

Brief Report

Type 1 Diabetes Mellitus in Movies: The Hollywood Effect

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ABSTRACT

Introduction. Type 1 diabetes mellitus (T1D) is one of the most common chronic diseases with childhood onset. Cinematic films and movies can reach populations worldwide and affect their concept of this disease. Through this research, the authors examined the accuracy of movies depicting T1D from childhood into adulthood.

Methods. We conducted an internet search of several databases, which resulted in a list of 39 movies from 2000 to 2022 with characters who had diabetes. We ultimately assessed 13 fictional movies. We calculated the percentages of movies that addressed vital aspects of T1D such as disease management, access to care, character development, and complications. We also applied a qualitative approach to assess the depth and accuracy of the portrayal of T1D.

Results. Movies portrayed severe but rare diabetes manifestations such as coma. They emphasized access to essential diabetes supplies and the cost of care. It was not until 2020 that movies featured a continuous glucose monitor (CGM) and insulin pumps. They presented female characters as resilient and unaffected by the struggles of their T1D.

Conclusions. This sample of fictional movies portrays extreme T1D symptoms and mostly outdated monitoring and treatment technology. It would be beneficial if future movies reflected the advances in closed-loop CGM/insulin pumps. Clinicians should know how the movie industry presents the disease to their patients. Clinicians can use popular movies to start difficult discussions with patients about topics pertinent to the comprehensive care of T1D.

INTRODUCTION

Type 1 diabetes mellitus (T1D) is a prevalent chronic disease, particularly among children, but can manifest at any age.¹ Its global prevalence is 9.5 per 10,000 people, with an incidence rate of 15 per 100,000 people.² Given its widespread occurrence, it is crucial that the portrayal of T1D in popular media, such as movies, is accurate and informative.

Movies can reach populations worldwide and affect their concept of T1D. Prior reviews have concluded that representations of people with T1D in films are susceptible to metaphor and exaggeration and often

are inaccurate.³ A 2017 review of 20 Bollywood movies that included characters with diabetes found that they were peripheral characters with minimal screen time.⁴ A small number of studies have examined the accuracy of T1D portrayals in Western movies. The authors in this study sought to evaluate the depiction of T1D in fictional English-language movies.

METHODS

This retrospective, observational study identified movies with several different approaches, including: “diabetes in movies” in Google and PubMed, the advanced search option for all movies with the keyword “diabetes” in the Internet Movie Database (IMDb),⁵ and “list of films featuring diabetes” using the English language version of the website Wikipedia.⁶ We excluded documentaries, non-fictional and non-English language movies, and those released before 2000 to avoid heterogeneity related to different time eras. We screened an initial list of 39 movies for substantial content related to the following variables: T1D disease management, access to care, character development, and complications, which resulted in 13 movies. We calculated percents to quantify the presence of these variables and employed a qualitative method to assess the depth and accuracy of the portrayal of T1D.

An individual with a 13-year history of T1D and a board-certified internist reviewed the movies independently to provide both patient and professional perspectives.

RESULTS

We assessed 13 fictional movies (Table 1). Disease management is the cornerstone in about half of the movies reviewed, mostly through scenes of hypoglycemia. Several tackled the importance of diabetic supplies. In *12 Feet Deep* (2017), the character is trapped underwater without supplies and becomes unconscious. *Greenland* (2020) also focused on the importance of packing supplies. In *Panic Room* (2002), the character carries the glucagon kit needed to reverse hypoglycemia. The accurate illustration of advances in treatment technologies took much time to come to cinema. An insulin pump first appears in *Greenland* (2020) but is an old model for that era. *Turning Red* (2022) shows an infusion pump. *Purple Hearts* (2022) presents a CGM and an insulin pump.

Table 1. List of assessed movies.

Movie	Date	Director	Genre
<i>Purple Hearts</i>	2022	Elizabeth Allen Rosenbaum	Romance
<i>Turning Red</i>	2022	Domee Shi	Animated-Comedy
<i>Greenland</i>	2020	Ric Roman Waugh	Thriller
<i>12 Feet Deep</i>	2017	Matt Eskandari	Horror
<i>A Deadly Adoption</i>	2015	Rachel Lee Goldenberg	Thriller
<i>Broken</i>	2012	Rufus Norris	Drama
<i>State of Emergency</i>	2011	Turner Clay	Horror
<i>The Next Three Days</i>	2010	Paul Haggis	Thriller
<i>Wonderful World</i>	2009	Joshua Goldin	Drama
<i>Derailed</i>	2005	Mikael Häfström	Thriller
<i>Panic Room</i>	2002	David Fincher	Thriller
<i>No Good Deed</i>	2002	Sam Miller	Thriller
<i>Memento</i>	2000	Christopher Nolan	Thriller

Three movies (23%) display the financial impact on T1D control. The lack of resource access in *The Next Three Days* (2010) leads to fluctuation and poor glucose control. *Purple Hearts* (2022) highlights the high cost of insulin when the character runs out due to low income. *Derailed* (2005) illustrates the cost of a kidney transplant and its associated medications.

Three movies (23%) send strong positive messages about resilience. Interestingly, all three characters are females. In *Broken* (2012), an adventurous 12-year-old manages T1D meticulously, not deterred by it. In *Purple Hearts* (2022), the character is hardworking and does not give up on her dreams. Similarly, T1D does not limit the character in *Turning Red* (2022).

Most of the movies reviewed (70%) highlighted the lifestyle effects of T1D outcomes. In *The Next Three Days* (2010), the character is a prisoner with fluctuating blood sugar. In *Panic Room* (2002), the character has poor dietary habits and uncontrolled sugar. Diabetic coma, a severe complication, is illustrated in *No Good Deed* (2002), *Wonderful World* (2009), *State of Emergency* (2011), and *A Deadly Adoption* (2015). *Memento* (2000) portrays insulin misuse (stacking) resulting in death. Renal failure, a significant long-term complication, is illustrated in *Derailed* (2005) with a character that has failed two kidney transplants and awaits a third one. Finally, in *Turning Red* (2022), the opposite is displayed with well-controlled T1D using an up-to-date insulin infusion pump.

DISCUSSION

The most common symptom of diabetes portrayed in movies is hypoglycemia, as it lends itself well to drama. Movies tend to overemphasize severe hypoglycemia with manifestations such as fainting or coma, but descriptions are mostly accurate. In real life, hypoglycemia is not as severe or as frequent, especially in patients monitoring blood sugars. Diabetic patients usually can recognize early symptoms, such as tremors, sweating, and hunger, and correct their blood sugar.⁷ The more advanced symptoms like seizure and coma happen at much lower glucose levels if not treated.^{8,9} It is not easy to show hyperglycemia's effects in a movie. Characters with high or fluctuating sugar appear but without much cinematic emphasis on associated symptoms.

The management of T1D is heavily dependent on supplies. Several movies highlight the importance of being prepared. That takes self-discipline, planning, and attention to detail, which can be problematic in adolescents. A different aspect, the lack of resources, is presented in adults. Poor socioeconomic status is associated with worse diabetes control and increased hospitalizations.¹⁰ Total direct estimated costs of diabetes increased from \$227 billion in 2012 to \$307 billion in 2022. In January 2023, the Insulin Affordability and the Inflation Reduction Act capped the out-of-pocket insulin cost to Medicare Beneficiaries at \$35.00.¹¹ In March 2023, Eli Lilly announced the Insulin Value Program, where all Lilly insulins are available for \$35 a month regardless of insurance.¹²

The psychological aspect of T1D is not to be underestimated. Movies show adolescents with T1D as trying to fit in and be perceived as ordinary by their peers. In practice, adolescent diabetics are typically assessed for depression, anxiety, school absences, family conflict, and other mental health challenges, especially if non-compliant.^{13,14} In

recent movies, T1D characters are presented as successful and integrated into their environments. This positive message could significantly impact adolescents, an inspiration to overcome their psychological challenges.

Adolescents who perceive greater sharing of responsibility for their T1D care with their caregivers are more likely to engage in better management of their disease.¹⁵ In movies, many T1D characters cannot manage their disease due to poor habits. Similarly, the trend for diabetes control in the U.S. has not been favorable. The National Health and Nutrition Examination Survey found a 7% decrease in control rate from 2015 to 2018 versus 2007 to 2010, with a 0.3% higher hemoglobin A1C.¹⁶ In adolescents, the SEARCH for Diabetes in Youth study found that 30% had no documentation of A1C values at appropriate intervals.¹⁷ Poor diabetes control can lead to severe and life-altering complications such as peripheral neuropathy, retinopathy, nephropathy, and vascular disease with potential loss of limbs and vital organ dysfunction.¹⁸ The long-term effects of poor diabetes control are not typically addressed in movies but can be an easy target to raise awareness and highlight the importance of adherence to therapy.

The treatment and management of T1D have evolved significantly over the last 20 years. The use of insulin pumps drastically increased since 1993, when the Diabetes Control and Complication Trials showed a significant reduction in T1D complications with tighter control.¹⁹ In the U.S., the number of insulin pump users grew from 7,000 in 1990 to 100,000 in 2000 and to greater than 350,000 in 2022.²⁰ New insulin pumps are user-friendly, small, and programmable by touch screen. Hybrid closed-loop systems include an algorithm-driven automated insulin delivery to correct high or low blood sugar. Coupled with a CGM, they offer better glucose control and reduced risk of hypoglycemia.²¹ Movies have only recently been proactive in displaying insulin pumps or CGM. The lag technological innovations on the big screen is understandable, as with lengthy production, the insulin pump or CGM featured is likely an older model.

Due to its observational nature, this study had several limitations, such as selection bias, recall bias, and limited generalizability. The most critical limitation was the subjective nature of movie evaluation. This study used no objective method of interpretation for visual data, and personal bias could have affected analysis.

CONCLUSIONS

This sample of fictional movies described T1D symptoms mostly accurately but portrayed outdated technology for monitoring and treatment. Future movies could reflect the advances in closed-loop CGM/insulin pumps and their usefulness in preventing hypo/hyperglycemia. Positive messages about both male and female teenagers with controlled T1D could be helpful. To heighten awareness, consequences of poor T1D control, such as cardiovascular disease, amputation, or blindness, could be presented. Those might be harsh scenes, but they highlight the importance of lifestyle modifications and treatment compliance to avoid early morbidity and mortality.

Representations of T1D in movies immediately affect an audience of millions. Hence, they deserve greater attention from health care providers. A fictional movie character could influence the attitude of patients toward CGM devices and closed-loop insulin pumps. Teenagers are affected by what they see on the screen. Those characters could sway their compliance with treatment and their outlook on T1D outcomes. Clinicians must know how the movie industry presents T1D to their patients. They can correct misconceptions while emphasizing characters with accurate depictions of manifestations and management. Clinicians can use popular movies to start difficult discussions with their patients about new treatment options, compliance, potential complications, self-esteem, and many other topics pertinent to the comprehensive care of T1D.

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