Mapping research on health topics presented in prime-time TV dramas in “developed” countries: A literature review

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Abstract: Some prime-time TV dramas containing health topics have large audiences both in the countries in which they are broadcast as well as on an international level via Internet television network. We conducted a literature review to map the current research articles on prime-time TV dramas with health themes produced in so-called developed countries from 1986 to 2014. The review discovered 59 articles, of which 29 (49.2%) examined the portrayal of patients, doctors, and illness; two (3.4%) examined audience characteristics and motives for watching medical dramas; 17 (28.8%) used cross-sectional methods to examine viewers’ knowledge, attitudes, or behaviors related to health concerns; and 11 (18.6%) used either pre- and post-exposure or post-exposure and follow-up tests to assess changes in viewers’ knowledge, attitudes or behaviors related to health concerns. Theories employed to understand changes in viewers’ knowledge and behaviors included cultivation theory, narrative transportation theory, and social cognitive theory. We noted that even viewers who are disinterested in health issues can be exposed to such content with minimal resistance; dramas and movies can be continuously and affordably distributed as streaming content; and large financial investments are being made in the entertainment industry around the world. As a means of health information exposure, then, narrative forms of entertainment content (e.g. dramas and films) should continue to be investigated, particularly their positive and negative effects on audiences.

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PUBLIC INTEREST STATEMENT
The present article maps past research articles which studied prime-time TV dramas containing health topics in so-called developed countries. We understand the communication as consisting in the following process: a sender produces and emits a message, which is received by a recipient, who responds to it. When we map past studies according to this communication process, 49.2% (n = 29) focused on what the TV drama portrayed, about 47.5% (n = 28) concentrated on how a recipient responds to prime-time TV dramas, and only 3.4% (n = 2) analysed the audience’s motivation to watch the TV drama. None studied senders, namely drama producers. As a means of health information exposure, narrative forms of entertainment content (e.g. dramas and films) should continue to be investigated, particularly their positive and negative effects on audiences.
1. Introduction

Prime-time TV dramas, defined as TV dramas broadcast in the time period of 20:00 to 23:00, depending on the countries, are watched by large audiences. For example, the American medical drama ER reached 30.79 million viewers in the 1996–1997 Season (Lowry, 1997). In 2015, in the United States, 2,622 TV drama series and 9,616 feature films were launched (www.imbd.com), with audiences that varied from the young to the elderly.

TV dramas caught the attention of communication scholars, including George Gerbner, one of the founders of cultivation theory (Gerbner & Gross, 1976). He was concerned with the repeated broadcasting of violence depicted in prime-time TV dramas and TV dramas for children. Cultivation theory scholars have pointed out that heavy viewers’ perceptions of crime in society differ from the statistics on crime occurrence in society (Gerbner, 1998). Thus, these scholars suggested that social perceptions of reality were being distorted by mass communication content, a consequence that was not intended by the content creators. Other researchers claim that the effects of TV dramas are limited. Such effects have indeed been studied for years in various disciplines such as communication, media studies and psychology, among others (Bryant & Oliver, 2009).

TV dramas can convey both pro-social/health and anti-social/health messages. Research on media effects of TV dramas has historically focused on negative effects to viewers’ health (Seale, 2003). On the other hand, “Entertainment education” (EE), a communication strategy that promotes the understanding of various issues by targeting people who show little interest in any particular issue, has been introduced (Singhal & Rogers, 1999). EE has been implemented—mainly in developing countries first—in radio and television soap operas, popular music, comic books, and other entertainment genres to promote various issues. For example, radio and television soap operas have been designed to promote gender equality, adult literacy, smaller family size, and HIV/AIDS prevention in countries such as India, Turkey, Pakistan, Mexico, and Tanzania (Kincaid, Yun, Piotrow, & Yaser, 1993; Lettenmaier, Krenn, Morgan, Kols, & Piotrow, 1993; Nariman, 1993; Piotrow, Kincaid, Rimon, Rinehart, & Samson, 1997; Rogers, Vaughan, Swalehe, Rao, & Sood, 1999; Singhal & Rogers, 1999).

EE has also been implemented in developed countries, with a media-saturated situation, and documented in many empirical studies (Davin, 2003; Hether, Huang, Beck, Murphy, & Valente, 2008; Langlieb, Cooper, & Gielen, 1999; Valente et al., 2007). Its theoretical perspective has been reviewed by Emily Moyer-Gusé (2008), who examined the persuasive effects of EE content by building on existing theories such as narrative involvement, identification, parasocial interaction, and similarity. She concluded that persuasiveness is based on narrative engagement and involvement with characters. Additionally, it has been suggested that resistance to persuasion during the consumption of entertainment narratives should be a key component of studying EE effects (Green & Brock, 2000; Green, Brock, & Kaufman, 2004; Green & Clark, 2013).

In this study, we aim to map how research on prime-time TV dramas, which transmit both positive and negative messages to viewers, has been conducted. We do this by categorizing the literature into the constructs of communication (sender characteristics; content portrayal; audience characteristics; and audience response). In addition, we also describe the theories behind the effects of prime-time TV dramas in the academic literature.
2. Method

2.1. Search procedure
We searched the following databases for eligible studies published in peer-reviewed journals in English from 1987, one year after the term “entertainment education” was introduced, to December 31, 2014: CINAHL Plus with full text, MEDLINE, PsycARTICLES, PsycINFO, SocINDEX with full text, PubMed, and Web of Science. Our search terms were (1) television drama AND health; (2) television drama AND medical issues; (3) television drama AND EE; (4) TV drama AND health; (5) TV drama AND medical issues; and (6) TV drama AND EE. The term “entertainment education” was added to confirm that all the studies on this topic had been included.

2.2. Inclusion criteria
Studies that focused on the influence or effects of watching prime-time TV dramas, and on health issues, were included.

2.3. Exclusion criteria
Studies were excluded if they did not have an abstract, were funded by health campaign organizations, included TV dramas that were not broadcast on prime time, or did not focus on health issues.

2.4. Study categorization
The studies were categorized according to three perspectives, by two reviewers who were trained to capture the relevant data. The first perspective focused on constructs of the communication process: (1) sender (TV drama and film producers) characteristics; (2) content portrayal; (3) audience characteristics; and (4) audience response. Under “sender characteristics”, producers’ motivations and cultural/social factors were considered. “Content portrayal” assesses what a prime-time TV drama shows its audience. “Audience characteristics” examined who watches a particular prime-time TV drama and why. It is important for health communicators to decide which drama producers they want to approach when using actual tactics of persuasive communication. Lastly, “audience response” assesses to what kind of prime-time TV drama content the audience responds, and how they respond.

The second perspective looked for health topics in TV content to assess any focus on particular topics. Health topics included pro-health or pro-social behaviors, unhealthy or anti-social behaviors, bioethics and medical education, and illness and health professionals.

The third perspective concentrated on the theories behind longitudinal media-effects studies of prime-time TV dramas.

3. Results

3.1. Literature search
Our initial search identified 401 titles, from which we selected 232 for a review of the abstract; these were narrowed down further to 156 for full-text reviews (Figure 1). We selected a total of 59 studies for the final review.

4. First perspective: Constructs in persuasive communication processes
Of the 59 studies we reviewed, none (0.0%) included sender characteristics, 29 (49.2%) analyzed content portrayal, two (3.4%) assessed audience characteristics, and 28 (47.4%) evaluated viewers’
knowledge, attitudes, or behaviors in response to the messages received. Of the 28 studies involving audience response, 17 examined the actual status in knowledge, attitudes, or behaviors, and 11 studies examined the changes in audience knowledge, attitudes, or behaviors before/after or with/without exposure (Figure 2).
| Authors (year)                        | Drama names*                                                                 | Health topics**                        | Type of analysis |
|--------------------------------------|------------------------------------------------------------------------------|----------------------------------------|-------------------|
| **Bioethics and professionalism**    |                                                                              |                                        |                   |
| Czarny et al. (2010)                 | Grey’s Anatomy, House M.D.                                                  | Bioethics and professionalism          | QA                |
| Hirt et al. (2013)                   | ER, Grey’s Anatomy, House M.D., Scrubs                                      | Medical education                       | QU                |
| **Pro-healthy and pro-social behaviors** |                                                                              |                                        |                   |
| Gordon et al. (1998)                | Cardiac Arrest (UK), Casualty (UK), Medics (UK)                              | CPR                                    | QA                |
| Van den Bulck and Damiaans (2004)    | Spoed (Belgium)                                                              | CPR                                    | QA                |
| Harris and Willoughby (2009)         | Casualty (UK), ER, Grey’s Anatomy, Holby City (UK)                           | CPR                                    | QA                |
| Hinkelbein et al. (2014)             | ER                                                                          | CPR                                    | QA                |
| Moeller et al. (2011)               | ER, Grey’s Anatomy, House M.D., Private Practice                             | Seizure first aid                      | QA                |
| Harbaugh et al. (2011)               | ER, Grey’s Anatomy, House M.D., Mercy, Miami Medical, Private Practice, Scrubs, Three Rivers, Trauma | Organ donation and transplantation      | QA                |
| **Unhealthy and anti-social behaviors** |                                                                              |                                        |                   |
| Wallack, Grube, Madden, and Breed (1990) | NA                                                                          | Alcohol drinking                       | QA                |
| Kanda et al. (2006)                 | NA, Dramas aired in Japan                                                    | Smoking                                | QA                |
| **Illness**                          |                                                                              |                                        |                   |
| Arrington and Goodier (2004);         | NYPD Blue                                                                    | Prostate cancer                        | QU                |
| Van den Bulck and Damiaans (2004)    | Spoed (Belgium)                                                              | Cardiovascular disease                 | QA                |
| Gordon et al. (1998)                | Cardiac Arrest (UK), Casualty (UK), Medics (UK)                              | Cardiovascular disease                 | QA                |
| Hetsroni (2009)                     | Chicago Hope, ER, Grey’s Anatomy                                             | Illness in general                     | QA                |
| Ye and Ward (2010)                  | ER, Grey’s Anatomy                                                           | Illness in general                     | QA                |
| **Medicine and healthcare system**   |                                                                              |                                        |                   |
| Harter and Japp (2001)               | Chicago Hope, ER                                                             | Medical technology                      | QU                |
| Lepofsky et al. (2006)              | ER                                                                          | Modern health care                     | QU                |
| Rich et al. (2008)                  | House M.D.                                                                  | Modern health care                     | QU                |
| Foss (2011)                         | Chicago Hope, ER, Grey’s Anatomy, House M.D.                                 | Medical error                          | QA                |
| **People (HCP)**                    |                                                                              |                                        |                   |
| Henderson and Franklin (2007)        | Holby City (UK), Hollyoaks (UK), The Bill (UK)                               | Social care professional               | QA                |
| Rich et al. (2008)                  | House M.D.                                                                  | Physician                              | QU                |
| Khun (2011)                         | White Tower (Japan), White Tower (South Korea), White Tower (Taiwan)         | Physicians                             | QU                |
| Strauman and Goodier (2011)         | House M.D.                                                                  | Physicians                             | QU                |
| Washington (2012)                   | ER, Grey’s Anatomy                                                           | HCPs                                   | QU                |
| Jain and Slater (2013)              | ER, Grey’s Anatomy, House M.D.                                              | HCPs                                   | QA                |
| Sheridan and O’Sullivan (2013)      | Bodies (UK)                                                                 | Healthcare management                   | QU                |
| **People (non-HCP)**                |                                                                              |                                        |                   |
| Wilson et al. (1999)                | Dangerfield (UK), Halifax f.p. (AU), Heartbeat (UK), Casualty (UK), Peak Practice (UK), Cracker (UK), Blue Heelers (AU), The Bill (UK), Cover Story (NZ) | Patients (Mental illness)              | QA                |
| Greenberg et al. (2003)             | NA                                                                          | Obese characters                       | QA                |
| Batchelor et al. (2004)             | Dawson’s Creek                                                              | Sexuality in young people              | QU                |
| Kessler et al. (2004)               | NA, Dramas aired in Germany                                                 | Elders                                 | QA                |
| Primack et al. (2012)               | ER                                                                          | Patients admitted to Emergency Department | QA                |
| Hetsroni (2009)                     | ER, Chicago Hope, Grey’s Anatomy                                           | Patients in general                    | QA                |

(Continued)
5. Second perspective: Health topics

5.1. Content portrayal (Table 1)

Of the 29 studies that analyzed content portrayal of prime-time TV dramas, 18 were quantitative and 11 were qualitative. Two of these studies examined bioethics and professionalism in prime-time TV medical dramas. One study conducted by Czarny, Faden, and Sugarman (2010), quantitatively analyzed the presentation of bioethics- and professionalism-related content in *Grey's Anatomy* and *House M.D.*, finding less of the second than the first. The other study, by Hirt, Wong, Erichsen, and White (2013), qualitatively analyzed *ER*, *Grey's Anatomy*, *House M.D.*, and *Scrubs* and showed the usefulness of each drama in teaching bioethics and professionalism to medical undergraduates in Canada.

The portrayal of behaviors was divided into two categories: (1) positive behaviors toward another person, and (2) unhealthy behaviors of an individual. The former category included cardiopulmonary resuscitation (CPR), first-aid skills administered for seizure episodes, and organ donation. The latter category included binge drinking, smoking, and unprotected sexual behavior. Four studies analyzed the portrayal of CPR in prime-time TV medical dramas originating in Belgium, the UK and the US. Gordon, Williamson, and Lawler (1998) showed how the CPR that was depicted in the UK medical dramas varied more, sometimes incorrectly, from real life, but the overall success rate was close to reality. Thus, the British TV medical dramas could not be blamed thoroughly for their depiction of CPR (Gordon et al., 1998). Harris and Willoughby (2009) found in their content analysis of UK and US medical dramas that CPR was portrayed as equally successful amongst young and old age groups, which is not realistic, despite the similarity with the overall immediate, real-life success rates (Harris & Willoughby, 2009). Hinkelbein et al. (2014) conducted a detailed analysis of the quality of CPR by comparing TV dramas *ER* with the American Heart Association (AHA) guidelines and found that only one CPR reenactment out of 136 cardiac arrest scenes was in agreement with those guidelines.

Similarly, Moeller, Moeller, Rahey, and Sadler (2011) investigated whether *ER*, *Grey's Anatomy*, *House M.D.*, and *Private Practice* portrayed proper seizure first-aid by comparing them with the Epilepsy Foundation of America guidelines. They found both inappropriate (43.1%) and appropriate first-aid (32.3%) portrayed in the scenes, and argued that the professional actors could easily incorporate the guidelines without sacrificing dramatic impact. Harbaugh et al. (2011) investigated the representation of organ transplants in recent medical dramas when the donation rate hit plateau and observed that episodes in US medical dramas containing only negative messages had over twice the household viewership compared with episodes that contained only positive messages (8.4 million vs. 4.1 million, \( p = 0.01 \)); they voiced concern over the contribution of such productions to the US public’s misperception of organ donation and transplantation.

Six studies evaluated the portrayal of illness in TV dramas. Arrington and Goodier (2004), for example, qualitatively analyzed how prostate cancer support groups, as well as prostate cancer itself, were portrayed in one episode of the US prime-time police drama, *NYPD Blue*. Hetsroni (2009) quantitatively analyzed all seasons of *Chicago Hope*, *ER*, and *Grey’s Anatomy* and found more dramatic diseases were portrayed in these prime-time TV dramas compared with national statistics of diagnoses in US hospitals. Using cultivation theory and media system dependency theory, he explained the possible...
impact of repeatedly watching representations of these overestimated diseases. Ye and Ward (2010) showed that ER and Grey’s Anatomy included a wide range of illnesses, with injury, cardiovascular disease, and cancer being the top three most frequently portrayed.

Of the 29 studies that analyzed content portrayal of prime-time TV dramas, 16 (55.2%) analyzed the depiction of health professionals. Six of these 16 studies analyzed the portrayal of healthcare professionals, including physicians (Jain & Slater, 2013; Khun, 2011; Rich, Simmons, Adams, Thorp, & Mink, 2008; Sheridan & O’Sullivan, 2013; Strauman & Goodier, 2011) and social workers (Henderson & Franklin, 2007). House M.D., a popular US medical drama, has been analyzed extensively; the main character, Dr. Gregory House, is portrayed as a “detective-like” doctor who does not enjoy communicating with patients, but rather prefers to diagnose symptoms. His eccentric attitude would be unacceptable in today’s medical settings. However, according to Strauman and Goodier (2011), audiences may desire this new “doctor-hero”. Khun (2011) assessed differences among Japanese, Taiwanese, and South Korean dramas that were produced from the same book, “The Great White Tower”. The doctors portrayed in these East Asian dramas, which aired in 2003 (Japan), 2006 (Taiwan) and 2007 (South Korea), were politically-oriented (paying attention to the politics of their hospital to survive in their positions) and worked in what was represented as a predominantly male organization, a university hospital.

Nine of the 16 studies analyzed how people, other than healthcare professionals, were portrayed in health-related matters. Four of the nine studies focused on patients with particular illnesses such as cardiovascular diseases (Gordon et al., 1998), seizures (Moeller et al., 2011), mental illness (Wilson, Nain, Coverdale, & Panapo, 1999), and obesity (Greenberg, Eastin, Hofschire, Lachlan, & Brownell, 2003). In their empirical study of the representation of aging in prime-time TV dramas aired in Germany, Kessler, Rakoczy, and Staudinger (2004) found that the elderly, and especially women, were underrepresented and the gender roles portrayed were traditional. Primack et al. (2012) compared sociodemographic and medical characteristics of patients depicted on the TV medical drama ER with actual US emergency room patients and concluded that women and non-white patients were underrepresented in televised medical dramas. These groups were also found to be underrepresented in Hetsroni’s (2009) analysis of the TV medical dramas, Chicago Hope and Grey’s Anatomy. Batchelor, Kitzinger, and Burtney (2004) reported that teenagers in the UK were exposed to opportunities for useful discussions based on information in teen dramas about teenage pregnancy, sexual health concerns, including sexually transmitted infections among young people. However, among the negative aspects, the responsibility of young men was underrepresented, there was a lack of positive images of LGBT teenagers, as well as a general failure to represent diversity.

Four studies analyzed the portrayal of medicine or healthcare in televised dramas (Foss, 2011; Harter & Japp, 2001; Lepofsky, Nash, Kaserman, & Gesler, 2006; Rich et al., 2008). Foss (2011) observed that medical errors were typically blamed on the health professional’s inexperience, institutional flaws, and temporary personal problems. In their examination of the TV medical drama, ER, from the perspective of medical/health geography (health care’s contemporary geography), Lepofsky et al. found that the drama provided a realistic portrayal of the role of healthcare today. Using Kenneth Burke’s (1969) theory of symbolic action, Harter and Japp (2001) explained that “defining technology as representative anecdote” in medical dramas “captures … the pervasive power and promise of technology, and how it has shaped our understandings of health, illness, the body,” healthcare professionals and medical institutions, as well as “diagnosis and treatment” of patients (p. 411).

Jain and Slater (2013) found that female physicians and international medical graduates were underrepresented in medical dramas. In addition, patient-oriented behaviors such as patient navigation and patient education were shown less than real-life though many aspects of real-life patient-centered communication, such as active listening, information exchange, cultural respectfulness, are modeled more on US reality TV shows than on TV medical dramas. These underrepresented components might have resulted in skewed perceptions and expectations regarding patient-physician interactions in real life.
5.2. Audience characteristics
Two of the 59 studies we reviewed examined motives for watching medical dramas. Davin (2000) was the first to explore the motivations of UK audiences for watching the US medical drama, *ER*, and found that they accepted *ER* as a trustworthy source of health information. Thus, he suggested that medical dramas can be useful tools in health promotion messaging. The other study explored the motives of *ER*, *Grey’s Anatomy*, and *House M.D.* viewers in the US, using a uses and gratifications theory perspective (Lee & Taylor, 2014). The results showed a positive association between viewing motive and use of health information from the drama. Additionally, entertainment-related motives showed indirect and positive associations with the use of health information from the drama via narrative involvement and/or involvement with characters.

5.3. Audience knowledge, attitudes, and behavior (Tables 2 and 3)
The medical dramas reviewed in this category of media-effects research were *Casualty*, *ER*, *Grey’s Anatomy*, *House M.D.*, *Private Practice*, *Scrubs*, *Shrinks*, *Spoed*, and *Three Rivers*. Seven (28.0%) of the 25 dramas we identified in our studies were non-medical genres; these included *Desperate Housewives*, *Law & Order: SVU*, *NCIS*, *NSI*, *Sex and the City*, and *The West Wing*.

Table 2. Actual status of audience knowledge, attitudes, and behavior (N = 17)

| Authors (year) | Audience | Drama title, if mentioned | Topic | Research design |
|---------------|----------|----------------------------|-------|-----------------|
| **Bioethics and professionalism** | | | | |
| Czarny et al. (2008) | US med students | ER, Grey’s Anatomy, House M.D., Nip/Tuck | Bioethics | QA |
| Weaver and Wilson (2011) | Australian undergrad med students | House M.D., Scrubs, Grey’s Anatomy, ER, Private Practice, All Saints(Australian) | Bioethics and professionalism | QA |
| Weaver et al. (2014) | Australian undergrad med students | Grey’s Anatomy, House M.D. | Professionalism | QA |
| **Illness and health beliefs** | | | | |
| Becker (2004) | Fiji teen girls | NA, Dramas aired in Fiji | Eating disorder, body image change | QU |
| Zoller and Worrell (2006) | US | The West Wing | Multiple Sclerosis | QU |
| Kennedy et al. (2011) | US | Law & Order SVU | Environmental exposure to toxic substances | QA |
| Chung (2014) | US | Medical dramas in general | Perception of health | QA |
| **People portrayal** | | | | |
| Cho et al. (2011) | US undergrads | ER, Grey’s Anatomy, House M.D. | Perception of physicians | QA |
| Stinson and Heischmidt (2012) | US undergrads | House M.D., Grey’s Anatomy, Scrubs, Private Practice, ER | Perception of physicians | QA |
| Sancho-Aldridge and Gunter (1994) | UK | Shrinks(UK) | Psychiatrists, patients | QA |
| Hetsroni (2014) | US general audience | ER, House M.D., Grey’s Anatomy | Genre-specific drama viewing effect, elderly, diseases | QA |
| **Pro-health and pro-social behaviors** | | | | |
| Hust et al. (2013) | US undergrads | Law & Order, NSI, NCIS | Intervene in sexual assault situation | QAs |
| Khalil and Rintamaki (2014) | US | Three Rivers | Organ donation | QA |
| Van den Bulck (2002) | Belgium | Spoed(Belgium) | CPR | QA |
| **Unhealthy and anti-social behaviors** | | | | |
| Simkin, Hawton, Whitehead, Fagg, and Eagle, 1995 | UK | Casualty(UK) | Substance self-poisoning | QA |
| Krcmar and Greene (2000) | US high school and college students | NA, Dramas aired in US | Risk-taking behavior among adolescents11–17 | QA |
| Godbold Kean and Fudge Albada (2003) | US undergrads | 20 prime time TV shows | Alcohol | QU, QA |

Notes: QA = quantitative; QU = qualitative.
Of the 28 studies in this category, 17 (60.7%) examined the actual status of audience knowledge, attitudes, and/or behaviors (Table 2). Three studies examined bioethics or professionalism, or both, in medical and/or nursing students in Australia and the US, and showed that US medical dramas were useful as a teaching tool (Czarny, Faden, Nolan, Bodensiek, & Sugarman, 2008; Weaver & Wilson, 2011; Weaver, Wilson, & Langendyk, 2014). Two studies examined the influence of TV viewing hours on patients’ perceptions of physicians. One of the studies, conducted by Stinson and Heischmidt (2012), found that “television exposure only negatively affected patients’ perceptions of physicians in regards to physical attractiveness and character, but not to physician propriety, power, communication, sociability, extroversion, competence, and composure” (p. 66). They discussed that this could be due to the actors themselves who are more physically attractive in the drama than doctors in real-life. The authors of the other study, Cho, Wilson, and Choi (2011), reached similar conclusions in their

Table 3. Change in audience knowledge, attitudes, and behaviors (N = 11)

| Authors (year) | Intervention (drama title if mentioned) | Topic | Research design and participants | Measures |
|---------------|----------------------------------------|-------|----------------------------------|----------|
| Illness and health | | | | |
| An et al. (2014) | Switched at Birth | Deafness | Pre-post comparison of 2x4 US general audience | Knowledge, attitude toward deafness |
| Bouman et al. (1998)* | Medisch Centrum West (NDL) | Cardiovascular disease | Post-test only design, telephone interview, 3 points, n = 754, 243, NDL | Identification, recognition, credibility, realism, talking with others, appreciation, knowledge |
| Fernando et al. (2011)* | Warriors (UK) | PTSD trauma in veterans | Pre and post-test survey to about 4000 UK veterans | Health perception fatigue, PTSD, common mental disorders |
| Hawton et al. (1999)* | Casualty (UK) | Self-poisoning | Two times post surveys (1 wk and 32 wks after broadcasting), UK | Knowledge related to paracetamol poisoning |
| Hether et al. (2008)** | ER, Grey’s Anatomy | Breast cancer | 3 wave surveys, US general audience | Knowledge of BRCA gene and breast cancer (BC) risks, attitudes about BC, behavioral intentions to BC screening, self-reported behaviors |
| Murphy et al. (2011)* | Desperate Housewives | Lymphoma | Pre and post test to 167 females, US general viewers | Health status, involvement with a character, involvement with the narrative, emotion, knowledge, attitude, behavior |
| Valente et al. (2007)** | ER | Teen obesity, hypertension, 5 a day | Surveys at 3 different sources, US general audience | Knowledge of 5 A Day, nutrition attitudes, nutrition practices, self-reported behavior change |
| Moyer-Gusé et al. (2011) | Sex and the City | Sexual health | 3 wave surveys (pre, 24 h later, 2wk later) of 243 undergraduates, US | Past sexual behavior, self-efficacy, behavioral intention, counterarguing, perceived vulnerability, identification, |
| Education | | | | |
| Alvarado and Maskiewicz (2011) | House M.D. | Medical education | Mixed-methods study, Nervous system, Immune system test groups (n = approx. 15–32), arms of control, experiment 1, and experiment 2, US California high school students(15–19 yrs) | N.A. |
| Østbye et al. (1997) | ER | Medical education | Canada | N.A. |
| Unhealthy and anti-social behaviors | | | | |
| Moyer-Gusé (2010) | Grey’s Anatomy, CSI, Gossip Girl | Sexual risk | 2 (genre: dramatic narrative, news)x2 (perceived message intent: entertain, persuade) between-subjects, experiment, n = 137, US undergrads | Past sexual behavior, perceived vulnerability of contracting a STI, preference for television |

Notes: NDL = the Netherlands; PTSD = post-traumatic stress disorder; STI = sexually transmitted infection; PTSR = posttraumatic stress reaction.

*Dramas were created without consultation with researchers + real-life exposure.
**Dramas were created in consultation with researchers + real-life exposure.
analysis of the same medical dramas: ER, Grey’s Anatomy, and House M.D. Furthermore, Krcmar and Greene (2000) demonstrated that exposure to violent drama was negatively related to risk-taking behavior; however, exposure to realistic crime shows and exposure to contact sports was positively related to risk taking behavior. In research conducted by Kennedy et al. (2011), episode viewing and narrative transportation (Green et al., 2004) were positively associated with knowledge of toxic exposure effects, and transported viewers revealed that they were more likely to report an unusually high number of cancer cases to authorities. Hust et al. found viewing an episode with a message for bystanders to intervene in a sexual assault positively supported viewers’ perceived social norms, perceived efficacy of intervening and correct knowledge of rape myth acceptance (Hust et al., 2013). Exposure to prosocial message in the TV drama Three Rivers was positively associated with positive discussion of organ donation among viewers in the US (Khalil & Rintamaki, 2014). On the other hand, one research source showed that TV drama’s influence remained strong even when audiences have practical knowledge of the issue at stake. Young audiences in Flanders, Belgium, showed a tendency towards overestimating survival chance after in hospital resuscitation by healthcare professionals, upon consuming the medical drama, Spoed (meaning Emergency in English) (Van den Bulck, 2002). They also found that this tendency was moderated but not eliminated by the audience’s practical knowledge of CPR.

Eleven (39.3%) of the 28 studies examined changes in the audience’s knowledge, attitudes, or behaviors before/after or with/without exposure to certain drama clips, at various points in time following exposure (i.e. immediately to months later) (Table 3). In this category, all the studies used drama clips as an intervention. There were two types of experiments: one was a pre- and post-exposure survey, and the other was three wave survey.

Three of the eleven studies used pre- and post-exposure surveys. In a study by Murphy, Frank, Moran, and Patnoe-Woodley (2011), character involvement was the best predictor of change in relevant knowledge, attitudes, and behaviors. In their study of the impact of a TV drama starring a deaf character, An et al. (2014) observed positive attitude changes in social interaction and deafness-as-handicap dimensions, consistent with the program content, which depicted positive deaf–hearing friendships and capable deaf characters. Fernando et al. (2011) analyzed the impact of a war drama on the psychological health of veterans who experienced military deployment in Bosnia and found the veterans were not observably affected by the drama.

Hether et al. (2008), Valente et al. (2007), and Moyer-Gusé, Chung, and Jain (2011) employed three-wave surveys to assess the short- and long-term influence of TV dramas on viewers’ knowledge, attitudes, and behaviors. Hether et al. (2008) examined how multiple exposures to one health message can be effective in a media-saturated modern society. They showed that the combined exposure to two dramas with the same message seemed to be most effective in changing viewers’ knowledge, attitudes and behaviors related to breast cancer. Valente et al. (2007) evaluated a storyline in the TV drama, ER, about teen obesity, hypertension, and the 5 A Day campaign—the latter carried out in the US, the UK and Germany with the objective of encouraging consumption of at least five portions of fruit and vegetables each day—on knowledge, attitudes and behaviors. They found the storyline affected self-reported behavior change and had modest impacts on knowledge, attitudes, and practices. In contrast to these two studies, which used viewer panels, Moyer-Gusé et al. (2011) set up an experiment in which undergraduates were randomly assigned to view one of two film excerpts: one that depicted characters engaged in sexual discussion and one that did not. They concluded that identification with the characters facilitated sexual discussion among the viewers by enhancing the audience’s self-efficacy and reducing counter-arguing.

6. Third perspective: Theories behind studies on change in audience knowledge, attitudes and behavior

Among the 11 studies on changes in viewers’ knowledge, attitudes, and behaviors, out of the 28 involving audience response, we identified several underlying theories. Each of these studies used
before/after exposure to certain TV drama clips and varied the time of exposure from immediately to months later.

6.1. Cultivation theory
Developed by Gerbner and Gross (1976), cultivation theory examines the long-term effects of television viewing. It states that the more time people spend watching the television, the more likely they are to believe the social reality portrayed on television (Gerbner, 1998). Hether et al. (2008) showed that a cultivation function, or “additive effect can be found when viewers are exposed to multiple storylines with a similar theme across different TV programs” (p. 820) in a media-saturated culture like the United States—in this case, a storyline about a breast cancer gene mutation (BRCA) test.

6.2. Social cognitive theory
Social cognitive theory posits that an individual can learn by observing and imitating the overt behavior of others in real life or on television (i.e. vicarious learning) (Bandura, 2001). In Valente et al.’s work (2007), observational learning and behavioral modeling required identification with characters, which “is related positively to increased attention, mental rehearsal of arguments, and modeling of behavior” (p. 552) (See also, Sharf, Freimuth, Greenspon, & Potnick, 1993; Sood, 2004). Bouman, Maas, and Kok (1998) explained that the Dutch drama, Medisch Centrum West, had already been established and did not follow the EE guidelines used in developing countries. However, “social cognition” as well as “agenda setting” and “uses and gratifications”, which we will explain later in this section, were applied by the Netherland Heart Foundation (NHF) in the design of the script to include actual cardiovascular issues in the drama.

6.3. Narrative transportation theory
Narrative transportation theory, or simply, transportation theory, has been conceptualized as “a distinct mental process, an integrative melding of attention, imagery, and feelings” (Green & Brock, 2000, p. 701). Moyer-Gusé et al. (2011) approached this theory, particularly focused on the core component of identification with characters. In their study, greater identification with characters “facilitated [the] effect by enhancing viewers’ self-efficacy and reducing counterarguing” (p. 387) in sexual health conversation with sexual partners. The result of their study was also consistent with Social Cognitive Theory and with the processes laid out by both the extended elaboration likelihood model (E-ELM) and the entertainment overcoming resistance model (EORM) (p. 402). The EORM posits that identification with a character who is vulnerable to a threat will increase a viewer’s own perceived vulnerability to the threat (p. 403). This is because of “the vicarious cognitive and emotional process that characterizes identification” (p. 392). During the process of identification, a viewer vicariously experiences the thoughts, emotions, behaviors, and consequences of that character (Cohen, 2001). Murphy et al. (2011) found that involvement with narratives and characters were predictors in changing knowledge, attitudes, and behaviors toward lymphoma among women who watched the program, Desperate Housewives.

6.4. Agenda setting
Initially conceptualized by McCombs, Shaw, and Weaver (2014), agenda setting has been developed on the basis of the 1968 US presidential campaign: specifically, the ability of the news media to influence the salience of topics on the public agenda. Bouman et al. (1998) found that talking with others about popular TV dramas stimulated people to consider and incorporate the drama’s ideas and messages.

6.5. Uses and gratifications theory
Uses and gratifications theory is an approach to understanding why and how people actively seek out specific media to satisfy specific needs with respect to mass communication (Rubin & Perse, 1987). Bouman et al. (1998) explained that a TV drama must be sufficiently gratifying to the viewers so that they will watch, and therefore be exposed to, the educational message multiple times to maximize its effect.
7. Discussion

In this literature review, we mapped the studies of influence of prime-time TV dramas containing health messages, which were used as a medium of EE in developed countries. While we limited our investigation to English-language publications, the studies we reviewed were conducted in the UK, the Netherlands, and Australia and nearly half of the studies were conducted in the US, a media-saturated society with a well-established entertainment industry.

In developed countries, it is a challenge for health communicators to convey pro-social and pro-health messages to a target audience because the target audience’s media consumption behavior varies. Today, it is necessary to employ multiple information sources to maximize public reach. Entertainment is one of the last frontiers for health communication. EE has been developed for its efficacy in health campaigns in developing countries, where traditional text-based literacy is limited. In developed countries, EE has been explored and elaborated upon extensively in empirical research.

Recent rapid change in the entertainment industry, facilitated by Information and Communication Technology (ICT) expansion in developed and developing countries, has increased audiences’ ease of access to entertainment narratives such as feature films and border-free TV productions. Entertainment narratives can arguably become a health information source for audiences around the world. These narratives may convey both negative messages (e.g. scenes of smoking, violence, and unsafe sex) and positive messages (e.g. scenes of safe sex, healthy diets, and non-smokers). For many years, health communication researchers have been studying the effects of extant narrative content, and health campaigners in developing countries have historically studied the effects of their created content. More recently, in a systematic review, Shen and Han (2014) evaluated the effectiveness of EE in radio and TV channels in both developed and developing countries. Importantly, they observed that EE had a modest effect on increasing health knowledge, changing attitudes and intentions, and affecting health behaviors.

In the present review, our three main findings were: (1) no research was conducted to study the drama producers; (2) most of the studies evaluated the already broadcast narratives; and (3) few established research designs have been developed to evaluate changes in knowledge, attitudes, and behaviors in real-life situations. We argue that it is important in communication research to study what we call “senders” i.e. TV drama and film producers, particularly due to these being influenced by their sponsors. In commercial industries, product placement has been widely used with success in brand enhancement and sales increase. With respect to our second finding, we suggest that it is essential to monitor current entertainment narratives for the messages they are conveying. Unfortunately, most of the studies covered in our review focused on the influence of already broadcast narratives, which we contend is looking backward; many health communicators are one step behind the immediate issues. To target prospectively, then, we must be able to reach out to senders to adjust pro-social and pro-health messages prior to their production. Finally, we believe that consuming entertainment narratives in real-life brings about different influences on an audience’s knowledge, attitudes, and behaviors, compared with those observed during experiments. Very few of the studies we reviewed tried to measure the effects of pro-health messages in TV dramas during live TV programming. However, because ICT development allows consumers today to freely access entertainment narratives, studying the effects of EE in real-life may become more practically challenging for researchers.

Many US medical dramas are exported all over the world. Future research should compare cultural and societal differences in the influence of US versus foreign dramas on audiences in various countries. We identified four studies of this kind: two in Australia, one in Canada, and one in the UK. The studies in Australia and Canada showed the usefulness of the US medical dramas, ER, Grey’s Anatomy, and House M.D., among others, as teaching materials for medical undergraduates in their bioethics or medical professionalism courses (Østbye, Miller, & Keller, 1997; Weaver & Wilson, 2011; Weaver et al., 2014). Davin’s (2000) exploratory study of what motivates British residents to watch
the US medical drama, *ER*, showed the potential for the drama to be a health promotion resource. In marketing communication research, product placement has been cross-culturally examined within Western countries, and has been shown to have positive influence on purchasing behaviors (Gould, Gupta, & Grabner-Kräuter, 2000). Therefore, it is likely that, while the influence of prime-time TV dramas and feature films on audience knowledge, attitudes, and behaviors is apt to differ in other cultures and societies, it may deliver the same pro-health messages.

### 8. Limitations

One limitation of this study is the exclusion of studies on soap opera dramas, which are broadcast on TV networks during the early afternoon; we excluded these because soap opera ratings have fallen significantly in the US and other developed countries since the 2000s. We also excluded dramas created by health promotion campaigners, even if they were intended for TV networks, because those campaigners were direct sponsors and thus had political and financial influence in creating the dramas. These dramas were not aligned with the goals of our study.

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