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Integration of ADDIE and Health Belief Model on drug and substance abuse prevention educational module (DSPEM): Conceptual paper

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Abstract

Drug and substance consumption among high school students continues to represent a significant public health issue in Malaysia, especially within identified high-risk zones. This conceptual paper outlines a theoretically grounded framework for developing a school-based drug and substance prevention education module. Central to the framework is the implementation of the Health Belief Model (HBM), which addresses key determinants of behaviour (perceived susceptibility, benefits, severity, barriers, cues of action, and self-efficacy) in shaping preventive knowledge and practices. These elements are strategically mapped onto the ADDIE instructional design model to produce a structured and impactful intervention tailored for secondary school students.

Keywords: Drug; Education; Module; Prevention

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1.0 Introduction

The prevalence of drug and substance misuse among students is a major issue in Malaysia, with Seberang Perai Utara, Pulau Pinang being particularly at risk. Adolescents aged 10 to 19 are in a sensitive developmental stage in which peer, familial, and social factors can lead to drug experimentation or misuse (Abdalrazak H et al., 2021). This behaviour not only restricts the personal development of adolescents, but it also creates a burden for their families, schools, and society. The growing prevalence of drug-related issues among adolescents has brought attention to the pressing need for focused preventive education modules to be designed, developed and validated in secondary school settings. Recent studies that highlight the influence of school-based preventative initiatives on long-term behavioural outcomes provide strong evidence of their importance. The development of government-led programs such as SHIELDS (Sayangi Diri Elak Derita Selamanya) aims to improve students' self-awareness, resilience, and sense of personal responsibility.

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Despite the implementation of drug prevention programs in Malaysia, the number of drug users among youth continues to rise each year. Secondary school students, in particular, show the highest rates of drug use. According to data from Agensi Anti Dadah Kebangsaan (2024), the majority of drug users (62.3%) have attained secondary education, followed by 26.2% who never attended school, 8.0% who completed primary education, and only 3.5% who achieved tertiary education. According to these figures, more efficient, focused and long-term intervention are desperately needed to respond to the rising trend of drug abuse among students in Malaysian schools.

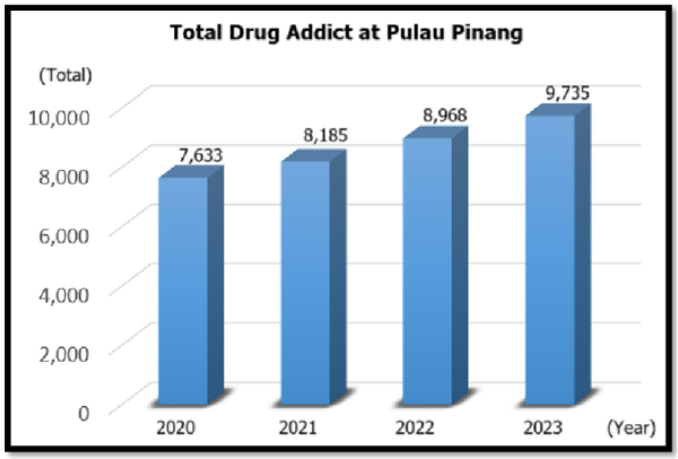

Fig. 1: The number of drug addicts for the years 2020, 2021, 2022, and 2023 at Pulau Pinang.
(Source: Agensi Anti Dadah Kebangsaan, 2024)

Between 2020 and 2023, Pulau Pinang's overall drug addict population increased steadily, as seen in Figure 1. In 2020, the total number of drug addicts was 7,633. In 2021, the number increased to 8,185, reflecting a 6.25% rise compared to 2020. In 2022, the total further increased to 8,968, showing an 8.2% growth from 2021. By 2023, the number reached 9,735, marking an 8.7% increase compared to 2022. Overall, the data indicates a continuous upward trend in drug addiction cases, with an approximate 25% increase over the four years. This highlights the need for enhanced intervention programs and preventive measures to address the growing issue.

A growing body of research highlights a complex interplay of factors that lead to drug and substance abuse among adolescents. Suarja et al., (2023) identify several key predictors, including peer pressure, dysfunctional family relationships, emotional instability and limited awareness about the harmful effects of drug use. These findings suggest that drug abuse among youth cannot be addressed through singular interventions but rather requires a comprehensive and multifaceted approach. Educational modules aimed at prevention must therefore go beyond simply delivering information. They must also foster emotional resilience, critical thinking and social competence to help students resist negative influences and make informed decisions. In addition, Liu and friends (2022) emphasize the critical role of the home environment in shaping adolescent behaviour. Their research points to the influence of parenting styles, communication patterns and overall family cohesion in either mitigating or exacerbating a young person's risk of engaging in substance use. This underscores the importance of integrating family-based components into school-based educational programs. Prevention strategies that involve parents like through workshops, communication tools or collaborative learning can reinforce positive behaviours at home and promote greater consistency and a positive environment for adolescents (Liu et al., 2022). Ultimately, an effective drug prevention module should adopt a holistic framework that addresses both the internal and external factors influencing adolescent decision-making.

Nawi et al., (2021) conducted a comprehensive review that found significant evidence supporting the effectiveness of focused interventions in addressing the underlying causes and risk factors of adolescent's drug and substance misuse. These interventions promote psychological resilience and provide adolescents with appropriate coping tools for navigating the obstacles and demands that come with adolescence. Rather than focusing exclusively on the risks of drug use, such modules emphasise the development of protective variables such as emotional regulation, self-esteem and problem-solving abilities. According to research, educating children about how to spot high-risk circumstances, assertively convey their refusal, and maintain confidence in their judgments reduces the likelihood of them starting to use substances dramatically. These studies demonstrate the need to incorporate both psychosocial and practical skill-building components into school-based drug prevention programs to accomplish long-term behavioural change among adolescents.

Building on these gaps, limitations and issues identified in the literature, the purpose of this paper is to develop a robust and evidence-based conceptual framework that serves as the backbone of the drug and substance abuse prevention education module development. This framework is intended to serve as a structured guideline for the design, development, and implementation of a drug and substance abuse prevention education module, ensuring that the module is theory-driven, student-centred and capable of promoting sustained positive behavioural outcomes. The main objective is to develop a new conceptual framework by integrating the ADDIE model, Health Belief model (HBM) and Knowledge, Behaviour and Attitude (KBA) framework.

2.0 Literature Review

2.1 Approach to Drug and Substance Abuse Prevention Among Malaysian Adolescents

Current studies reveal a troubling increase in the use of drugs and substance abuse by Malaysian adolescents, particularly those aged 16–19, with cannabis, amphetamine-type stimulants and alcohol being the most frequently abused (Muhamad et al., 2024). Contributing factors include peer influence, family attitudes toward drug use and socioeconomic conditions (Kamal et al., 2024). A lack of awareness and misconceptions about drug risks also heightens vulnerability (Ismail et al., 2021). Education plays a vital role in prevention with social media emerging as an effective platform for delivering drug-related awareness campaigns. Peer education models such as school-based workshops have proven successful in shifting perceptions and encouraging mutual responsibility among the students (Mokadem et al., 2021). Moreover, including life skills education in the school curriculum enhances students' resilience and decision-making abilities and reduces their risk of engaging in high-risk behaviours (Shaluhiyah et al., 2021). These combined efforts suggest that a multifaceted community-supported approach is essential for effective substance abuse prevention among Malaysian youth.

2.2 Knowledge, Behaviours, and Practices (KBP)

Key elements in the creation and efficacy of drug prevention programs are knowledge, behaviours, and practices (KBP). Knowledge is defined as people's awareness and comprehension of drug-related risks, such as the negative effects of substance usage on their bodies, minds, and society. This foundational knowledge is crucial. It informs and shapes individuals' perceptions and decisions surrounding drug use and makes them more inclined to engage in healthy behaviours associated with prevention (Lisdahayati et al., 2023). Behaviours encompass the actions individuals enact based on their knowledge towards drugs. These behaviours include the decision to abstain from drug use, seek help, or participate in prevention programs. A strong correlation exists between knowledge and effective behavioural change such as adolescents equipped with accurate information about the dangers of drugs are more inclined to take preventive behaviours (Karjuniwati et al. (2024). Practices are the habitual activities that individuals adopt to reinforce their protective measures against drug use. Effective drug prevention practices might involve regularly attending educational sessions, participating in peer support groups and maintaining healthy social networks that discourage substance abuse. Together, KBP forms a comprehensive approach to understanding and mitigating drug abuse by fostering an informed, proactive and supportive environment for youth (Efika et al., (2023). Integrating these elements into educational curricula is crucial for creating interventions that are effective tailored for adolescents.

2.3 ADDIE Model

There are five stages in the ADDIE model, which are Analysis, Design, Development, Implementation and Evaluation. It provides a methodical foundation for developing successful educational plans, such as those including drug prevention. Initially, a needs analysis identifies the specific issues surrounding drug use within the target population, thus informing the design phase (Analysis). Subsequently, educators craft learning objectives, select appropriate materials and devise assessments tailored to the identified needs (Design) (Cabı, 2021). During the development phase, these materials and assessments are created, ensuring they are engaging and effective for the audience (Development). The implementation phase, where the program is delivered to participants, often in varied formats to enhance accessibility and engagement (Implementation) (Shrivastava et al., 2025). Finally, evaluation assesses both learner performance and instructional effectiveness and facilitates enhancements to future iterations of the program (Evaluation) (Hidayati et al., 2022). The ADDIE model delivers an organized and systematic framework for developing educational programs, including drug and substance abuse prevention education modules. This model enables educators to conduct a thorough needs analysis, design tailored content, implement engaging learning experiences and evaluate effectiveness, ultimately enhancing both student knowledge and behavioural change in substance use prevention (Adeoye et al., 2024).

2.4 Health Belief Modal (HBM)

For drug prevention programs, the Health Belief Model (HBM) acts as a framework for psychological factors that helps understand why people choose to engage in health-promoting behaviours. It operates on several constructs which is perceived susceptibility (individuals' beliefs about their vulnerability to drug addiction), perceived severity (the emotional and social consequences of drug use), perceived benefits (the positive effects of adopting preventive behaviours), and perceived barriers (factors that hinder preventive actions) (Hidayati et al., 2022; Sudhewa et al., 2023). By framing educational programs within these constructs, the HBM enhances awareness and self-efficacy, encouraging individuals to take preventive measures against drug use (Joorbonyan et al., 2022). Research has demonstrated that interventions designed around the HBM can effectively raise participants' perceptions of susceptibility and benefits, motivate action and foster sustained behavioural change (Essa & Soliman, 2021). Therefore, the HBM emphasises the significance of personal beliefs in influencing health-related behaviours and offers a structured approach for developing and carrying out drug prevention plans (Suirvi et al., 2022). This model (HBM) offers significant advantages for drug and substance abuse prevention education by emphasising individual motivations and beliefs related to health behaviours. This model helps participants understand the severity of substance use issues and the potential risks associated with drug abuse, thereby increasing perceived susceptibility and seriousness Naji & Younis (2021). By addressing perceived barriers and enhancing perceived benefits, educators can effectively motivate students to engage in preventative behaviours (Li et al., 2022). Furthermore, the model promotes increased awareness of the social and psychological factors impacting substance use decisions, fostering a supportive environment for behavioural change (Younis, 2022). Overall, HBM-based interventions empower individuals to adopt healthier lifestyles and actively

engage in prevention strategies that can significantly reduce the likelihood of substance misuse among youth (Mohammadi et al., 2023).

3.0 Methodology

This research will adopt a quasi-experimental method to develop the educational module utilising the Analysis, Design, Development, Implementation and Evaluation (ADDIE model), which apply the Health Belief Model (HBM) to influence students' knowledge, behaviours and practice. The methodology includes the following components:

Analysis: It will be necessary to gather both qualitative and quantitative data in order to comprehend the needs of secondary school students (Creswell et al., 2018). The qualitative phase will involve the collection of both primary and secondary data. Primary data involves an interview session with participants and secondary data is from other resources such as previous studies, articles and news. Then quantitative will go through surveys and focus groups from Seberang Prai Utara. This initial phase aims to assess their existing knowledge about drugs and practice of the harm associated with substance misuse.

Design: In this phase, educational materials will be constructed to be culturally resonant and engaging, focusing on topics that promote understanding of the biological effects of drugs integrated into relevant subjects like chemistry and biology. This method not only improves the education experience but also provides practical knowledge applicable to real-world scenarios.

Development: During this phase, engaging educational content will be created emphasizing key components of the Health Belief Model (HBM) especially perceived susceptibility, perceived benefits, perceived severity, perceived barriers, cues to action, and self-efficacy (Hidayati et al., 2022). Which have shown effectiveness in shaping drug-preventive behaviours in adolescents.

Implementation: The educational module will be delivered in various schools using trained facilitators to conduct interactive sessions that actively engage students. Facilitators will encourage participation and peer discussion through diverse teaching methods, reinforcing the focus on self-efficacy and cue-to-action strategies (Turnin et al., 2013).

Evaluation: The effectiveness of the intervention will be assessed using the intervention which is pre and post test and three-month post-intervention test to measure changes in students' knowledge, behaviours and practice regarding drug use. Continuous evaluation allows timely modifications to the program, ensuring it remains responsive and effective.

This paper adopts a quasi-experimental approach guided by the ADDIE model and underpinned by the Health Belief Model (HBM) to systematically develop and implement a drug and substance abuse prevention education module. Each phase is carefully structured to ensure that the module is evidence-based, culturally relevant and capable of enhancing students' knowledge, behaviours and practical skills related to substance misuse. By integrating both qualitative and quantitative data collection, engaging instructional materials, interactive facilitation and continuous evaluation, this methodology ensures that the module is responsive to the needs of secondary school students while promoting sustainable and positive behavioural change.

4.0 Result

The figure below presents the conceptual framework derived from the research findings of the literature review. It integrates the Knowledge, Behaviour and Practice (KBP) framework, the ADDIE instructional design model and the Health Belief Model (HBM) to guide the development of the proposed drug prevention education module.

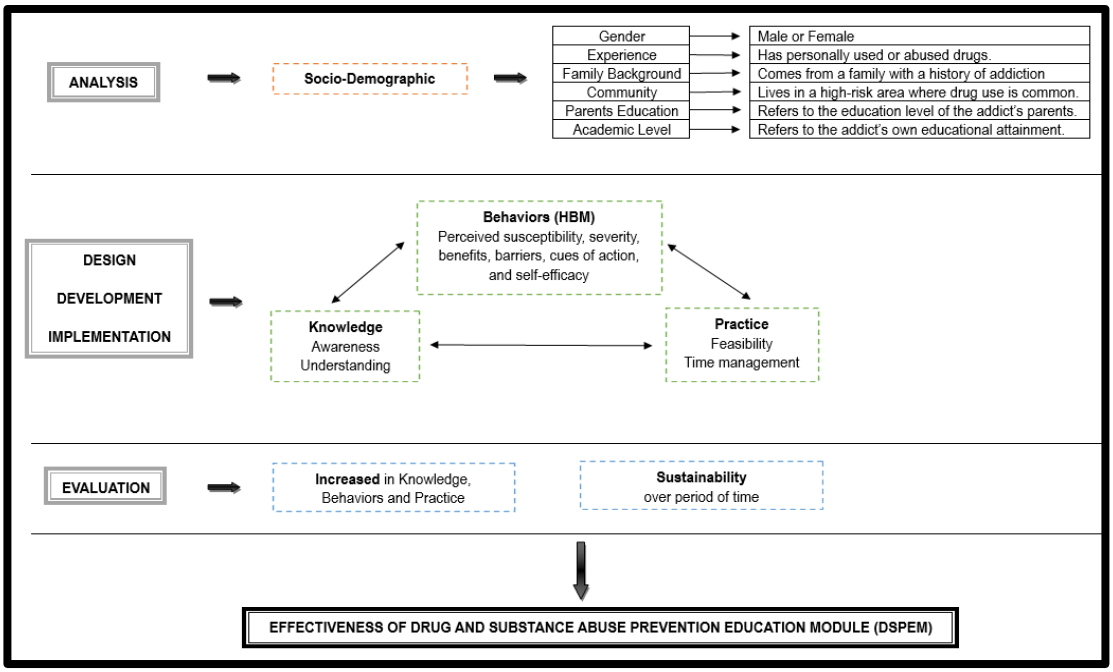

Fig. 2: Conceptual framework

5.0 Discussion

The integration of the ADDIE Model and the HBM in drug prevention programs plays a vital role in shaping adolescents' knowledge, behaviours and practices (KBP) concerning substance use. This dual-framework approach merges structured instructional design with health psychology principles, creating a holistic foundation for effective and sustainable prevention education. The ADDIE Model offers a systematic pathway for program development, beginning with the Analysis phase, which ensures that a thorough needs assessment is conducted. This phase identifies specific knowledge gaps and risk factors related to drug use through a merge of qualitative and quantitative data. In the Design and Development phases, educational content is tailored to the cultural, developmental and contextual needs of adolescents. This includes the creation of age-appropriate and engaging materials that communicate the physiological and social consequences of drug use. These materials are enriched by the integration of HBM constructs, which emphasize students' beliefs about their perceived susceptibility to drug-related harm, the severity of consequences, the benefits of preventive action and the barriers that may hinder healthy decision-making (Essa & Soliman, 2021). By aligning program content with these constructs, students are more likely to recognize personal risk, perceive drug use as a serious issue and feel motivated to engage in preventive behaviours.

During the Implementation phase, the use of interactive and participatory teaching methods such as role-playing, peer-led discussions, digital storytelling and scenario-based learning, fosters active student involvement. These methods not only enhance engagement but also build self-efficacy, a key component of both HBM and effective behavioural change. The emphasis on self-confidence and agency encourages adolescents to manage peer pressure and make informed autonomous decisions on using drugs. Evidence from other health education initiatives demonstrates that programs grounded in HBM significantly influence positive behavioural outcomes (Sudhewa et al., 2023).

Finally, the Evaluation phase ensures continuous improvement by assessing both short-term and long-term impacts of the program. Through feedback mechanisms, pre-tests and post-tests and also behavioural monitoring educators can determine the effectiveness of the intervention in achieving its intended KBP outcomes. The evaluation also provides opportunities to adapt content and delivery strategies in real time, ensuring relevance and sustainability (Hidayati et al., 2022).

In conclusion, the integration of the ADDIE instructional model with the Health Belief Model not only enhances the pedagogical structure of drug prevention programs but also reinforces the psychological and behavioural aspects essential for meaningful change. This synergy ensures that students are not merely informed but are actively empowered to make healthier lifestyle choices, thereby contributing to long-term reduction in adolescent substance abuse.

6.0 Conclusion & Recommendations

By integrating the Knowledge, Behaviour and Practice (KBP) framework with the ADDIE instructional design model and the Health Belief Model (HBM), this proposal introduces a comprehensive, structured and evidence-based approach to the development of a drug and substance abuse prevention education module tailored for secondary schools' students. Each framework contributes uniquely to the overall effectiveness of the module. The KBP framework ensures a holistic focus by targeting cognitive understanding (knowledge), emotional and psychological responses (behaviour) and practical application (practice). While the ADDIE model offers a systematic instructional design process and the HBM addresses the motivational and perceptual factors that affect health-related decision-making among school students. The combination of these models enables the design of a highly responsive and adaptable educational intervention. The KBP framework ensures that the content not only disseminates critical knowledge about the dangers and consequences of drug use but also fosters the development of responsible attitudes and the application of safe preventive practices. Meanwhile, the ADDIE model, through its stages of Analysis, Design, Development, Implementation and Evaluation, ensures that each component of the module is meticulously planned, contextually relevant and continuously refined based on learner feedback and outcomes. The integration of the HBM further enhances the module by embedding psychological constructs such as perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy. These constructs help to align educational content with the learners' personal beliefs and risk perceptions, thus motivating behaviour change from within. Students tend to embrace positive behaviours and avoid substance use when they perceive a real risk, understand the potential consequences and believe that preventive actions are both beneficial and achievable. Moreover, the delivery of content through engaging, student-centred learning experiences such as interactive lessons, peer education, group discussions, digital media and real-life scenarios enhances both retention and emotional connection to the topic. These dynamic methods not only support knowledge acquisition but also cultivate critical life skills such as assertive communication, stress management, decision-making and peer resistance. Collectively, this multidimensional approach does not simply aim to inform students but to transform their understanding, attitudes and actions toward drugs and substance abuse. By embedding learning within a behaviourally and psychologically grounded framework, the proposed module is expected to contribute significantly to reducing drug-related risks among students, while simultaneously promoting healthier and more resilient lifestyles. This integrated strategy holds potential for replication and scalability across school systems, offering a valuable tool in national and community-level drug prevention efforts.

Despite these strengths, certain limitations are acknowledged. The proposed framework has not yet been empirically tested within real classroom settings and its effectiveness may vary depending on students' socio-cultural backgrounds and school environments. Additionally, deploying such a comprehensive module may require intensive training for facilitators to ensure they are adequately prepared to deliver content effectively and consistently.

Therefore, it is recommended that future initiatives in secondary schools provide more specific training for facilitator and also conduct pilot studies in diverse school settings to test the practicality, effectiveness and adaptability of the integrated KBP, ADDIE and HBM framework. Future research should also incorporate longitudinal follow-ups to evaluate sustained behavioural change and

examine which teaching strategies such as peer education, interactive activities or digital tools that are most effective. Additionally, studies should explore strategies for scaling the model to multiple schools and regions to ensure broader applicability and sustainability.

7.0 Acknowledgement

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The Paper's Impact on the Relevant Area of Study

This paper provides insights for the area of health education and school students' behavioural prevention by presenting an innovative and integrative framework for drug and substance abuse prevention. By combining the Knowledge, Behaviour and Practice (KBP) framework with the ADDIE instructional design model and the Health Belief Model (HBM), the study presents a structured and theory-driven approach targeted to Malaysian students' requirements. This multidimensional framework improves the efficiency of educational interventions by addressing not only knowledge gaps but also behavioural impacts and practical decision-making abilities. The proposed module design encourages active participation, cultural relevance and evidence-based practice. This provides a consistent and flexible solution for school-based preventive initiatives. This contribution is especially useful for educators, policymakers and public health practitioners who want to prevent drug usage among school students through curriculum-integrated interventions.

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