

## HPV GAME: ALLEVIATES VACCINE HESITANCY AMONG HIGH SCHOOL STUDENTS THROUGH EDUTAINMENT GAMING

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**Introduction:** Cervical cancer ranks as the third most common cancer among women in Malaysia. Therefore, there is a great need to increase the prevention of the disease through HPV (Human Papillomavirus) vaccination among adolescents. However, the Malaysian Ministry of Health encounter vaccine hesitancy issues among Malaysian youths. The possible factors for reduced vaccine uptakes among high school students were due to lack of awareness and vaccine hesitancy.

**Objective:** This study aims to alleviate vaccine hesitancy among high school student by creating awareness towards cervical cancer, and to promote the HPV vaccines uptake among high school students by using edutainment gaming known as "HPV Game".

**Materials and Methods:** This game targeted high school students from 10 to 17 years of age. The players were expected to finish all 3 levels and able to answer all 15 questions. Our target players were Malaysian citizens, possess personal computers (PC) with connectivity to the game. We exclude those with physical disabilities.

**Results:** "HPV game" was the first edutainment on Human Papilloma Virus, cervical cancer, and HPV vaccine. This game enables players to think critically of the best answer to protect themselves against the obstacles in the game. This game fills the gap between formal lectures and socio-cultural myths on HPV vaccination.

**Conclusion:** Preventing cervical cancer by promoting HPV vaccines uptakes by using a forward technology such as a serious game for health most probably will enhance the target clients' adherence to HPV vaccination and increased awareness. Therefore, for precisely tested the benefit of HPV vaccine game, conducting an observational study to assess players' perspective among teenagers is highly recommended.

**Keywords:** HPV, Vaccine, Serious Game, Teenagers, Health Game.

### Introduction

Human papillomavirus (HPV) vaccine is a vaccine that prevents infection by certain types of human papillomavirus. Available vaccines protect against either two, four, or nine types of HPV. All vaccines protect against at least HPV type 16 and 18 that cause the greatest risk of cervical cancer. Cervical cancer ranking as the second most common cancer among women in Malaysia so there is a great need to increase the prevention of the disease through vaccination and regular screening. However, according to the 2006 National Health and Morbidity Survey, only 47.3% of eligible women have ever had one.

In this paper, we focus to alleviate vaccine hesitancy among high school student by creating awareness towards cervical cancer, and to promote the HPV vaccines uptake high school students by using edutainment gaming known as "HPV Game".

### Content

"HPV Game" is a serious game for health particularly designed for high school students to enhanced knowledge about Human Papillomavirus, create awareness regarding cervical cancer and promote practices towards HPV vaccination.

"HPV Game" was initiated by a lecturer from Universiti Malaysia of Pahang (UMP) in collaboration with a public health physician from Malaysia Ministry of Health. The first prototype was employed with Unity and optimized by professional game developers. During the development, firstly, we chose the background of the game, correct resolution, Then we set up the virus image using the coding script in C++ by MonoDevelop.

"HPV Game" has 3 levels where each level has five questions. At the first level, the question arose in relation to the transfer of knowledge on Human Papillomavirus (HPV), at the second level there is a question about awareness of cervical cancer and the last stage has questions regarding the perspective of the HPV vaccine. **Table 1** shown describes the "HPV Vaccine Game" elements further.

Table 1: HPV Game elements

Game element	Description
System	Players will receive scores and rewards if they managed to pass every questions and stage in the game. The rewards will be in term of score point and time duration.
Players	This game is designed for the individual player. The players only interact with the game content.
Abstracts	Games involve abstraction of reality and typically take place in a game space. The genes reflect on Malaysia setting with various cultures and beliefs.
Challenge	The game is designed to have different challenges at every stage and has a different difficulty level.
Rules	Age restriction, demographic information is required before play the game, playing the game in order (cannot skip), the player cannot interact with other neighbors.
Interactivity	The players interact with the game system and the game environment.
Feedback	To complete each stage, the question appeared on the screen and the feedback from the player is required.
Quantifiable Outcome	There was a typical scoring system and the players need to pass certain scores to go to the next level.
Emotional Reaction	The game involves emotions such as fear, anger, and happiness, and enjoyable upon each level.

"HPV Game" was targeted for high school students from 13 to 17 years of age. The inclusion criteria were Malaysian citizen, possess computer (PC) with connectivity to the game. We exclude those with physical disabilities (i.e., blindness, or limitation to hands movement). "HPV Game" is important to education as it may serve as tools to alleviate vaccine hesitancy among high school students. This edutainment gaming enables students to enhanced knowledge about Human Papillomavirus, create awareness regarding cervical cancer, and promote practices towards HPV vaccination.

"HPV Game" specially designed for high school students to ensure knowledge transmission about Human Papilloma Virus (HPV), to create awareness towards cervical cancer, and to promote the HPV vaccines uptakes among teenagers. The novelty of this HPV game is cost-effective, free PC games and become the 1<sup>st</sup> HPV game in Malaysia.

"HPV Game" was the first edutainment on Human Papilloma Virus, cervical cancer, and HPV vaccines. Players are able to collect life in order to survive to achieve a certain level in the game. This game enables players to critically think of the best answer to protect themselves against the obstacles in the game. This game fills the gap between formal lectures and socio-cultural myths on HPV vaccination. Currently, this HPV game still under consideration for copyright application and we believe that health games give a potential effect among teenagers where the game becomes an important medium to improve behavioral health towards a healthy lifestyle, increase disease's awareness and promotes the choices of healthcare services provided by the Ministry of Health and other health facilities.

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