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Facilitators and barriers to gastrointestinal health behaviors: a systematic review based on the COM-B model

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Abstract

Background: This review examined factors contributing to gastrointestinal health behaviors using the COM-B (capability, opportunity, motivation) model. Methods: Five electronic databases (PubMed, Medline, Cochrane, Web of Science, CINAHL) were searched following PRISMA guidelines, extracting the data and applying the inductive deductive method to map the impact factors to the COM-B model. Results: The COM-B model identified 20 influencing factors mapped to five subcomponents: psychological capability, physical opportunity, social opportunity, reflective motivation, and automatic motivation. Conclusions: Enhancing gastrointestinal health entails considering personal, societal, and environmental considerations.

Key Words: Gastrointestinal Tract; COM-B model; Health behavior; factors; Health Promotion.

1 | Introduction

Gastrointestinal diseases refer to a wide range of disorders affecting the gastrointestinal tract[1]. Studies have shown that the global prevalence of irritable bowel syndrome is 45%, and functional dyspepsia is 57.0%[2, 3]. Globally, more than half of the population is infected with Helicobacter pylori, which is the leading cause of 90% of non-cardia gastric cancers[4]. Gastrointestinal diseases drastically reduce patients' quality of life and impose a heavy healthcare financial burden[5].

The development of gastrointestinal diseases is strongly associated with gastrointestinal health behaviors; according to a study[6], Alcohol and tobacco use increase the likelihood of gastrointestinal diseases by more than 1.5 times. The issue of poor gastrointestinal health behaviors among the population is a widespread problem worldwide. Studies show that most people have unhealthy behaviors such as smoking and excessive alcohol consumption[7], indicating interventions are needed to improve public gastrointestinal health behaviors.

Currently, most interventions solely concentrate on knowledge and education factors[8]. The Capability, Opportunity, Motivation-Behavior Model (COM-B model), proposed by Michie et al. in 2011 to identify influences on behavior change[9], has been widely used to understand and guide behavior change[10, 11]. The model considers behavior as a result of the interaction of three modules: capability (physical and mental), opportunity (social and physical), and motivation (automatic and reflective). It offers a clear direction for systematically identifying behavioral

influences and implementing precise interventions. This study aims to use the COM-B model to understand and analyze the factors that influence gastrointestinal health behaviors.

2 | Method

This review was registered on PROSPERO(CRD42023455651); the review is reported according to PRISMA statements.

2.1|Search Strategy

Research studies on gastrointestinal health behavioral intentions in five databases, PubMed, Medline, Cochrane, Web of Science, and CINAHL, were searched from the time of database creation to August 2023, using a combination of subject terms and free words. The detailed search strategy, using PubMed as an example, is provided in Appendix 1.

2.2|Selection Criteria

Inclusion criteria: (1) original peer-reviewed articles; (2) studies exploring factors influencing gastrointestinal health behaviors. Exclusion criteria: (1) publications not in English; (2) reviews, conference papers, papers with incomplete bibliographic information, and papers without full electronic text.

2.3|Citation Screening and Data Extraction

Duplicate studies were eliminated using Endnotes X9 software to manage the retrieved literature. Two researchers screened titles and abstracts for inclusion and exclusion criteria. Information on the characteristics of the included studies was extracted using an Excel sheet, including the first

author's surname, year of publication, country or region, type of literature, type of population, sample size and quality assessment, and facilitating and hindering factors. (Table 1).

Table 1 Characteristics of 23 included Studies

Author, Year	Country of Study	Sample Size	Participants, mean age	Factors	Quality
Otiniano[12], 2014	USA	274	Hispanics eligible for colorectal cancer screening≥50 years old	F: Having cancer, old age. Discussed risk factors with the doctor	87%
Kotwal[13], 2016	USA	1608	Married couples, 62-90 years old	F: The wife is satisfied with the marital relationship; high level of education, high economic level B: Low wife support	87%
Hawkins[14], 2015	USA	593	Colorectal cancer survivors, mean age=74 years old	F: Female, Married, High level of education B: Healthy eating requires too much effort. Believes that healthy eating can be harmful to the body	87%
Emmons[15], 2005	USA	1247	Colorectal polyp patients,40-75 years old	F: High level of education, High self-efficacy B: Young age, Low perceived risk	87%
Cho[16], 2006	USA	56	General Population, >45 years old	F: Believe that examination can find cancer, Provision of translation, Checkups are free, B: no time, no symptom	87%
Tran[17], 2018	USA	981	General Population, 50-75 years old	F: Korean, Insured, Receive regular checkups， Family history B： Faith in Destiny	75%
Wang[18], 2022	China	1042	General Population, ≥18 years old	F: High economic level, High level of gastrointestinal knowledge, Stomach Diseases, Have Symptoms B: No symptoms， Lack of	75%

				knowledge， Low economic level，	
Liu[19], 2019	China	1200	General Population, ≥18 years old	F: High economic level, Upper gastrointestinal tract diseases B: Worried about the results, No symptoms， No time, Fear of inspection	87%
Lee[20], 2020	China	550	People who have purchased gastrointestinal supplements>21 years old	F: Perceived susceptibility, perceived severity, perceived benefits of action, and perceived behavioral control B； Perceived barriers to action	75%
Abbott[21], 1996	UK	60	patients with cystic fibrosis, 16-44 years old	F: High level of disease concern, Consider that medical professionals can be responsible for health， Consider themselves more control over their health than others	87%
Vrinten[22], 2015	UK	1920	General Population, 55-64 years old	F： Fear of cancer, worry about cancer B： Feel uncomfortable with cancer	87%
Hahm[23], 2011	Korea	1517	People with low economic status, ≥ 40 years old	F: High economic level, High education level	87%
Hahm[24], 2008	Korea	1509	General Population, 40-70 years old	F: Previous Screening Experience, Free, Perceived cancer risk B: Financial burden	87%
Adane[25], 2017	Ethiopia	472	Guardians of children with acute diarrhea, mean age=29.3(±6.1) years old	F: High level of education of guardians, High economic level, Severe symptoms, Convenience	87%
Madlensky[26], 2003	Canada	368	Families of colorectal cancer patients, 34 years old	F: Old age, High perceived gains, and low perceived barrier scores, Multiple colorectal cancer relatives, support from doctors or relatives	87%

Ng[27], 2007	Singapore	514	Chinese Singaporeans, years old	≥50	F: Received screening for other diseases, Low perceived severity score, High knowledge score,	87%

Note:In this table, "F" stands for facilitators of gastrointestinal health behaviors and "B" stands for inhibitors.

2 | Results

A total of 16 literature were included, with study sites primarily in the United States (n=6), followed by China (n=3), the United Kingdom (n=2), South Korea (n=2), Ethiopia (n=1), Canada (n=1), and Singapore (n=1). The literature screening process and results are shown in Figure 1.

2.1|psychological capacity

Psychological capability refers to the knowledge and mental skills necessary to adopt gastrointestinal health behaviors. Factors linked to Psychological capability in this literature encompass education level, high health awareness, gastrointestinal health knowledge, and prior screening experience.

Five studies examined how education level impacts gastrointestinal health behaviors. Patients with high levels of education were more likely to seek out gastrointestinal health behaviors, such as timely medical care[25], participation in health screenings[24], and avoiding some gastrointestinal risk behaviors[14, 15].

Older adults are more health conscious and likely to adopt gastrointestinal health behaviors than younger adults[12, 26]. However, a lack of knowledge and information about gastrointestinal health impedes all ages[27]. Previous screening experience facilitated screening for gastrointestinal disorders [24, 27], and increased willingness to undergo screening.

2.2|Physical opportunity

Physical opportunity refers to external factors in the physical environment that enable the behavior to occur. The factors associated with physical opportunity in this paper include economic level, time, competition, and availability of healthcare resources.

Economic level significantly influences patients' adoption of gastrointestinal health behaviors and can diminish their intention to engage in such behaviors by impacting motivation. The cost of adopting gastrointestinal health behaviors is an important influencing factor, and people's intention to engage in gastrointestinal health behaviors declines as the financial cost incurred increases[14, 16, 24]. It has also been shown that high-income individuals have better health-seeking behaviors for gastrointestinal diseases and health screening behaviors than low-income individuals [13, 18, 19, 23, 25] .

Improved access and availability of healthcare resources promote gastrointestinal health behaviors, and being closer to a healthcare facility triples the likelihood of attending [25]. Nevertheless, time and other competing priorities also play a significant role in influencing gastrointestinal health behaviors, They decide they need to prioritize other things [16].

2.3|Social opportunity

Social opportunities are external, social, and environmental factors that enable behavior. Factors considered social opportunities in this paper include information about the risk of gastrointestinal diseases and behavioral advice from health care providers, emotional support from family and friends, customs and culture, and racial awareness.

Professional advice from physicians plays a crucial role in encouraging people to undergo gastrointestinal screening [15, 26]. Individuals interacting more with the healthcare system are more

willing to undergo screening. Emotional support from family or friends is a facilitator of gastrointestinal health behaviors[13, 26, 27], while a lack of emotional and informational support from social networks is a hindrance [17].

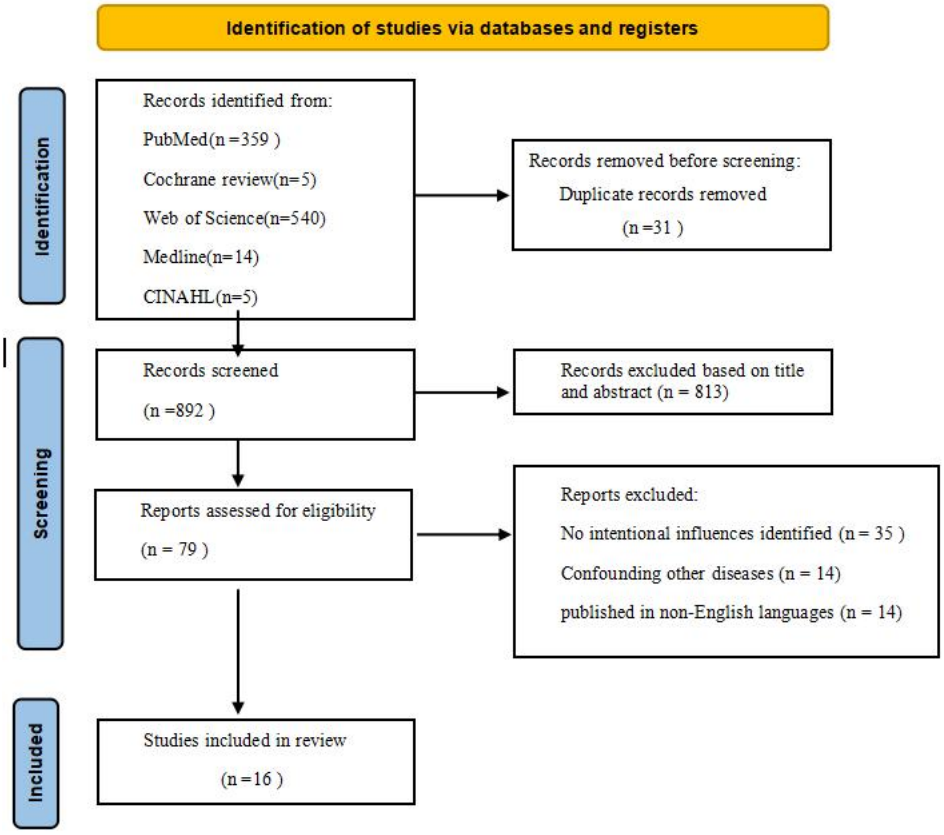

Figure 1. Study selection

2.4|Reflexive motivation

Reflexive motivation is the conscious brain activity that motivates and guides an organism to adopt gastrointestinal health behaviors. Factors associated with reflexive motivation in this paper include the absence of symptoms, beliefs about the disease, trust in the healthcare system, perceived risks, and benefits.

Six studies [16, 18, 19] found that the absence of symptoms was a significant barrier to gastrointestinal health behaviors. Gastrointestinal health behavioral intentions were linked to the severity of symptoms [25]. Trust in the healthcare system plays a crucial role in motivating gastrointestinal health behaviors [16, 21].

Beliefs about gastrointestinal diseases are influential factors in gastrointestinal health behaviors, individuals who believe that gastrointestinal cancers can be prevented and treated will participate in gastrointestinal health screenings[19], and fear of cancer is both a facilitator and a deterrent[22].

Individuals with a family history of gastrointestinal disease are more likely to perceive the risk of disease and have higher adherence to gastrointestinal health behaviors[17, 20, 24] ; perceiving the benefits of gastrointestinal health behaviors enhances individuals' motivation to engage in such behaviors[26].

3 | Discussion

The COM-B model is the core of the BCW theory, and the intervention policies of the BCW theory are selected for the influencing factors identified by the COM-B model; therefore, this paper discusses the influencing factors of gastrointestinal health behaviors using interventions based on the BCW theory.

3.1Enhancement of capabilities

Recent studies by Kerrison [28], and Hu [29] have reported similar results, with the level of knowledge being the most cited influencing factor in the psychological capability component. The study results suggest that the focus group discussion format stimulates behavioral intentions related to

gastrointestinal health, possibly due to increased knowledge and emotional support. Previous studies [30, 31] have demonstrated that intervention preferences are influenced by age, education level, and occupation. These findings suggest the need to develop interventions that consider the realities and priorities of stakeholders to maximize benefits.

Clark et al. [32] applied the COM-B model to explore the influencing factors of behavioral change in patients with dementia, They found that this paper did not identify influencing factors that can be mapped to physical capacity. This may be because most of the study subjects are in the general population and do not have physical ability deficits. Future research should focus on strengthening the study of gastrointestinal health behaviors in vulnerable populations such as the elderly, sick, disabled, and others.

3.2|Enhancing opportunities

Fatalism, as part of the social opportunity component in the COM-B model, was found to significantly and negatively impact gastrointestinal health. This finding aligns with previous studies [33, 34]. However, there was a limited in-depth discussion of fatalism, mainly categorized as "religious beliefs." Fatalism was also linked to lower educational levels [35], indicating that previous interventions that approached the issue from the "cultural beliefs" standpoint might have lost some validity. The fatalistic views of individuals with low levels of education can be mainly attributed to negative experiences when seeking health information on Internet platforms [36]. These experiences include frustration with the difficulty of accessing, understanding, and distinguishing health information, worsened by the abundance of information in the information age. Researchers should

consider the social environment in which participants live and their obstacles. The COM-B model emphasizes the equal importance of individuals, groups, and backgrounds in influencing behavior. Easy-to-understand information about gastrointestinal health should be shared through reputable social media platforms. This approach will enhance public access to practical information and encourage the adoption of gastrointestinal health behaviors.

3.3|Enhancement of motivation levels

The study findings indicated that the fear of gastrointestinal screening results is an impediment, aligning with previous research [29, 33, 37]. This correlation may be attributed to the public's perception of cancer as an unconquerable adversary [38]. Importantly, this study discovered that the fear of gastrointestinal cancer screening results can have both hindering and facilitating effects, likely stemming from the emotional rather than cognitive nature of cancer-related fear [39]. Studies have shown that individuals with high self-efficacy, positive emotional responses, and other moderating factors tend to engage in cancer screening after a diagnosis. In contrast, the opposite is true for individuals without these factors [40]. Thus, promoting "preventable and controllable cancer" education becomes a crucial intervention objective to alleviate cancer fear [41]. This fear can, unfortunately, result in individuals actively avoiding cancer-related knowledge and information [42, 43]. A single form of education may not be effective in addressing this situation. Peer education, an educational approach that utilizes individuals with similar life experiences as the medium for education, has been widely and successfully implemented in various areas, including cancer prevention, disease self-management, and health behavior change [44, 45]. Therefore, using the "modeling" intervention

of the BCW model, which involves providing positive role models, to communicate gastrointestinal cancer prevention and control messages to critical individuals has been proven effective.

4 | Strengths and limitations

This article is the first to use a validated theory that links behavior to mapping gastrointestinal influences. Provides a clear framework for developing gastrointestinal health interventions. Additionally, this paper includes studies from diverse regions, enhancing the applicability of the findings. This review has limitations. Cross-sectional studies dominate the included literature and lack data from prospective cohort studies, so this paper cannot measure the distance between intention and behavior.

5 | Conclusion

This systematic review analyzes facilitators and impediments to gastrointestinal health behaviors. The framework of these factors allows for the development of individualized intervention programs to improve gastrointestinal health behaviors in the population.

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