Development of a health promotion model for parents to promote healthy diet to prevent cancer in adolescents: a cross-sectional study in East Java Indonesia

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Abstract

A healthy diet has been proven to reduce mortality risk. However, the number of people consuming unhealthy diets is increasing, especially among adolescents. Parents are responsible for promoting a healthy lifestyle for adolescents. This research aims to develop a health promotion model for parents of adolescents regarding a healthy diet to prevent cancer. The study used a cross-sectional design with an explanatory survey. The population were 148 parents of junior high school students in Surabaya and East Java, Indonesia, who accessed online form over four months. The sample was determined based on the following inclusion criteria: parents of adolescents aged 13-16 years, parents of adolescents registered at junior high schools in Surabaya, parents capable of completing the form, and parents willing to participate in the research. Convenience sampling was used. Data was collected via a Google Forms questionnaire and analysed using Partial Least Square with T=1.96. There were nine questionnaires used (demographic, perceived benefits and barriers, the self-efficacy for exercise, the Physical Activity Enjoyment Scale - PACES, environmental support, knowledge, participation, the shortened Committed Action Questionnaire, and Health-Promoting Lifestyle Profile - HPLP II). The study included 148 parents of adolescents. Parental characteristics influenced cognition and affect (T=3.4) and environmental support (T=4.2). Environmental support influenced parental empowerment (T=2.9). Similarly, cognition and affect influenced empowerment (T=4.189). Parental empowerment influenced commitment (T=3.3), which in turn influenced health promotion behaviour regarding a healthy diet (T=3.3). The health promotion model was developed through efforts to empower parents and strengthen their commitment to implementing a healthy diet for adolescents, even in challenging situations.

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Introduction

Cancer is the leading cause of death in children and adolescents worldwide (WHO, 2021). Indonesia has the highest incidence of childhood cancer in the Southeast Asia Region, with 8,677 children suffering from cancer and a death rate of 3,292.[1] The increasing prevalence of cancer in Indonesia may be attributed to a shift in food consumption patterns from traditional to modern processing, such as fast food.[2] Consuming healthy snacks after main meals has been proven to reduce mortality risk and prevent diseases, including cancer.[3] Parents play a crucial role in preventing health risk behaviour in children and adolescents.[4] Efforts to increase preventive behaviour in parents can be achieved through health promotion initiatives.[5] While health promotion theory has been widely used to improve the health status of children and adolescents, its application to increase parental preventive behaviour in promoting healthy snack consumption to prevent cancer remains limited.

According to data from the Ministry of Agriculture, fast food currently accounts for 28% of all calories consumed by urban residents, with children and adolescents being the largest consumers.[6] Research in Lampung shows that more than 50% of adolescents consume fast food 3-5 times a week.[7] The higher the frequency of

fast food consumption, the greater the risk of cancer.[8] While fast food does not directly cause cancer, its content can trigger cancer development.[9] A healthy diet is a solution to prevent increased fast-food consumption and reduce cancer risk.[3]

Pender's Health Promotion Model (HPM) is widely used to change unhealthy behaviour and improve health.[10] The HPM explores characteristics and previous experiences, cognition and affect, commitment, and preventive behaviour implemented by parents, in this case, regarding healthy snacks. The greater the commitment to a specific action plan, the more likely health-promoting behaviour is maintained over time.[11] The objective of this study was to develop a health promotion model for parents of adolescents regarding a healthy diet to prevent cancer.

Materials and Methods

Design

This study employed a cross-sectional design with an explanatory survey method. This research design was chosen to explore and explain the causal relationships between independent and dependent variables within the phenomenon under investigation.

Population, samples, and sampling

The population of this study were all parents of junior high school students in East Java who accessed the online form from June to September 2023. The sample was determined based on the following inclusion criteria: i) parents of adolescents aged 13-16 years, ii) parents of adolescents registered in junior high school in East Java, iii) parents who completed the online form, and iv) parents who signed informed consent for the research. Convenience sampling was used over four months. The final sample size was 148 parents.

Variables

The independent variables in this study were previous parental characteristics: father's education, mother's education, age, father's occupation and mother's occupation, cognition and affect (perceived benefits and barriers, self-efficacy and affect), environmental support, empowerment (knowledge and participation), and commitment. The dependent variable was health promotion behaviour related to a healthy diet.

Instruments

Parent characteristics

The parent characteristics questionnaire is a checklist that captures respondents' demographic information, including education, age, and occupation.

Perceived benefits and barriers

The perceived benefits instrument was adopted from the exercise benefits questionnaire.[12] The instrument measuring the benefits of healthy diet behaviour consists of four subscales: i) physical appearance, ii) psychological aspects, iii) social interactions, and iv) preventive health. The instrument measuring the benefits of healthy diet behaviour consists of four subscales: i) environmental conditions, ii) time spent, iii) drained energy, and iv) family disappointment. Responses are recorded on a 4-point Likert scale: 4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree.

Self-efficacy

The self-efficacy measurement instrument is based on the Self-Efficacy for Exercise (SEE) scale questionnaire,[13] modified to focus on healthy diet behaviour instead of exercise. The questionnaire consists of nine items assessing parents' confidence in providing a healthy diet. Responses range from 0 (not confident) to 10 (very confident).

Affect

The affect assessment uses the Physical Activity Enjoyment Scale (PACES),[14] consisting of 10 items rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The total score is calculated by summing all responses.

Environmental support

The environmental support questionnaire focuses on the non-physical environment, precisely information sources. These sources include health workers, family members, and others in the respondents' social circle. Responses are scored as follows: always = 3, sometimes = 2, never = 1. The maximum possible score is 9, and the minimum is 3.

Knowledge

The knowledge questionnaire consists of five true/false questions covering i) the definition of a healthy diet, ii) types of healthy diets, iii) food sources of protein, iv) food sources of saturated fat, and v) iodized salt. Correct answers receive 1 point, while incorrect answers receive 0 points. The maximum possible score is 5.

Participation

The participation questionnaire was adopted from Pengpid & Peltzer[16] and consists of five items measuring parental involvement in preparing a healthy diet. The questions cover: i) involving children in determining the daily meal menu, ii) involving children to help cook food, iii) involving children in preparing the dining table, iv) involving children in serving food, and v) involving children in cleaning the dining table. Responses are scored on a 5-point scale: always = 5, often = 4, rarely = 3, once = 2, never = 1. The maximum possible score is 25, and the minimum is 5.

Commitment

The commitment questionnaire used the shortened Committed Action Questionnaire,[17] adapted to focus on healthy dietary behaviour in parents of adolescents. It consists of eight items with the following response options: 0 = never, 1 = very rarely, 2 = rarely, 3 = sometimes, 4 = often, 5 = almost always, and 6 = always.

Health promotion

The Health Promotion Questionnaire on a healthy diet was adapted from the Health-Promoting Lifestyle Profile [HPLP II] (Adult Version) questionnaire.[18] It consists of nine items with four response options: 4 = always, 3 = often, 2 = sometimes, 1 = never. The maximum possible score is 36, and the minimum is 9.

Data collection

Data was collected through Google Forms distributed to the target group using various methods, including: i) sending to colleagues with adolescents attending junior high school in Surabaya, ii) sharing links with colleagues or professional associations of Pediatric Nurses in the East Java region via group messages, iii) publishing the questionnaire link on the researchers' social media

status. Before completing the questionnaire, potential respondents were provided information about the research title, research team, objectives, benefits, risks, and compensation. Consent was obtained by having respondents click an «agree» button. To validate that respondents were parents of junior high school students, they were required to provide the name and location of their child's school.

Data analysis

The collected data was analysed using Smart Partial Least Square (PLS) SmartPLS version 4.0.9.5 (Oststeinbek, Germany).[19] An indicator was considered valid if it had an outer loading value above 0.5 and a T-statistic value above 1.96. Hypothesis testing was conducted using the t-statistical test.

Ethical clearance

This study involved human subjects, specifically parents of adolescents. The research team strictly adhered to ethical principles throughout the study. These principles included: i) informed consent: potential participants were provided with a full explanation of the study before agreeing to participate; ii) anonymity: respondents' names were not collected or included in the study data; iii) confidentiality: all data collected from the questionnaires was kept confidential; iv) autonomy: participants were allowed to withdraw from the study if they felt uncomfortable at any point during the questionnaire completion process; v) compensation: to ensure equitable participation, respondents were provided with internet data allowances commensurate with the online questionnaire completion requirements. The study design and protocols were reviewed and approved by the Health Research Ethics Commission of Faculty of Nursing Universitas Airlangga, which issued an ethical feasibility certificate (number 2823-KEPK).

Results

Table 1 shows that over 50% of parents in this study had the last education at senior high school, with the largest employment category being employees in the private sector, both fathers and mothers. Table 2 indicates that parents' cognition and affect regarding the benefits of a healthy diet had a mean score of 13.7 (SD = 2.0). The primary benefit perceived was that a healthy diet that prevents cancer could make adolescents more attentive to their health. However, parents reported obstacles in maintaining health and providing a healthy diet at home, with the most significant challenge being a lack of time due to work commitments. Parental self-efficacy had the highest average score of 63.6 (SD = 21.0), indicating that many parents felt capable of providing the best care for their children, including a healthy diet, even in difficult situations. On average, all mothers reported positive affect when maintaining health and a healthy diet for their adolescents.

Table 3 reveals that parents obtained most of their information from family and close associates, with a minimum score of environmental support of 3 and a maximum score of 9. Parental knowledge about healthy diets for adolescents ranged from a minimum score of 1 to a maximum of 5. The question most frequently answered correctly concerned the definition of a healthy diet, while the question most often answered incorrectly related to types of food containing animal protein. Parental participation scores ranged from 5 to 25, with involving adolescents in preparing healthy diet menus being the highest form of participation and involving them in cooking being the lowest. Parents showed the strongest commitment to maintaining a healthy diet for adolescents even in challenging conditions, while their lowest commitment level was in their ability to change methods rather than abandon healthy diet practices. No parents reported never providing a healthy diet to adolescents, and some always did so. The most commonly implemented healthy diet practice was limiting sugar consumption, while the least common was serving 6-11 portions of bread or cereal daily.

Table 4 presents the results of hypothesis testing for the influence of exogenous variables on endogenous variables. The test criteria state that the relationship is significant if the T-statistic value ≥ T-table (1.96). All exogenous variables showed significant relationships with endogenous variables, except for the relationship between parent characteristics and health promotion behaviour (T=0.2; p=0.772). Figure 1 illustrates the final (fit) model for developing a health promotion model for parents of adolescents regarding a healthy diet. The model shows that parent characteristics do not directly influence health promotion behaviour for a healthy diet, but can indirectly influence it through cognition and affect as well as environmental support. This represents a novel finding from this research. Furthermore, both empowerment and commitment variables positively influence the formation of healthy diet behaviour in adolescents to prevent cancer.

Discussion

Based on data from WHO, it is estimated that 400,000 children and adolescents aged 0–19 years suffer from cancer every year.[20] Parents have a very important role in preventing disease in adolescents. Disease prevention carried out by parents can start by providing healthy and nutritious food for adolescents. Several personal factors of parents are related to preventing health-risk behaviour, including preventing disease.[21] The study found that parental characteristics, including work and education, influence cognition and affect. This aligns with Pender's theory that individual characteristics influence cognition and affect.[22] Higher individual characteris-

Table 1. General characteristics of the participants (n=148).

Characteristics	n	%
Father's education		
Elementary school	21	14.2
Junior high school	24	16.2
Senior high school	77	52.0
Higher education (University)	26	17.6
Occupation (father)		
Farmer	4	2.7
Employee	70	47.3
Entrepreneurs	56	37.8
Civil Servant	8	5.4
Military	7	4.7
Fisher	3	2.0
Mother's education		
Elementary school	19	12.8
Junior high school	26	17.6
Senior high school	76	51.4
Higher education (University)	27	18.2
Occupation (mother)		
Farmer	9	6.1
Employee	71	48.0
Entrepreneurs	54	36.5
Civil Servant	14	9.5

tics produce higher cognition and affect, determining subsequent actions.[23] Parental characteristics in this context include previous experiences, which are a source of knowledge and a way to obtain the truth of knowledge.[24] Most respondents were parents of adolescents who understood the importance of a healthy diet in preventing cancer, indicating prior experience in maintaining their children's diet. More than half of the parents had permanent jobs in the private sector, suggesting they could afford to buy healthy food for their children. However, some parents struggled to prepare food according to a healthy diet, possibly due to a lack of understanding about what constitutes a healthy diet menu for adolescents. The health promotion model emphasizes that each person has unique personal characteristics and experiences that can influence subsequent actions.[25] In terms of health care for adolescents to prevent cancer, parents need to pay attention to their children's eating patterns both at home and outside. The facilitation process aims to increase parents' potential to act better and more innovatively.[26]

Environmental support is greatly influenced by individual characteristics.[27] In this study, the greatest support for healthy dietary behaviour came from family or people close to the adolescent's parents. The family plays a significant role in solving health problems.[28] Parents need reinforcement and support from family members to carry out health promotion behaviour, specifically providing a healthy diet for adolescents to prevent cancer. Parents who have knowledge and participate in providing a healthy diet can feel empowered to support their adolescent children's health.[29]

Cognition and affect are built from perceived benefits, barriers, and self-efficacy. More than half of the parents felt high benefits in maintaining their teenage children's health to prevent cancer. The most significant benefit perceived by parents was that maintaining a healthy diet increased their attention to their children's health. The biggest obstacle reported was a lack of time to provide a healthy diet regularly. All parents reported a positive effect towards maintaining their children's healthy diet. Routine and regular healthy diet behaviour in adolescents is a way to prevent cancer.[30] Parents need self-efficacy to be able to carry out their role in preventing disease in adolescents properly.[4] Self-efficacy is also a necessity for parents in preventing disease in toddlers.[31] Self-efficacy can also encourage parents to behave well in carrying out prevention without experiencing boredom. Commitment directly influences healthy dietary behaviour carried out by parents.

Table 2. Cognition and affect indicators about a healthy diet in adolescents.

Indicators	Minimum	Maximum	Mean ± SD
Perceived benefits	9	16	13.7±2.0
Perceived barriers	4	16	11.0±2.7
Self-efficacy	9	90	63.6±21.0
Affect	23	50	40.8±8.4

Table 3. Distribution of variables of environmental support, empowerment, and health promotion behaviour of healthy diet among adolescents.

Indicators	Minimum	Maximum	Mean ± SD
Environmental support	3	9	6.1±1.8
Knowledge	1	5	3.0±1.0
Participation	5	25	18.7±3.9
Commitment	10	40	23.5±6.0
Health promotion behaviour	13	36	25.1±5.6

Table 4. Hypothesis testing of the health promotion model regarding a healthy diet to prevent cancer.

	T Statistics	p
Characteristics -> environmental support	4.2	<0.001*
Characteristics -> cognition and affect	3.4	0.001*
Environmental support-> empowerment	2.9	0.004*
Cognition -> empowerment	4.1	<0.001*
Empowerment -> commitment	3.3	0.001*
Characteristics -> health promotion behaviour	0.2	0.772
Commitment -> health promotion behaviour	3.3	0.001*

* ($p \leq 0.05$)

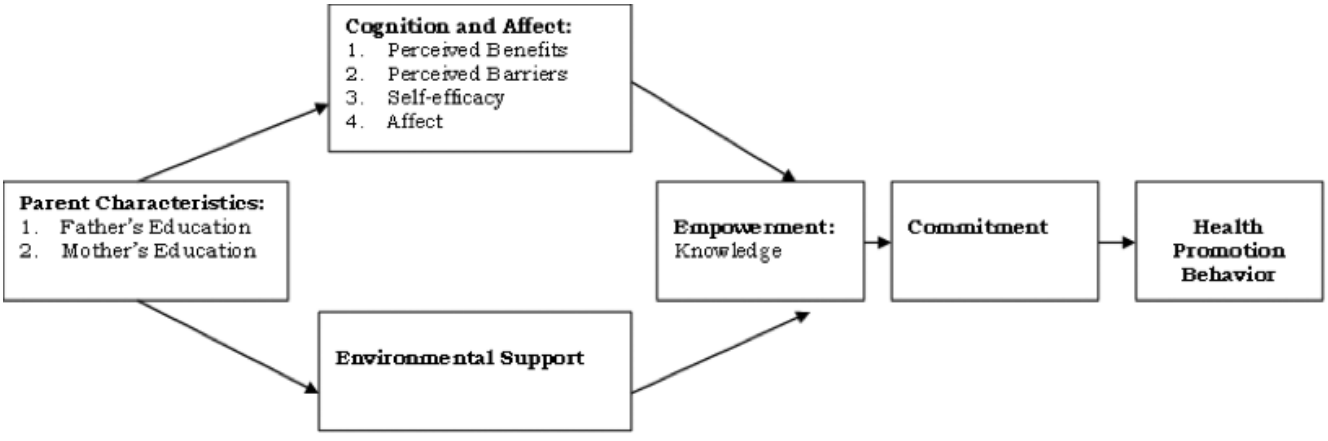

Figure 1. Model fit development of a health promotion model for parents of adolescents regarding a healthy diet to prevent cancer.

Parents' commitment fosters greater attention in their teenage children to maintain health through a healthy diet. Preventive behaviour based on a commitment will last a long time so that goals can be achieved. One factor that can influence the formation of commitment is the existence of a collaborating team.[32] Empowerment has a direct effect on commitment. Parental empowerment is one of the factors that must be carried out to form a disease prevention program through adequate information about nutrition.[33] Parents' lack of knowledge about cancer can negatively affect their daily behaviour. Forming commitment requires several continuous processes and stages, and cannot happen quickly.[34]

The health promotion model about a healthy diet for adolescents in preventing cancer is very much determined by the education of parents, both mothers and fathers. Parental education is the basis for the formation of cognition and affect. Parents who have higher education can minimise the perceived obstacles and strengthen the perceived benefits. The health promotion model about a healthy diet for adolescents in preventing cancer is very much determined by parental education, both the mother's and the father's. Parental education is the basis for the formation of cognition and affect. Parents who have higher education can minimise perceived obstacles and strengthen perceived benefits. Parents with a good level of education have strong self-efficacy and positive affect to provide a healthy diet to adolescents. The existence of adequate environmental support for parents can create empowerment so as to foster commitment in implementing health promotion in providing diet to adolescents. Without commitment from parents, health promotion behaviour in a healthy diet for adolescents cannot be formed.

Conclusions

The health promotion model for healthy diet behaviour applied by parents to adolescents can be formed through strengthening characteristic factors, cognition and affect, environmental support, empowerment, and commitment. Parental education is a significant factor in shaping cognition, affect, and environmental support. The benefits, obstacles, self-efficacy, and affect experienced by parents can foster a sense of empowerment, which is strengthened by family support. The sense of empowerment experienced by parents will foster commitment through a determination to continue providing healthy diets to adolescents, even in difficult situations. Behaviour formed through strong commitment is likely to be more sustainable.

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