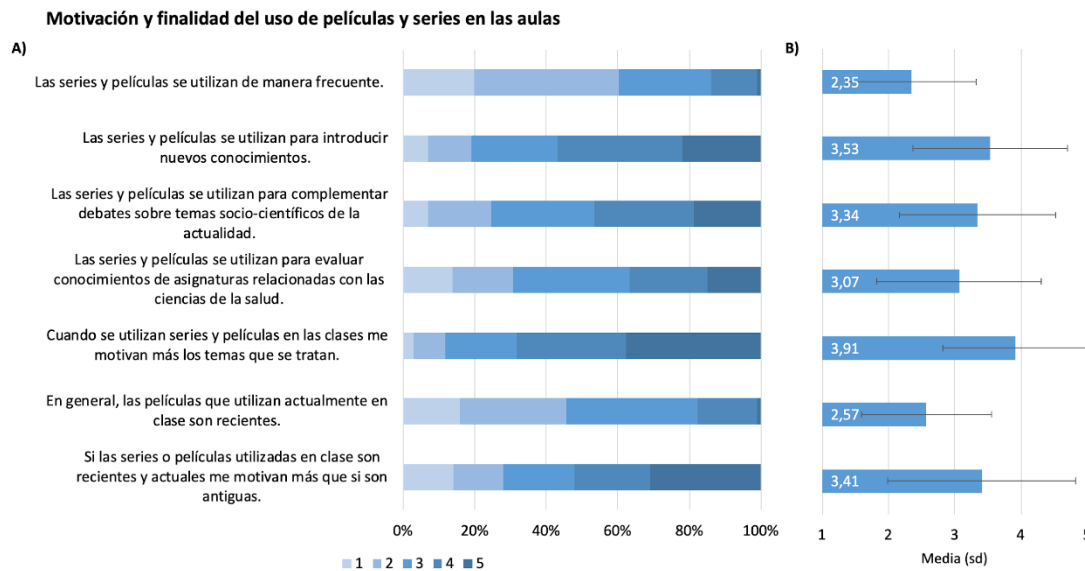


Figure 2. Motivation and purpose of using films and series in the classroom (N=101). **2A)** percentage of mentions, **2B)** mean of responses with standard deviation (sd) for each item.

Source: own elaboration

When asked whether films and series are frequently used in secondary education classrooms, a mean of 2.35 out of 5 ($\sigma=0.97$) was obtained and 60.40% of respondents disagreed or strongly disagreed with this statement. These resources are used for different teaching purposes, the most common being to introduce new knowledge, with a mean of 3.53 out of 5 ($\sigma=1.17$), to a lesser extent they are used to complement current socio-scientific debates, with a mean of 3.34 ($\sigma=1.18$) and, lastly, they are used to assess knowledge of health-related subjects, with a mean of 3.07 ($\sigma=1.24$). However, it seems that topical resources are not often used, with a mean of 2.57 out of 5 ($\sigma=0.98$) when asked if they are recent.

On the other hand, 68.32% of the students agree or strongly agree with the fact that when these resources are used, it increases their motivation towards the topics being worked on ($=3.91$; $\sigma=1.10$), with 37.62% strongly agreeing. Finally, we obtain an average of 3.41 out of 5 ($\sigma=1.41$) when asked whether motivation is greater when these audiovisual materials are recent, with 52% of students agreeing or strongly agreeing with this statement.

3.4. Identification of the health education objectives identified in the audio-visual materials

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Again, we take the responses of the 101 students who respond that, in secondary school classes, they do use audiovisual resources in secondary school classes, and we now analyse the usefulness of these materials for health literacy (**Figure 3**).

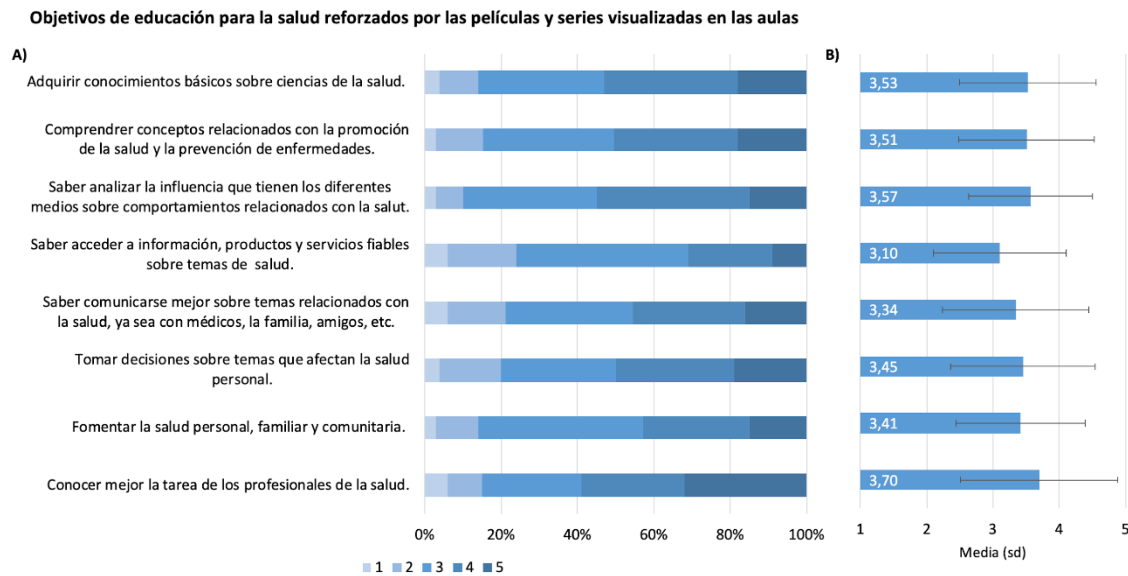


Figure 3. Health education objectives reinforced by films and series used in the classroom (N=101). **3A)** percentage of mentions, **3B)** mean of responses with standard deviation (sd) for each item.

Source: own elaboration

When asked whether the use of these resources helps them to acquire basic knowledge about health sciences, 53% agree or strongly agree ($=3.53$; $\sigma=1.03$). Similarly, an average of 3.51 out of 5 ($\sigma=1.02$) is obtained when asked about the understanding of concepts related to health promotion and disease prevention. 55% of students agree or strongly agree that these classes help them to know how to analyse the influence of family, peers or the media on health-related behaviour ($=3.57$; $\sigma=0.93$). If we focus on access to reliable information or communication on health-related topics, 45% ($=3.10$; $\sigma=1.00$) and 33.33% ($=3.34$; $\sigma=1.11$) neither agree nor disagree respectively. With regard to how they have been helped in making decisions on issues affecting their health, such as drug use, taking medication or eating, we obtained an average of 3.45 out of 5 ($\sigma=1.10$) and in the promotion of personal, family and community health we obtained an average of 3.41 out of 5 ($\sigma=0.98$). Finally, 59% ($=3.70$; $\sigma=1.18$) agree or strongly agree that this type of class helps them to learn more about the work carried out by health professionals, with 32% strongly agreeing.

4. DISCUSSION AND CONCLUSIONS

Health education encompasses learning opportunities to improve health literacy and includes improving people's knowledge and developing personal skills that lead to

individual and community health (Serrano Poveda, 2012). It is not only about transmitting information but also about fostering motivation and personal skills to adopt measures to take care of health and prevent diseases (Labonte, 1993).

Audiovisual media are an undeniable opportunity to transmit information and foster motivation and personal skills. In this research, we found as key factors in establishing the use of these resources in the classroom, the fact that the films and series that students watch autonomously show these health issues and that they provoke motivation towards this area.

As can be seen in the results of this exploratory study with secondary school students in Spain, fictional audiovisual materials related to health sciences are quite present in their daily lives. Students mention that they watch series and films related to health sciences. A great variety of audiovisual materials are not current but can be watched on different online platforms such as Netflix or HBO, which through their catalogues permanently offer new products but also reruns of films and series that have already been broadcasted. Most of the audiovisual products are of American origin, which leads us to think that: on the one hand, the American film industry continues to be a world leader in production and distribution; and on the other hand, that the reality of society, and in particular the health system, are different depending on the context and this allows us to explore in class different situations with socio-economic implications.

It is interesting to mention that students remember 35 series and 51 films on health issues. However, the most viewed audio-visual materials are medical series, which coincides with the predominance of the hospital theme.

The most watched films and series are related to hospital themes. The most viewed audiovisual materials are the medical series *The Good Doctor* and *Grey's Anatomy*. This coincides with the results of a previous study on the viewing of medical series by university students of health sciences, in greater quantity and frequency than films (Cambra-Badii et al., 2020). These series are relevant as they show the reality experienced in hospitals and the multiple situations that we may encounter at some point in our lives where health can be affected (Padilla, 2014).

The Good Doctor is one of the newest medical series, broadcast since 2017 in the United States (and from 2018 in Spain), which shows the life of a young doctor who has autism and savant syndrome, and is starting his residency in surgery. The series approaches health issues from a different point of view, with a protagonist who has marked difficulties in his interpersonal relationships and in doctor-patient communication, and the originality of this character increases his interest on the part of young people (Cambra-Badii and Baños, 2018). On the other hand, *Grey's Anatomy* maintains its audience after 16 seasons, and is broadcast weekly in the United States and Spain. In this case, the medical series is combined with romantic drama and attracts viewers worldwide (Weaver and Wilson, 2011; Czarny, 2008).

In addition to films and series set in hospitals, students choose to watch audiovisual materials related to evolution, cloning and genetic engineering. This is important because it shows that adolescents also have insights into the world of health sciences beyond hospitals. These films allow them to reflect on the possible consequences of cloning or genetic engineering research in a particular case (as in the film *Lucy*) or as a socially accepted tool (as in *The Island*) (Rodríguez and Baños, 2014).

In relation to the high frequency of occurrence of films and mentions of epidemics and plagues, it can be understood that the interest in this particular type of disease may reflect the context in which the work has been carried out, in the midst of the global pandemic of COVID-19. Indeed, in Spain, downloads of the film *Contagion* (2011) have multiplied at the beginning of the confinement (El Mundo, 2020), and this film portrays the development of an epidemic with several points of similarity in relation to the coronavirus (Morales Vidal, 2020). In future research on this topic and other bridges between fiction and reality, it would be interesting to be able to corroborate whether the context favours students remembering these films more, or whether they are more motivated to study these topics that reflect their everyday reality.

As for the mention of films that show topics on sex education and drugs, we understand that they are very important to work on in adolescence. Audiovisual materials open doors for us to work on these health topics that can be taboo but are very necessary to teach in the context of secondary education (Ríos Espuny et al., 2018; Vega, 2002). In this case, the spontaneous role that cinema can have in prevention and the contribution to personal autonomy can be valuable resources to be investigated more specifically in other research.

The second objective of the research, to identify which health education objectives are addressed in the films and series remembered by the students, yielded a wide variety of responses coinciding in the usefulness of these audiovisual materials.

More than half of the respondents answered that they agree or strongly agree that these audiovisual materials show basic knowledge about health sciences. The theme with which there was the highest degree of agreement is the influence that different sources of information have on establishing healthy behaviours or making decisions in situations that may compromise individual and community health. This is important as, for example, in a complex situation, the individual decision made may be key to maintaining community health (Kendal, 2019).

Secondly, the theme that had a wide degree of agreement is the possibility of getting to know the work of health professionals better. This dimension is important because it allows to know and discuss professional representations in a realistic view, with the daily professional successes and mistakes beyond the clichés of madness or evil, and on the other hand, because it allows to explore possibilities for students to develop a scientific vocation (García Sánchez, 2011).

Other topics, such as access to reliable information or communication about health issues with friends and family, are expressed with more indifference than agreement: the majority of students neither agree nor disagree with these statements. However, it is necessary to clarify that there are aspects that can be seen in the films but students may not be very aware of this, and this is why the teacher's contribution is necessary, both in the previous content analysis of the audiovisual material, the delimitation of class objectives, the conduction of the debate, among others.

The results on the use of films and series in secondary school classrooms are very relevant. More than half of the respondents indicate that these resources are not used in their schools, and among those who respond that they are, the tendency is that they are not used frequently. However, when identifying the objectives for health education that are worked on in class using audiovisual materials, the results are practically similar to when this question is asked about the topics that they identify in their independent film viewing. This leads us to believe that these resources do indeed play an important role in working on key health concepts. It would be interesting to encourage their use in the classroom because students report more motivation towards the topics they are working on when these resources are used, and motivation is a key factor for correct learning (Ospina Rodríguez, 2006).

On the other hand, students state that they are more motivated if the audiovisual materials used are recent, but that they actually use more those that are not. What could be the reasons for working with films and series that are not recent releases? On the one hand, there are audiovisual materials that can certainly be considered "classics" because they expose topics of interest in a deep and adequate way; but on the other hand, the question of updating materials and classes can be introduced.

In relation to the way these audiovisual materials are used, it is found that students state that these resources are used more in the classes to introduce new knowledge, rather than to complement current socio-scientific debates, which emphasises the importance of audiovisual material and the power that films and series have as conceptual vehicles (Serra, 2011).

It is important to find the ideal way to work on these concepts in the classroom, to be able to take audiovisual materials to a real context where they interpret situations that they themselves may encounter in their daily lives and have the tools to deal with them (Santesmases-Masana et al., 2017). Specific aspects of a film or series (such as dialogues, narrative sequences, characters) can be used, and activities can be designed to rethink the audiovisual material according to the educational objectives.

It is always necessary to make a prior preparation where educational objectives are established based on what is to be communicated and to make a good teaching design for the selection of the audiovisual material and the moment it will be broadcast (Fresnadillo Martínez, 2005). Before viewing the film, it is advisable to make a brief introduction in the classroom of the objectives to be worked on and then to encourage a contextualised discussion, both with the teacher and with classmates, of the specific

content so that students are able to compare the different situations shown with their personal experiences (Arroio, 2010; Kadivar et al., 2018). In addition, pre-activities can be prepared for students to carry out a thematic observation, and activities to be carried out immediately after the visualisation.

We can conclude that the results suggest a favourable use of current audiovisual materials to successfully work on health literacy issues in secondary school classes. However, the use of these resources should be further encouraged in order to get the maximum possible return on students' motivation, the development of empathy and emotions, the work from a real or plausible context, and the development of content related to health decision-making and values, with a language different from the usual classroom language and close to their daily lives.

For future research, it would be interesting to establish empirical studies on the pedagogical effectiveness of films and series (Cambra Badii and Baños, 2020) applied to secondary schools, as well as to investigate the consumption of films and series and the use of these audiovisual materials in the classroom in a larger sample, representative of the whole of Spain. It would also be interesting to investigate the use of these audiovisual materials in secondary school classrooms from the teachers' perspective. The assessment of knowledge from the use of audiovisual materials should also be studied in detail. On the other hand, an in-depth analysis of the contents of the most frequently mentioned films and series can be carried out in order to identify the specific health topics covered in each of them and to define teaching objectives to work on in the classroom. In addition, the health literacy among adolescents that is objectively achieved with these resources could be measured in a practical way through qualitative and quantitative measurement instruments such as the HELMA ("Health Literacy Measure for Adolescents") (Ghanbari et al., 2016) or shorter word recognition tests such as the REALM-Teen ("Rapid Estimate of Adolescent Literacy in Medicine") (Davis et al., 2006).

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Annex

Questionnaire

Title: Study of the use of cinema and series in the classroom for health sciences education.

Description:

If you are studying ESO or Bachillerato, would you be so kind as to answer this survey? It won't take you more than 5-8 minutes.

This questionnaire is part of my final degree project in Human Biology (UPF). Through this study I intend to find out what impact the films and series you watch have on health science education, as well as to find out what use is currently made of commercial films and series in secondary and high school classes.

Thank you very much for your participation and help in carrying out the study.

Dimension 1:

- Gender: Female, Male, Other
- Current year (1st ESO - 2 Bachillerato)
- Autonomous Community where you study

Dimension 2: Impact of films and series on everyday life

- Do you usually watch films or series related to the field of health sciences (hospital sector, about diseases, about laboratories, mutations, evolution, genetics...)? YES/NO
- Cite the films or series that you remember having seen recently in the field of health sciences (hospital sector, diseases, laboratories, mutations, evolution, genetics, etc.).

Please rate from 1 (strongly disagree) to 5 (strongly agree) the following statements about the impact of series and films on informal learning in health sciences.

- I feel that these series and films have motivated me to want to know more about health science topics.

These series and films deal with topics such as:

- Basic knowledge about health sciences (mutations, genetic engineering, DNA, hereditary diseases, cloning, etc.).
- Concepts related to health promotion and disease prevention (relationship between healthy behaviours and personal health, comparison and contrast of advantages and disadvantages of maintaining healthy practices...).
- The influence of family, peers, media or technology on health-related behaviours.
- Access to reliable health-related information, products and services.
- Communication about health-related issues with doctors, family, friends, etc. La toma de decisiones que afectan a la salud personal delante de situaciones como el consumo de drogas, la alimentación, el uso de diferentes tratamientos médicos, etc.
- Aspects of responsibility for personal, family and community health (contagion of infectious diseases, vaccination, etc.).

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- The tasks carried out by health professionals (doctors, nurses, researchers, etc.).

After reading the questions, would you like to add any films or series that you have remembered that deal with the above issues?

Dimension 3: Use of films and series in academia

- Does your school use commercial films and series for health science-related lessons? YES/NO
- If the answer to the above question is yes, please answer the following questions on a scale from 1 (strongly disagree) to 5 (strongly agree).
- Series and films are used frequently.
- Series and films are used to introduce new knowledge.
- Series and films are used to complement discussions on current socio-scientific issues.
- Series and films are used to assess knowledge in health science subjects.
- When series and films are used in lessons, I am more motivated by the topics covered.
- Generally, the films currently used in class are recent.
- If the series or films used in class are recent and current, they motivate me more than if they are old.

Watching these series and films in the classroom has helped me:

- Acquire basic knowledge of health sciences (mutations, genetic engineering, DNA, hereditary diseases, cloning, etc.).
- Understand concepts related to health promotion and disease prevention (relationship between healthy behaviours and personal health, comparison and contrast of advantages and disadvantages of maintaining healthy practices...).
- Know how to analyse the influence of family, peers, media or technology on health-related behaviours.
- Know how to access reliable information, products and services on health issues.
- Be able to communicate better about health-related issues, whether with doctors, family, friends, etc.
- Make decisions about issues that affect personal health, in situations such as drug use, diet, use of different doctors' treatments, etc.
- Promote personal, family and community health.
- To learn more about the work of health professionals (doctors, nurses, researchers, etc.).