AfricanJournalofBiological Sciences

The health belief model: A comprehensive Examination of its Application in Health promotion and behaviour change. A review

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Abstract:

In order to direct nutrition education activities, the Health Belief Model (HBM) has become a well-known and effective framework. This review paper thoroughly examines the factors that contribute to the HBM's success in promoting healthy dietary behaviour modification and its applicability for nutrition education programmes. This review emphasises the model's elements, such as perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy, and their roles in influencing people's perceptions of and behaviours regarding nutrition.The aim of this review article is to analyse and interpret the results of intervention studies conducted over the last decade, employing the HBM as a theoretical framework. This review examines the essential elements of the HBM by drawing on the knowledge gained from a substantial body of research that includes 28 publications written over the past ten years. Specifically, this review seeks to assess the effectiveness of the HBM in promoting health-related behaviours and provide insights into its relevance in contemporary healthcare settings. By synthesizing findings, it aims to identify common trends, contextual factors, and practical implications for healthcare practitioners and policymakers. Ultimately, the goal is to contribute to evidence-based decision-making and enhance public health outcomes.

Keyword: Health belief model, Nutrition education and health promotion.

Introduction:

The Health Belief Model (HBM), developed in the 1950s by social psychologists Irwin M. Rosenstock and others, is a widely used and significant psychological framework. By analysing the factors that affect a person's decision to take preventive health measures or engage in health-promoting behaviours, it was first intended to explain and predict health-related behaviours. The Health Belief Model postulates that a combination of perceived threat, perceived advantages, perceived barriers, cues to action, and individual traits affect people's decisions towards their health.Shahnazi*et al.,*(2020).

The HBM's versatility to a variety of groups, taking into account cultural factors, emphasises its value in bridging intercultural divides in nutrition education. The HBM provides a framework for designing interventions that are in line with people's perceptions and motives as nutrition-related health concerns proliferate globally. The practical consequences are highlighted, assisting educators in maximising the model's potential. The Health Belief Model is essentially an effective method for promoting sensible decision-making and long-lasting eating behaviour change through thorough, flexible tactics.The HBM conceptualises the determinants of behaviour into a number of contributing components, known as constructs, in order to study behaviour at the individual and community levels.The model is built on the idea that people's preventive behaviour is influenced by their perceptions of risk (perceived susceptibility), the seriousness of risk (perceived severity), the existence of a way to reduce the incidence or severity of disease (perceived benefits), and higher costs versus the benefits of action (perceived barriers), and as a result they participate in the prevention programme.DodelandMesch(2017).

The HBM contends that immediate cues to action as well as personal beliefs influence behaviour. In turn, beliefs are influenced by one's background and are made up of one's perception of the perceived threat, the perceived advantages of acting, the perceived obstacles to acting, and one's perception of their capacity to act. Sheppard and Thomas (2021).

The review will considerably advance our understanding of how the HBM can be used to promote health and alter behaviour. Researchers, practitioners, and policymakers will be better able to comprehend the model's advantages and disadvantages in modern healthcare contexts by compiling and analysing the findings of the most recent ten years of intervention studies. In the end, this analysis intends to provide information for evidence-based decision-making and the creation of more potent health promotion initiatives, which may result in improved public health outcomes in the future.

Fig 1: The Health Belief Model Adapted from Rosenstock, 1988.
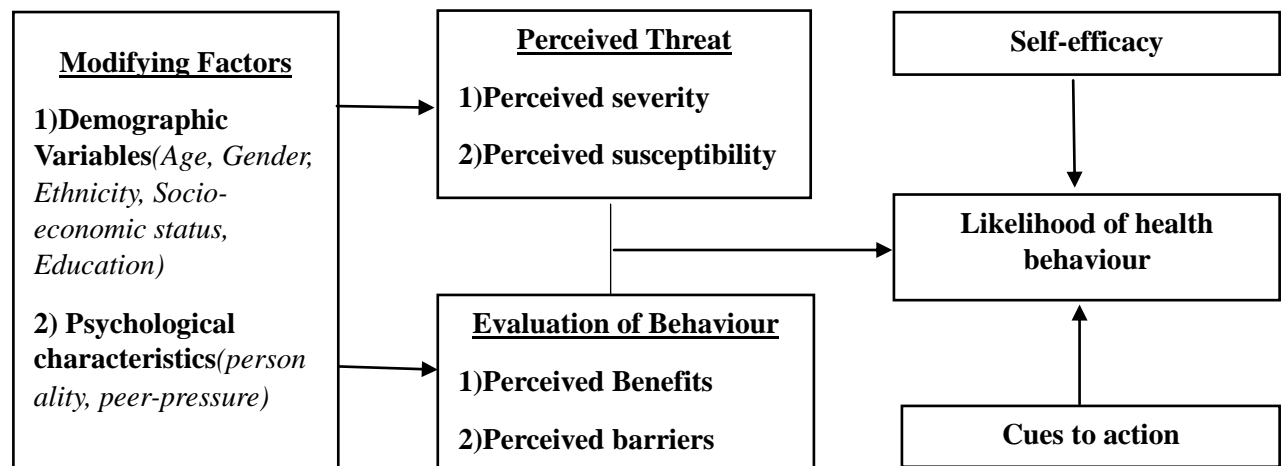
Methods:

According to Tricco*et al.* (2018), our approach complied with PRISMA's scoping review standards. The education intervention based on the health belief model had to be the main topic of the articles to be included. Papers were considered if they were authored in English and published between 2013 and 2022 in a peer-reviewed journal or conference proceedings. Studies that were both quantitative and qualitative as well as descriptive publications that discussed the programmes or structures of the health belief model were all included.

Fig2: Search strategy.
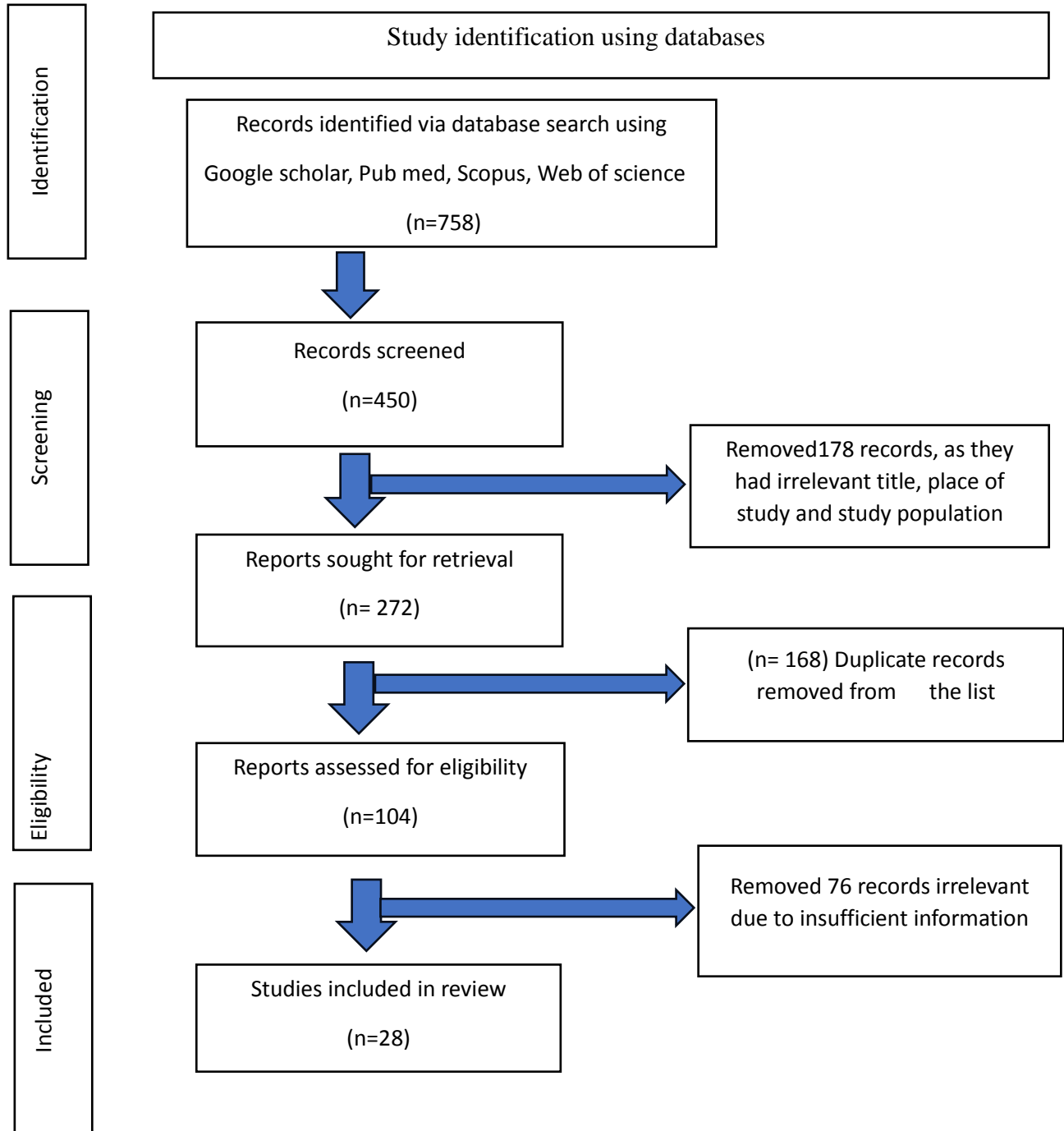
Analysing, Assembling, and Reporting findings

The main goal of this review is to describe the extent of the HBM concept and the reliability of key factors as behavioural predictors, summarising the findings as they were given in the

various papers rather than focusing on particular findings that would be better addressed in a systematic review.The names of the authors, the year the study was published, the study's purpose, its design, its participants, its sample size, its sampling technique, and its findings were all taken from each study. Utilising qualitative content analysis, the outcomes of data extraction from the charting data form were examined, and narrative reports were created based on each article.

Bias- Probability (Quality measure):

Criteria for evaluating the quality of a study included a thorough evaluation of its fidelity, perceived conflict of interest regarding outcome due to sponsorship, study design, imprecision, consistency, use of Health belief model theory, reasonable length of intervention, and whether it achieved its stated goals. The ratings had a scale from 1 to 6. Studies were graded as having a low risk of bias (Score 5 and 6), a moderate risk (Score 3 and 4), or a high risk (Score 1-2).

Results:

The table 1 provides a thorough summary of several research carried out to evaluate the effects of educational interventions based on the HBM on various health-related behaviours among various populations.

Table 1: Effectiveness of Health Belief Model-Based Education Interventions on Health-Related Behaviours from 2013 to 2022.

Authors and year of the study	Objective of the study	Study population, size and Intervention period. Study design	Interventions based on health belief model	Bias-Probability (Quality Measure)	Findings of the study
Azadi *et al*., (2021)	To investigate the impact of education program on hypertension prevention behaviour among Medicinal sciences staff in iran.	Both men and women. EXP – 64 CON – 64 3 months Quasi-experimental study	EXP - Group discussion, lecture, question and answer techniques. CON -no intervention	Low	Significant increase in the perceived susceptibility, benefits, barriers, practice mean score in EXP than CON.
Vahedian-Shahroodi *et al*., (2021)	To assess how nutrition-related behaviours	Female primary students EXP - 90 CON - 90 2 months	EXP- Lecture, discussion in small groups, pamphlet, training brochure, and	Low.	Nutrition educationshowed a good effect on student's

	in female students are affected by health education.	Semi-experimental study.	question and answer CON - no intervention		nutritional behaviour, with increased perceived susceptibility in EXP than CON.
Li *et al.*, (2021)	To assess the effect of education program on self-managemen t behaviour among middle-aged stroke patients.	Both men and women. EXP - 35 CON - 35 3 months Quasi-experimental study.	EXP - face-to-face health education sessions, booklets, videos, pictures, family discussion session, telephone follow up, text reminder via Wechat application. CON group - telephone follow up	Low	There is a significant increase in the self-management score in the EXP than the CON group after the intervention.
Ayaz- Al kaya (2020)	To evaluate the Education programme on managing premenstrua l syndrome (PMS) during late adolescence	Female students with PMS. EXP - 30 CON - 30 3 months Randomised control study.	EXP - Lectures, question and answer sessions, group discussion, demonstration, brain storming, and usage of visual-audial tools like computers, slide projectors, and white boards. CON - no intervention	Low	There is significant increase in the follow up session in coping up with PMS among the EXP group than the CON group.
Cengiz *et al.,* (2020)	To investigate the impact of home-based nursing treatments guided by the Health Belief Model on stoma patient care outcomes.	Both men and women underwent stoma operation. EXP - 30 CON- 31 Quasi-experimental study.	EXP - home visit counselling (6 times). CON - 2 home visit counselling.	Low	There was a significant increase in the compliance rates of those in the EXP group than in the CON group.
Kisaland kartal (2019)	To evaluate the effect of education	Nursing students, (gender not mentioned).	EXP - Discussion, demonstration using breast	Moderate	Initially 14.6% of students were

	intervention on self-breast examination (SBE) practice.	EXP –32 CON - nil 1 year. A semi-experimental study.	model, videos and leaflets on breast health. CON- nil		identified as regularly engaging in SBE. After the intervention, this figure increased to 45.8% at the six-month mark and 28.1% at the one-year mark.
Yakubu *et al.,*(2019)	To evaluate a sexual abstinence education programme in Northern Ghana among adolescent girls.	Adolescent girls EXP - 183 CON - 180 3 months. Clustered Randomized controlled Trial	EXP - Lecture, group discussions, pamphlets and role-play. CON -no intervention.	Low	There was a significant increase in EXP in sexual abstinence as a result of the educational interventions.
Keshani *et al.,*(2019)	To evaluate how educational intervention affects the nutritional quality of teenage diet.	Both men and women EXP - 163 CON - 148 Months not clearly mentioned. Randomized field trial study	EXP - Lectures, discussion, focus group discussion and role paly. CON- no intervention,	Low	Following the intervention, there was a significant increase in EXP in the scores for the Revised Children's Diet Quality Index than control.
Saleman d Said(2018)	To evaluate the dietary practises of female secondary school students both before and after a nutrition education intervention programme.	Adolescent Girls EXP - 108. CON - nil 3 months Quasi-experimental study.	EXP - Short lecture session, videos and pamphlets. CON – nil	Low	The mean score for nutrition knowledge increased from (4.772.7) to (6.22.1) following the intervention. The average knowledge of nutritious and unhealthy foods and lifestyle practises increased from (2.361.01) to (3.80.68). The

					mean knowledge score on food safety score increased in the EXP from 3.79 ± 2.54 in the pre-test to 6.01 ± 1.68 in the post-test.
Nahidi*et al.,* (2017)	To evaluate the effect of education on self-examination of breast.	Women EXP - 72 CON - 72 2 months. Experimental study.	EXP-Training manual, pamphlet and training slides (power point) about breast cancer, screening and breast self-examination. CON -no intervention	Low	Average awareness, perceived susceptibility scoreincreased significantly in EXP group than the CON
Khorsandi*et al.,*(2017)	To evaluate the effect of education on the adoption of hypertension-controlling behaviours.	Elderly (both men and women) with hypertension. EXP -45 CON - 46 3 months. Quasi-experimental study.	EXP - Lecture, educational film, and group discussion. CON - educational pamphlets.	Moderate	The HBM constructs scores in the EXP increased than the CON groups after three and six months of intervention.
Khiyali*et al.,*(2017)	To investigate the impact of educational intervention on the behaviour of breast self-examination in women who have been referred to medical facilities, at Iran	Women EXP - 46. CON - 46. 3 months. Quasi experimental study.	EXP - Group discussion, question and answer session and video demonstration. CON - no intervention.	Low	After intervention, the EXP group's mean scores for knowledge, HBM components, and self-examination behaviour were higher than those of the CON group.
Khademolhosseini(2017)	To evaluate the effect of education through	Married women. EXP - 48 CON - 47 group. 3 months.	EXP - Text messaging, e-posters, infographics,	Low	The mean scoreon the knowledge and all HBM

	telegram messaging on Pap smear test.	Quasi experimental study.	podcasts, and video tutorial. CON - no intervention		constructs significantly increased right after intervention in EXP group than the CON.
Maheri*et al.,*(2017)	To understand how an educational intervention affects student's internet addiction prevention behaviours.	Female college students. EXP - 80 CON - 80. Four months. Quasi-experimental study, case control study.	EXP - Group discussions, questions-answers, lectures, poster and pamphlets. CON - no intervention.	Low	Internet addiction prevalence, perceived barriers, and mean scores were significantly decreased in the EXP group after the intervention compared to the CON group.
Shabibi *et al.,*(2017)	To evaluate the impact of educational intervention on improving self-care behaviours in type 2 diabetic patients(T2 DB).	T2DP (Both men and women). EXP - 70 CON - nil 2 months. Quasi-experimental research.	EXP - Presentation, questions and answers, group discussion, and practical demonstration. CON –nil	Moderate	Both the self-care behaviours and the mean score for each HBM component considerably rose post the intervention.
Jeihooni *et al.,*(2017)	To evaluate the impact of a health education programme on oral and dental hygiene practises.	Pregnant women. EXP - 55 CON - 55. Four months. Clinical trial study.	EXP - Lecture sessions, questions and answers session, group discussions, practical demonstrations, videos, pamphlets and posters. CON - no intervention	Moderate	The education program had a statistically significant improvement in knowledge, perceived susceptibility, perceived severity, self-efficacy, cues to action, and reduce in perceived barriers among the participants in EXP than

					CON.
Zeighei mat*et al.,*(2016)	To evaluate the effect of education intervention on adoption of health-care practises required to reduce nosocomial infections (Nis).	Female Nursing students EXP - 35 CON - 65. 2 months. A quasi-experimental study.	EXP - Lecture session, pamphlets and posters. CON - no intervention	Moderate	EXP group showed increase in Nis- related prevention and control actions than CON group.
Tola *et al.,*(2016)	To assess the effects of educational and psychological counselling on adherence to Tuberculosis (TB) therapy. At Ethiopia.	TB patients (Both men and women). EXP - 368 CON - 330 Four months. A cluster randomized control trial.	EXP - psychological counselling. Medium used for Education intervention is not clearly mentioned. CON - usual DOTS services.	Moderate	Psychological counselling and educational interventions had decreased non adherence levelin theEXP. No change was observed in the CON.
Khorama badi*et al.,*(2016)	To evaluate the effect of education on dietary behaviours among pregnant women in Iran.	Pregnant women. EXP - 64 CON - 64 1 month Randomised control study.	EXP - Lecture session, photographs, poster, pamphlets and group discussion. CON -usual routine care.	Moderate	Significant increase in the mean score of knowledge, perceived severity, perceived barriers, performance guidance, and individual performance were found EXP than those in the CON group.
Muluale m*et al.,*(2016)	To determine the impact of nutrition education on promoting	Mother-child pairs. EXP - 80 CON - 80 6 months. Quasi-experimental study.	EXP - Education lessons, group discussions, recipe-based demonstration/red emonstration and poster.	Low	Children in the intervention group experienced significant increases in mean weight,

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			CON - usual education.		weight for height, and weight for age.
Zare *et al.,*(2016)	To evaluate the effect of HBM based Education intervention on Knowledge and and prostate cancer screening behaviours.	Men EXP - 93 CON - 87 3 months A non-blinded randomised control study.	EXP - Lecture session, videos, booklets and Group discussion. CON -no intervention	Low	One month and three months after the intervention, the rate of prostate cancer screening in the EXP group rose from 7.5% to 24% and 43.3%.
Jeihooni *et al.,*(2015)	Effect of Education intervention on Prevention of osteoporosis.	Women EXP - 60 CON - 60. 6 months Quasi-experimental study.	EXP - Eight sessions lasting 55–60 minutes each included a presentation, a group discussion, questions and answers, informativebroch ures and posters, movie screenings, and PowerPoint presentations. CON - no intervention	Low	In the EXP group, the hip Bone mineral density T-score increased to 0.125, but in the CON group, it fell to 0.028.
Khani (2015)	To assess the effect of education on prevention of osteoporosis.	Women EXP - 60 CON - 60 6 months. Quasi-case study.	EXP - Speech, group discussion, poster, pamphlets, film, power point, text message and nutritional performance and exercise. CON–nil	Low	The bone mineral density T-score increased 0.127 in EXP group. while the CON group reduced to - 0.043.
Jadgal *et al.,*(2015)	To ascertain the effect of health belief model- based education on patients in Chabahar, Iran, who have pulmonary Tuberculosi	TB patients (Both men and women). EXP - 40 CON - 40 1 month Quasi-experimental study.	EXP - Booklets and pamphlets. CON - no intervention	Low	Following intervention, cognitive abilities considerably raised from 6.10 to 6.88 in the EXP group. There is no significant improvement in CON group.

	s and smear-positive Tuberculosis.				
Tehrani, F. J *et al.,*(2014)	To evaluate the effect of education intervention among women with Urinary Tract Infection (UTI).	Women with UTI. EXP - 85 CON - 85 6 months. Quasi experimental study.	EXP - Education session, power point presentation and booklets. CON - no intervention	Low	There was significant increase in perceived susceptibility, perceived severity, perceived benefits, cues to action and health behaviourin EXP than CON.
Al Seratyand Ali (2014)	To evaluate the effects of educational intervention for osteoporosis prevention among female students in applied medical Sciences college, at Saudi Arabia.	Female students. EXP - 100 CON - nil 1 month. Quasi-experimental study.	EXP - Group discussion, role play, demonstration, posters, handouts, booklets. CON – nil	Low	Following the intervention, there was a significant increase in osteoporosis protective behaviour, perception of calcium intake, and daily activity levels among the participants in EXP.
Naghashpour*et al.,*(2014)	To assess the impact of nutrition program on female students about knowledge, attitude, practice on dietary calcium	Female students. EXP - 95 CON - 93 3 months. Controlled intervention study.	EXP - short lectures, slide shows illustrating, pamphlets, discussion CON - no intervention	Low	The significant increase inadolescent'sk nowledge, attitudes, and practises regarding calcium consumption in EXP than CON
Bayat *et al.,*(2013)	To assess the effectiveness of	T2DP (Both men and women) EXP - 60 CON - 60	EXP - Lecture session, pamphlets and questions and	Low	The educational programme had a

	educational intervention on type 2 diabetic patients (T2DP).	6 months. A randomised study.	answers session. CON - no intervention		favourable and substantial effectamong the EXP than CON.

Note: EXP = Experiment group, CON = control group.

Discussion:

This review attempt to shed light on the efficacy of educational interventions in promoting healthy behaviours and offer perceptions into the potential advantages of adopting the HBM as a theoretical framework. The studies cover a wide range of health-related behaviours, including basic dietary and nutrition-related practises, prevention strategies for diseases like osteoporosis and urinary tract infections, and management of diabetes. Age, gender, and health conditions differ across the research populations, which also include pregnant women, nursing students, teenagers, the elderly, and patients with particular health issues.

A significant number of studies show that educational interventions significantly improved health-related behaviours and HBM elements. Increased awareness, perceptions of vulnerability, severity, and benefits, as well as cues to take action and self-efficacy are among the experiment group is observed.The majority of research show low to moderate bias, indicating a reasonable degree of trust in the results that were reported. The observed changes in health behaviours are therefore more credible and reliable.The intervention intervals range from one to six months, and success in changing behaviour within these timespans differs.

The interventions use a variety of teaching techniques, adapted to the particular target demographic and health behaviour being addressed, such as lectures, talks, booklets, videos, and hands-on demonstrations.

Overall, these research' findings highlight the potential for educational interventions based on the HBM to have a positive influence on a range of health-related behaviours among varied populations. They emphasise the value of individualised and situation-specific treatments in fostering healthy behaviours and inspiring people to start living a healthier lifestyle. These studies emphasise the importance of education in enhancing public health outcomes and offer useful insights for healthcare professionals and policymakers. The creation of more successful public health policies can be aided by additional study and continued examination of the HBM as a framework for behaviour change interventions.

Conclusion:

The HBM is a potent and flexible framework for directing nutrition education initiatives and encouraging the adjustment of good dietary behaviour. The model's capacity to influence people's perceptions and behaviours in the area of nutrition has been illuminated through a thorough analysis of its key elements, including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. One of the notable strengths of the HBM is its flexibility and applicability to diverse groups while taking cultural factors into account, which underscores its potential to bridge cross-cultural divides in the field of nutrition education.

This adaptability allows educators and practitioners to develop interventions that align with people's beliefs and motivations, especially as global concerns about diet-related health continue to grow. Ultimately, the HBM provides a solid foundation for developing and implementing interventions that align with people's values and aspirations and enable them to make informed and sustainable choices about their dietary habits. In the complex landscape of public health and nutrition, it is clear that HBM remains an effective tool for promoting

rational choices and facilitating long-term changes in dietary behaviour through thoughtful and flexible strategies. By leveraging the insights and principles of HBM, we can work toward a healthier and better-informed global population.

Limitations of the current review

The current review intended to include all experimental research using a quantitative or mixed technique that investigated links between the health belief model and beneficial behavioural changes. We only included publications whose entire texts were accessible in English, so it's possible that some pertinent pieces may have been overlooked.

Conflict of interest:

There is no conflict of interest.

Reference:

Al Seraty, W. H. H., and Ali, W. G. M. (2014). The impacts of health belief model based intervention for osteoporosis prevention among female students in Al Dawadmi Applied Medical Science, Shaqraa University, Saudi Arabia. Journal of Biology, Agriculture and Healthcare, 4(7), 125-131.

Ayaz- Alkaya, S., Yaman- Sözbir, Ş., and Terzi, H. (2020). The effect of Health Belief Model- based health education programme on coping with premenstrual syndrome: a randomised controlled trial. İnternational journal of nursing practice, 26(2), e12816.

Azadi, N. A., Ziapour, A., Lebni, J. Y., Irandoost, S. F., Abbas, J., andChaboksavar, F. (2021). The effect of education based on health belief model on promoting preventive behaviors of hypertensive disease in staff of the Iran University of Medical Sciences. Archives of Public Health, 79(1), 69.

Bayat, F., Shojaeezadeh, D., Baikpour, M., Heshmat, R., Baikpour, M., and Hosseini, M. (2013). The effects of education based on extended health belief model in type 2 diabetic patients: a randomized controlled trial. Journal of diabetes and Metabolic disorders, 12, 1-6.

Cengiz, B., Bahar, Z., and Canda, A. E. (2020). The effects of patient care results of applied nursing intervention to individuals with stoma according to the health belief model. Cancer nursing, 43(2), E87-E96.

Dodel, M., and Mesch, G. (2017). Cyber-victimization preventive behavior: A health belief model approach. Computers in Human behavior, 68, 359-367.

Jeihooni, A. K., Hidarnia, A., Kaveh, M. H., Hajizadeh, E., and Askari, A. (2015). The effect of an educational program based on health belief model on preventing osteoporosis in women. International journal of preventive medicine, 6.

Jeihooni, A. K., Jamshidi, H., Kashfi, S. M., Avand, A., andKhiyali, Z. (2017). The effect of health education program based on health belief model on oral health behaviors in pregnant women of Fasa city, Fars province, south of Iran. Journal of International Society of Preventive and Community Dentistry, 7(6), 336.

Jadgal, K. M., Nakhaei-Moghadam, T., Alizadeh-Seiouki, H., Zareban, I., and Sharifi-Rad, J. (2015). Impact of educational intervention on patients behavior with smear-positive pulmonary tuberculosis: a study using the health belief model. Materia socio-medica, 27(4), 229.

Keshani, P., Hossein Kaveh, M., Faghih, S., and Salehi, M. (2019). Improving diet quality among adolescents, using health belief model in a collaborative learning context: A randomized field trial study. Health education research, 34(3), 279-288.

Khademolhosseini, F., Noroozi, A., and Tahmasebi, R. (2017). The effect of health belief model-based education through telegram instant messaging services on Pap smear performance. Asian Pacific journal of cancer prevention: APJCP, 18(8), 2221.

Khani, J. A., Hidarnia, A., Kaveh, M. H., and Hajizadeh, E. (2015). The effect of a prevention program based on health belief model on osteoporosis. Journal of Research in health sciences,15(1), 47-53.

Khiyali, Z., Aliyan, F., Kashfi, S. H., Mansourian, M., andJeihooni, A. K. (2017). Educational intervention on breast self-examination behavior in women referred to health centers: Application of Health Belief Model. Asian Pacific journal of cancer prevention: APJCP, 18(10), 2833.

Khoramabadi, M., Dolatian, M., Hajian, S., Zamanian, M., Taheripanah, R., Sheikhan, Z., ... and Seyedi-Moghadam, A. (2016). Effects of education based on health belief model on dietary behaviors of Iranian pregnant women. Global journal of health science, 8(2), 230.

Khorsandi, M., Fekrizadeh, Z., andRoozbahani, N. (2017). Investigation of the effect of education based on the health belief model on the adoption of hypertension-controlling behaviors in the elderly. Clinical interventions in aging, 233-240.

Kissal, A., and Kartal, B. (2019). Effects of health belief model-based education on health beliefs and breast self-examination in nursing students. Asia-pacific journal of oncology nursing, 6(4), 403-410.

Li, Y., Zhang, S., Song, J., Tuo, M., Sun, C., and Yang, F. (2021). Effects of self-management intervention programs based on the health belief model and planned behavior theory on self-management behavior and quality of life in middle-aged stroke patients. Evidence-Based Complementary and Alternative Medicine, 2021.

Maheri, A., Tol, A., and Sadeghi, R. (2017). Assessing the effect of an educational intervention program based on Health Belief Model on preventive behaviors of internet addiction. Journal of education and health promotion, 6.

Mulualem, D., Henry, C. J., Berhanu, G., and Whiting, S. J. (2016). The effectiveness of nutrition education: Applying the Health Belief Model in child-feeding practices to use pulses for complementary feeding in Southern Ethiopia. Ecology of food and nutrition, 55(3), 308-323.

Naghashpour, M., Shakerinejad, G., Lourizadeh, M. R., Hajinajaf, S., andJarvandi, F. (2014). Nutrition education based on health belief model improves dietary calcium intake among

female students of junior high schools. Journal of health, population, and nutrition, 32(3), 420.

Nahidi, F., Dolatian, M., Roozbeh, N., Asadi, Z., and Shakeri, N. (2017). Effect of health-belief-model-based training on performance of women in breast self-examination. Electronic physician, 9(6), 4577.

Rosenstock, I. M., Strecher, V. J., and Becker, M. H. (1988). Social learning theory and the health belief model. Health education quarterly, 15(2), 175-183.

Salem, G. M., and Said, R. M. (2018). Effect of health belief model based nutrition education on dietary habits of secondary school adolescent girls in Sharkia governorate. Egypt J Commun Med, 36(3), 35-47.

Shahnazi, H., Ahmadi-Livani, M., Pahlavanzadeh, B., Rajabi, A., Hamrah, M. S., andCharkazi, A. (2020). Assessing preventive health behaviors from COVID-19: a cross sectional study with health belief model in Golestan Province, Northern of Iran. Infectious diseases of poverty, 9(06), 91-99.

Shabibi, P., Zavareh, M. S. A., Sayehmiri, K., Qorbani, M., Safari, O., Rastegarimehr, B., and Mansourian, M. (2017). Effect of educational intervention based on the Health Belief Model on promoting self-care behaviors of type-2 diabetes patients. Electronic physician, 9(12), 5960.

Sheppard, J., and Thomas, C. B. (2021). Community pharmacists and communication in the time of COVID-19: Applying the health belief model. Research in Social and Administrative Pharmacy, 17(1), 1984-1987.

Tehrani, F. J., Nikpour, S., Kazemi, E. A. H., Sanaie, N., and Panahi, S. A. S. (2014). The effect of education based on health belief model on health beliefs of women with urinary tract infection. International journal of community-based nursing and midwifery, 2(1), 2.

Tola, H. H., Shojaeizadeh, D., Tol, A., Garmaroudi, G., Yekaninejad, M. S., Kebede, A., and Klinkenberg, E. (2016). Psychological and educational intervention to improve tuberculosis treatment adherence in Ethiopia based on health belief model: a cluster randomized control trial. PloS one, 11(5), e0155147.

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J.,Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft,A., Wilson, M. G., Garritty, C., ... Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMAScR): Checklist and explanation. Annals of Internal Medicine, 169(7), 467–473. https://doi.org/10.7326/M18-0850.

Vahedian-Shahroodi, M., Tehrani, H., Robat-Sarpooshi, D., GHolian–Aval, M., Jafari, A., and Alizadeh-Siuki, H. (2021). The impact of health education on nutritional behaviors in female students: An application of health belief model. International Journal of Health Promotion and Education, 59(2), 70-82.

Yakubu, I., Garmaroudi, G., Sadeghi, R., Tol, A., Yekaninejad, M. S., and Yidana, A. (2019). Assessing the impact of an educational intervention program on sexual abstinence based on

the health belief model amongst adolescent girls in Northern Ghana, a cluster randomised control trial. Reproductive health, 16(1), 1-12.

Zare, M., Ghodsbin, F., Jahanbin, I., Ariafar, A., Keshavarzi, S., and Izadi, T. (2016). The effect of health belief model-based education on knowledge and prostate cancer screening behaviors: a randomized controlled trial. International journal of community-based nursing and midwifery, 4(1), 57.

Zeigheimat, F., Ebadi, A., Rahmati-Najarkolaei, F., andGhadamgahi, F. (2016). An investigation into the effect of health belief model-based education on healthcare behaviors of nursing staff in controlling nosocomial infections. Journal of education and health promotion, 5.

Zhang, H., Chen, L., and Zhang, F. (2022). Revisit the effects of health literacy on health behaviors in the context of COVID-19: the mediation pathways based on the health belief model. Frontiers in Public Health, 10, 917022.