BMJ Open

Influencing factors of health promotion behaviour in patients with aortic dissection: A qualitative study using the COM-B model

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2023-076181
Article Type:	Original research
Date Submitted by the Author:	30-May-2023
Complete List of Authors:	Gao, Jia; Fujian Medical University Union Hospital, Department of Cardiac Surgery Pan, Qiong; Fujian Medical University Union Hospital, Department of Nursing Li, Sai; Fujian Medical University Union Hospital, Department of Cardiac Surgery Chen, Shaolin; Fujian Medical University Union Hospital, Department of cardiology Luo, Baolin; Fujian Medical University Union Hospital, Department of Cardiac Surgery Chen, Liangwan; Fujian Medical University Union Hospital, Department of Cardiac Surgery Lin, Yanjuan; Fujian Medical University Union Hospital, Department of Nursing；Department of Cardiac Surgery
Keywords:	QUALITATIVE RESEARCH, Nursing Care, CARDIOLOGY

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

Influencing factors of health promotion behaviour in patients with aortic dissection: A qualitative study using the COM-B model

Abstract

Objectives: This study aimed to understand influencing factors of health promotion behaviour in patients with aortic dissection (AD) using the capability, opportunity, motivation, behaviour (COM-B) model of behaviour.

Design: This study adopted a qualitative design using semi-structured interviews analysed with content analysis and the COM-B framework.

Setting: Union Hospital of Fujian Province in China.

Participants: A convenient and purposive sample of 16 AD patients were recruited.

Results: The themes and subthemes were identified: psychological capability: (1)lack of disease knowledge; (2) knowledge conflict; physical capability: (1)physical function limitation; (2) fatigue; (3) previous exercise habits; (4) medication side effects; (5) limited access to professional knowledge; physical opportunity: (1) communication between providers and patients; (2)lack of time and energy; (3) objective condition restriction; (4) public health emergency; social opportunity: (1) stigma; (2) social support; reflective motivation: (1) self-efficacy; (2) sense of health benefit; (3)personal and family responsibilities; automatic motivation: (1) difficulties in changing habits; (2) posttraumatic growth; (3) fear of disease progression.

Conclusion: The health promotion behaviour of patients with AD is affected by multiple factors. Medical staff can improve patients' disease cognition and self-efficacy, enhance their sense of health benefit, exert the positive role of their positive psychology, and

establish a multi-social support system to enhance their health promotion behaviour.

Keywords: qualitative research; COM-B model; aortic dissection ; health promotion behaviour; influencing factors.

STRENGTHS AND LIMITATIONS OF THIS STUDY

This is the first qualitative study to apply the capability, opportunity, motivation and behaviour framework to understand the influencing factors of health promotion behaviour in patients with aortic dissection (AD).

While this study is the use of maximum variation sampling, which made it possible to discover individual perspectives and common patterns, this study was limited to China.

1 INTRODUCTION

Aortic dissection (AD) refers to a pathological change in which blood in the aortic lumen penetrates into the middle layer of the aortic wall through an intimal tear to form a hematoma and extends along the long axis of the aorta, resulting in the separation of the true and false aortic chambers with the characteristics of acute onset, high mortality and poor prognosis.[1-2] As one of the most serious cardiovascular diseases, the incidence of AD in China is 2.78/100,000.[3] In recent years, with the rapid development of diagnosis and treatment technology, the survival rate of AD patients has been greatly improved, but serious complications such as new dissection, organ ischemia, aneurysm formation or rupture may still occur in their survival period.[4]

Health promotion behaviour refers to a series of behavioural activities taken by individuals in order to achieve the best health state and realize self-worth.[5] Studies have shown that good health promotion behaviour can effectively reduce the occurrence of

cardiovascular events, reduce the mortality rate of cardiovascular disease patients and improve their quality of life [6], but more than 80% of cardiovascular disease patients cannot maintain their health promotion behaviour. [7] The occurrence and recurrence of AD are closely related to adverse health behaviour. Understanding the influencing factors of health promotion behaviour in AD patients can help them establish and maintain good health behaviour. However, existing research mostly explores the health promotion behaviour of cardiovascular disease patients from the perspective of quantitative research, with a focus on patients with hypertension[8], coronary heart disease [9], and chronic heart failure.[10] There are few studies on patients with AD.

The ability, opportunity, motivation, behaviour model was proposed in 2011 by Michie et al.[11] This model considers that the occurrence of behaviour includes three necessary conditions: ability, opportunity, and motivation, which is called the COM-B model. Ability and opportunity can not only directly affect behavior, but also indirectly affect behaviour through motivation. The advantage of this model is that it can comprehensively and systematically understand the obstacles and promoting factors in the behavioural model. Therefore, this model has been applied to many clinical problems[12-14], but has not yet been applied to the health promotion behaviour of AD patients. The aim of this study was to use the COM-B model to describe influencing factors to health promotion behaviour from the perspective of patients with AD.

2 METHODS

Design

A qualitative study was conducted with one-to-one and face-to-face interviews with AD

patients using a semi-structured question guide. The study was reported according to the consolidated criteria for reporting qualitative research guidance.

Participants

Purposive and convenience sampling were used to recruit potential participants from the Union Hospital of Fujian Province between October 2022 to February 2023. Inclusion criteria were diagnosed with AD, older than 18 years of age, and had had the disease for at least 3 months. Patients suffered from severe mental illness or cognitive impairment were excluded. The sample size required was determined when saturation of themes was achieved.

Data collection

Through literature review, discussion by the research group and expert consultation, an interview outline was drawn up, and two patients with AD were pre-interviewed. The interviews were conducted in an independent and quiet clinic. Prior to the interview, the participants were informed about the study, asked to provide informed consent, and socio-demographic data were collected. Interviews were conducted by JG and QP (Master's Degree). Both were clinical fellows with qualitative research training. The interviewers had not been involved in the patients' care at any point prior to the study. No one was present except the participants and researchers. The interviews lasted for 30–60 min, were audio-recorded. After the interviews, the participants had the opportunity to check the transcripts , and unclear answers were clarified during a second interview.

Data analysis

The transcripts were analysed inductively and deductively by content analysis strategies, and extracts themes using the COM-B Model as the framework. Data were managed using NVivo v.11 software.

3 RESULTS

Participants' characteristics

Table 1 shows the characteristics of the participants. The sample included 16 participants (25 participants were approached but 9 did not fulfil inclusion criteria or refused participation), including 10 men (67.50%) and 6 women (32.50%). Ages ranged from 23 to 75 years (mean 47.06, SD = 14.53). Patients had been diagnosed with AD for a minimum of 4 months to a maximum of 7 years.

Table 1. Participant characteristics (n = 16)

Variables	
Age, years (range)	47.06 (23-75)
Time of AD diagnosis, months(range)	23.66 (4-84)
Gender	
Male	10 (62.5)
Female	6 (27.5)
Educational level	

Primary school or below	3(18.75)
Middle school	7(43.75)
High school	3(18.75)
College or above	3(18.75)
Family residence	
City	7 (43.75)
Rural	9 (56.25)
Type of disease	
A	9 (56.25)
B	7 (43.75)

Themes

The themes and subthemes based on the COM-B model are presented in table 2.

Table 2. Themes and subthemes

COM-B model	Themes	Subthemes
Capability	Psychological	Lack of disease knowledge
		Knowledge conflict
	Physical	Physical function limitation
		Fatigue
		Previous exercise habits
		Medication side effects

		Limited access to professional knowledge
Opportunity	Physical	Communication between providers and patients
		Lack of time and energy
		Objective condition restriction
		Public health emergency
	Social	Stigma
		Social support
Motivation	Reflective	Self-efficacy
		Sense of health benefit
		Personal and family responsibilities
	Automatic	Difficulties in changing habits
		Posttraumatic growth
		Fear of disease progression

Capability

Psychological capability

Lack of disease knowledge

Lack of disease knowledge, including diet, exercise was a common hindering factor. Patients lack relevant knowledge, so they are worried about the potential risks related to exercise. P3:" I used to run all the time, but now I dare not. I am afraid that too intense exercise will lead to recurrence, so I exercise less. "

Knowledge conflict

Patients often receive information in various ways, which is influenced by the sender, the

receiver, the information itself and other factors, leading to confusion and conflict in their understanding.P11: "Now the Internet is very developed, but I feel that the information is very messy, I don't know where it comes from, and I don't know whether to believe it or not."

Physical capability

Physical function limitation

There were many barriers to health promotion behaviour because of physical restrictions, such as low vision. A small number of elderly patients said that their activities were limited because of their decreased physical function and chronic diseases.P10: "My right leg is not very agile. I fell several times. If I want to abduct it on crutches, I can only simply move my upper body." P7: "I am so old, my eyes are not very good, I can't see clearly. I had a cerebral infarction two years ago, and I have some sequelae, so I can't walk steadily. That's it (sigh)."

Fatigue

Some patients said that they often felt tired and weak after illness, which caused them not to exercise.P8: "It's completely different from before. Now don't talk about exercise. I can't stand normal work, and I don't have the strength to do any exercise. I like lying down when I have nothing to do." P11: "After getting sick, my physical strength is getting worse, and I feel tired with a little effort, which makes me feel sluggish, so I have less exercise. "

Previous exercise habits

A small number of patients felt that exercise was interesting because they had exercise

habits before they got sick. P2: "I used to like fitness, and I would go to the gym every day after work. Now, although I can't do strenuous exercise, I will still insist on doing some aerobic exercise. "

Medication side effects

Some patients stop taking drugs or reduce their dosage without authorization because of the large side effects of drugs and the existence of fluky psychology.P5: "I used to take medicine according to the doctor's advice, but I felt that the kidney function was deteriorating, and I often had to urinate all day long, especially when I had to get up three or four times at night. I could not sleep well in a daze, so I reduced the dosage myself."

Limited access to professional knowledge

For patients, the main source of professional knowledge is medical staff. Many patients lack the ability to acquire knowledge from multiple sources. P12: "I can only learn about diseases from doctors and nurses, there is no other way to get knowledge, sometimes I want to learn more, but I am old and cannot use a smartphone, there is no place to learn."

Opportunity

Physical opportunity

Communication between providers and patients

Poor communication between medical staff and patients was found. Most patients complain that they cannot get enough health information from medical staff. Most patients complained that they could not obtain enough information from medical staff. Most of the time, medical staff are too busy to give detailed health advice.P15: "The

doctor was very busy. He gave me a list, told me to take the medicine as required, and left. Actually, I thought he could tell me more about it. "

Lack of time and energy

Some patients said that lack of time and energy limited their health promotion behaviour. P12: "I have to support a large family. When I recovered almost, I went out to find two jobs. It will be eleven o'clock when I go back at night, so I don't care much about my illness."

Objective condition restriction

The health promotion behaviour of AD patients is influenced by economy, residence, medical conditions, reimbursement system.P14: "I've always wanted to check it again, but the conditions don't allow it. Our city hospital can't, so we can only go to the provincial capital. It's very troublesome and expensive to go from the countryside." P15: "I was hospitalized at my own expense. I have had several operations, and my family's economy has been dragged down. Now I can only treat it conservatively."

Public health emergency

Some patients said that due to the epidemic situation in COVID-19, their activities and medical treatment were restricted. P8: " I used to go downstairs to dance square dance every night, but I stayed at home in case of an epidemic, and the whole person became fat. " P10: "I haven't taken oral medicine for several days. I was going to go to the hospital last week, but the hospital closed because of the epidemic. I can't buy it outside, I can only wait for this wave of epidemic to pass. "

Social opportunity

Stigma

Some patients said that the diagnosis of AD has brought them great psychological pressure. Because of social stigma, they are afraid to disclose their illness and tend to reduce the chances of going out to socialize.P13 : "This disease is very shameful, the shadow of my life. In recent years, I have been living alone. Sometimes I occasionally meet an acquaintance while walking, and I just wave to each other."

Social support

Family support provides a healthier living environment and emotional support for AD patients.P11: "After getting sick, my mother changed all the soybean oil at home into olive oil, which made it healthier." Peer support has a positive effect on patients' disease management and mental health. P2: "We have a group of patients, in which we can communicate with each other and see that there are many people who have experienced the same experience as me. They are all alive and well, which makes me more confident to face this disease." Professional support is very important to guide and standardize the healthy behaviour of patients.P10: "Every time I follow-up visit, the doctor will give me some professional health advice according to my situation, which will make me more aware."

Motivation

Reflective motivation

Self-efficacy

Good self-efficacy can fully mobilize patients' subjective initiative and make them adhere to healthy behaviour. P14: "I used to eat whatever I wanted, and now I occasionally think

about it, but I will refrain from fooling around."

Sense of health benefit

Most patients said that the physical benefits and mental relaxation brought by healthy behaviours are important factors driving their health promotion behaviours. P9: "In the past, my blood pressure and blood sugar were high. I didn't take medicine, and felt tired. Now I eat lightly, and with taking medicine on time, my health is better." P14: "I will practice Tai Chi every morning, and I feel relaxed, more flexible in my hands and feet, and I won't think about it mentally." A few patients said that they had a negative attitude towards health promotion behaviour because they could not perceive the benefits brought by healthy behaviour. P8: "I stopped drinking for a while after listening to the doctor's advice, but I didn't find any benefits. On the contrary, sometimes drinking wine can relieve fatigue."

Personal and family responsibilities

Some patients said that taking health promotion behaviour is a responsibility to individuals and families, and under this responsibility, they have the obligation to maintain healthy behaviour. P9: "This is not only responsible for myself, but also for my family. I don't want to burden my family any more. I haven't drunk or stayed up late for three years."

Automatic motivation

Difficulties in changing habits

Some patients said that they lacked the determination to overcome various obstacles and had poor confidence in their ability to follow healthy behaviours.P11: "To tell the truth, I

just can't keep my mouth shut and like to drink. I can do it in a short time. It's really too difficult for me for a long time. I'm afraid I can't do it."

Posttraumatic growth

Most patients said that they re-examined the meaning of life, changed their ideas and values of life, and paid more attention to their own health problems. P13 : "This illness is also a warning to myself. I tried hard to make money before, but I broke my body. Now I spend money to buy my life. This is meaningless and not worth it."

Fear of disease progression

Most patients said that they will pay more attention to the secondary and tertiary prevention of the disease because of their worries about the prognosis of AD and fear of death, so as to avoid poor prognosis. P9: "This disease is really terrible. I can say that I walked in the gate of hell, so I am more regular in my work and rest and diet, and I dare not be careless."

4 DISCUSSION

We applied the COM-B model to improve our understanding of the influencing factors of health promotion behaviour in patients with AD. This study shows that three themes of ability, motivation, and opportunity factors, and 19 subthemes factors contributed to the health promotion behaviour among patients with AD.

This study found that the fear of disease progression or recurrence of AD patients is an important promoting factor of their health promotion behaviour. According to the theory of protective motivation, patients will be more willing to change their bad behaviours if they can fully realize the possible harm caused by diseases.[15] In this study, Most patients

have insufficient understanding of AD and lack self-management ability, which can be manifested as a lack of disease knowledge and poor medication compliance. Therefore, medical staff can provide patients with health education based on the theory of protective motivation, increase their professional knowledge reserves, improve their cognition of diseases, treatment methods and complications, reduce their perception of negative diseases, mobilize their subjective initiative, enhance their self-management ability of diseases, and guide them to establish the concept of correct and safe medication, so as to improve their medication compliance. This study also found that the self-efficacy of AD patients is closely related to their health promotion behaviour, the stronger their health beliefs and motives, the easier they are to implement health promotion behaviours. This is consistent with the existing literature, which has found that self-efficacy is the most significant predictor of quitting smoking, increasing physical activity and improving healthy diet in stroke patients. [16] Therefore, medical staff should guide patients to explore their own bright spots, establish confidence and determination to cultivate health promotion behaviours, and enhance their sense of self-efficacy, so as to establish and maintain their healthy behaviours.

This study found that AD patients can grow up in the process of illness, mainly by accepting the disease, learning to adjust themselves and paying attention to their own health. However, studies have shown that although cardiac patients may experience posttraumatic growth, their level of growth is relatively low. [17] This may be due to the fact that AD, as an acute traumatic event, causes significant physiological and psychological harm to patients, who are prone to negative emotions such as anxiety, fear, depression,

and posttraumatic stress disorder[18], so their growth level is low. Therefore, medical staff should actively pay attention to the possibility of posttraumatic growth of AD patients, fully tap their dominant potential, and guide them to have a positive cognition of traumatic events. At present, there are few intervention studies on the posttraumatic growth of AD patients. Medical staff can learn from the existing intervention strategies, such as acceptance and commitment therapy and mindfulness-based stress reduction [19-20], so as to increase patients' acceptance of AD, improve negative emotions, improve their psychological flexibility, promote psychological growth, and thus produce more positive feelings of disease and health promotion behaviour.

This study found that AD patients perceive the positive effects of health behaviours and are more willing to adopt health promotion behaviours. Conversely, if the patient does not experience a significant sense of health benefit, it will directly affect his attitude and adherence to health promotion behaviour. In this study, although some patients have realized the potential benefits of healthy behaviours such as exercise for their physical and mental health, it is difficult to integrate exercise into daily life due to various hindrance factors such as old age, comorbidities, fatigue, fear of exercise, and laziness.Therefore, medical staff can carry out cognitive behavioural intervention for AD patients [21], improve patients' awareness of the importance of healthy behaviours such as diet control, exercise intervention, blood pressure monitoring, correct medication, and fluid management, and turn this understanding into an internal driving force, while reducing their concerns about the potential risks of exercise, correcting their misperception of exercise risks, strengthening the screening of fatigue symptoms in AD

patients, and carrying out fatigue management education[22], helping them improve fatigue symptoms and improve their ability to perform activities of daily living. More attention should also be paid to creating exercise conditions for elderly patients with comorbidities and creating a friendly healthy aging environment to enhance patients' sense of health benefits, enhance their compliance and motivation for health promotion behaviour, and change their bad lifestyles and behaviours.

As an integral part of an individual's health promotion, social support influences the formation and continuation of their health behaviours. In this study, AD patients felt cared for and supported by family, peers, and healthcare professionals, which met their emotional and informational needs to some extent and promoted their health behaviours, This study also found that the lack of access to health information and the ability to understand and use it are important reasons that hinder patients' health promotion behaviour. This study found that objective factors such as economy, poor medical accessibility, medical insurance reimbursement system and public emergencies are important hindering factors for the health promotion behaviour of AD patients. Therefore, medical staff should encourage patients to actively seek social support and help, pay attention to their disease needs, regularly hold patient meetings, establish WeChat public account platforms and WeChat groups, provide them with targeted emotional support and information support, enrich their channels for obtaining and using professional information, and fully mobilize patients' family and community resources, establish a hospital-family-community linkage intervention model, and provide them with continuous care. The government should further improve the medical and health service system,

expand medical insurance coverage and reimbursement ratio, reduce the medical and economic burden of AD patients, rationally allocate medical resources, while improving the diagnosis and treatment level of grassroots and community hospitals, strengthen the linkage between higher and lower level hospitals, expand and sink high-quality medical resources, actively carry out telemedicine services, build smart Internet hospitals, provide online health assessment, consultation, drug prescription, drug distribution and other diagnosis and treatment services, and improve the ability of medical and health institutions to respond to public health emergencies. Improve the accessibility of medical services in rural and remote and backward areas, and popularize AD-related knowledge to the public through public lectures, media, social networks and other channels, so as to raise social awareness and attention to AD.

LIMITATIONS

The study has several limitations. First, this study was a qualitative study, we could only preliminarily explore the problem and could not reveal causal relationships. Moreover, as a single-center study, it could not directly draw conclusions on the overall characteristics of health promotion behaviour of AD patients. Thus, the follow-up study can further expand the sample size and conduct multi-center quantitative or mixed research, so as to fully understand the health behaviour characteristics of patients with AD and provide reference for formulating targeted intervention strategies.

5 CONCLUSIONS

This study adopted a qualitative approach and conducted in-depth interviews with 16 AD patients to analyse their health promotion behaviour based on the COM-B model.

Medical staff can improve patients' disease cognition and self-efficacy, enhance their sense of health benefit, exert the positive role of their positive psychology, and establish a multi-social support system to enhance their health promoting behaviours.

Data availability statement

Data are available on reasonable request. Original data are available on request by emailing the first author, who will delete any personal identification information.

Ethics statements

Patient consent for publication

Not applicable.

Ethics approval

This study involves human participants and the study was approved by the Ethics Committee of the Fujian Medical University Union Hospital (2022KY189). Participants gave informed consent to participate in the study before taking part.

AUTHOR CONTRIBUTIONS

The study was designed by Yanjuan Lin and Jia Gao. All authors contributed to data collection and analysis. All authors commented on the manuscript and approved the final manuscript.

ACKNOWLEDGEMENTS

The authors are very thankful to the participants, for their contributions to this study. This study was supported by grants from Project Research Project of Fujian Association for Science and Technology Innovation Think Tank (No.FJKX-A2129) and the The Fifth Batch of Hospital Key Discipline Construction Projects-Clinical Nursing

(2022YYZDXK01).

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Nienaber CA, Clough RE, Sakalihasan N, et al. Aortic dissection [J]. Nat Rev Dis Primers, 2016, 2(16053.

[2] Kasher JA, El-Bialy A, Balingit P. Aortic dissection: a dreaded disease with many faces [J]. J Cardiovasc Pharmacol Ther, 2004, 9(3): 211-218.

[3] Tang X, Lu K, Liu X, et al. Incidence and Survival of Aortic Dissection in Urban China: Results from the National Insurance Claims for Epidemiological Research (NICER) Study [J]. Lancet Reg Health West Pac, 2021, 17(100280.

[4] Sharma A, Manunga JM, Stanberry L, et al. Is Compliance With Guideline Recommended Follow-Up After Aortic Dissection Associated With Survival? [J]. Ann Thorac Surg, 2022, 113(3): 846-852.

[5] Pender NJ, Murdaugh CL, Parsons MA. Health promotion in nursing practice [M]. Health promotion in nursing practice, 2011.

[6] Go AS, Mozaffarian D, Roger VL, et al. Heart disease and stroke statistics--2014 update: a report from the American Heart Association [J]. Circulation, 2014, 129(3): e28-e292.

[7] Hamilton JM, Kives KD, Micevski V, et al. Time perspective and health-promoting behavior in a cardiac rehabilitation population [J]. Behav Med, 2003, 28(4): 132-139.

[8] Lor M, Koleck TA, Bakken S, et al. Association Between Health Literacy and Medication Adherence Among Hispanics with Hypertension [J]. J Racial Ethn Health Disparities, 2019, 6(3): 517-524.

[9] Li X, Gao Q, Sun L, et al. Effect of self-control on health promotion behavior in patients with coronary heart disease: mediating effect of ego-depletion [J]. Psychol Health Med, 2022, 27(6): 1268-1276.

[10] Kessing D, Pelle AJ, Kupper N, et al. Positive affect, anhedonia, and compliance with self-care in patients with chronic heart failure [J]. J Psychosom Res, 2014, 77(4): 296-301.

[11] Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions [J]. Implement Sci, 2011, 6(42.

[12] Ee C, MacMillan F, Boyages J, et al. Barriers and enablers of weight management after breast cancer: a thematic analysis of free text survey responses using the COM-B model [J]. BMC Public Health, 2022, 22(1): 1587.

[13] Madhani A, Finlay KA. Using the COM-B model to characterize the barriers and facilitators of pre-exposure prophylaxis (PrEP) uptake in men who have sex with men [J]. Br J Health Psychol, 2022, 27(4): 1330-1353.

[14] O'Donovan B, Mooney T, Rimmer B, et al. Advancing understanding of influences on cervical screening (non)-participation among younger and older women: A qualitative study using the theoretical domains framework and the COM-B model [J]. Health Expect, 2021, 24(6): 2023-2035.

[15] Rogers RW. A Protection Motivation Theory of Fear Appeals and Attitude Change1 [J]. J Psychol,

1975, 91(1): 93-114.
[16] Brouwer-Goossensen D, den Hertog HM, Mastenbroek-de Jong MA, et al. Patient perspectives on health-related behavior change after transient ischemic attack or ischemic stroke [J]. Brain Behav, 2021, 11(4): e01993.
[17] Lee SY, Park CL, Laflash S. Perceived posttraumatic growth in cardiac patients: A systematic scoping review [J]. J Trauma Stress, 2022, 35(3): 791-803.
[18] Adam U, Habazettl H, Graefe K, et al. Health-related quality of life of patients after surgery for acute Type A aortic dissection [J]. Interact Cardiovasc Thorac Surg, 2018, 27(1): 48-53.
[19] Li H, Wong CL, Jin X, et al. Effects of Acceptance and Commitment Therapy on health-related outcomes for patients with advanced cancer: A systematic review [J]. Int J Nurs Stud, 2021, 115(103876.
[20] Schell LK, Monsef I, Wöckel A, et al. Mindfulness-based stress reduction for women diagnosed with breast cancer [J]. Cochrane Database Syst Rev, 2019, 3(3): Cd011518.
[21] Stacey FG, James EL, Chapman K, et al. A systematic review and meta-analysis of social cognitive theory-based physical activity and/or nutrition behavior change interventions for cancer survivors [J]. J Cancer Surviv, 2015, 9(2): 305-338.
[22] Van Heest KNL, Mogush AR, Mathiowetz VG. Effects of a One-to-One Fatigue Management Course for People With Chronic Conditions and Fatigue [J]. Am J Occup Ther, 2017, 71(4): 7104100020p7104100021-7104100020p7104100029.

BMJ Open

Influencing factors of health promotion behaviour in patients with aortic dissection: A qualitative study using the COM-B model

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2023-076181.R1
Article Type:	Original research
Date Submitted by the Author:	27-Sep-2023
Complete List of Authors:	Gao, Jia; Fujian Medical University Union Hospital, Department of Cardiac Surgery Nursing Pan, Qiong; Fujian Medical University Union Hospital, Department of Nursing Li, Sai; Fujian Medical University Union Hospital, Department of Cardiac Surgery Nursing Chen, Shaolin; Fujian Medical University Union Hospital, Department of Cardiology Nursing Luo, Baolin; Fujian Medical University Union Hospital, Department of Cardiac Surgery Nursing Chen, Liangwan; Fujian Medical University Union Hospital, Department of Cardiac Surgery Lin, Yanjuan; Fujian Medical University Union Hospital, Department of Nursing；Department of Cardiac Surgery Nursing
Primary Subject Heading:	Nursing
Secondary Subject Heading:	Nursing, Qualitative research, Public health
Keywords:	QUALITATIVE RESEARCH, Nursing Care, CARDIOLOGY

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

TITEL PAGE

Title: Influencing factors of health promotion behaviour in patients with aortic dissection: A qualitative study using the COM-B model

Order of Authors:

Jia Gao [1],Qiong Pan[2], Sailan Li [1], Shaolin Chen[3], Baolin Luo[1], Liangwan Chen[4] *, Yanjuan Lin [1,2]*

*: Yanjuan Lin and Liangwan Chen are co-corresponding authors.

Author affiliations:

1 Department of Cardiac Surgery Nursing, Fujian Medical University Union Hospital, Fuzhou, China

2 Department of Nursing, Fujian Medical University Union Hospital, Fuzhou, Fujian Province, China

3 Department of Cardiology Nursing， Fujian Medical University Union Hospital, Fuzhou, Fujian Province, China

4 Department of Cardiac Surgery, Fujian Medical University Union Hospital, Fuzhou, China

Corresponding Author:

Yanjuan Lin

(1) Department of Nursing, Fujian Medical University Union Hospital, Fuzhou, Fujian Province, China.

(2) Department of Cardiac Surgery Nursing, Fujian Medical University Union Hospital, Fuzhou, Fujian Province, China. Fax: +8683344034, Tel: +86059186218581, Email: fjxhyjl@163.com

Liangwan Chen

Department of Cardiac Surgery, Fujian Medical University Union Hospital, Fuzhou, Fujian

Province, China. Fax: +86059183301393, Email: fjxhlwc@163.com

Influencing factors of health promotion behaviour in patients with aortic dissection: A qualitative study using the COM-B model

Abstract

Objectives: This study aimed to understand influencing factors of health promotion behaviour in patients with aortic dissection (AD) using the capability, opportunity, motivation, behaviour (COM-B) model of behaviour.

Design: This study adopted a qualitative design using semi-structured interviews analysed with content analysis and the COM-B framework.

Setting: Union Hospital of Fujian Province in China.

Participants: A convenient and purposive sample of 16 AD patients were recruited.

Results: The themes and subthemes were identified: psychological capability: (1)lack of disease knowledge; physical capability: (1)physical function limitation; (2) fatigue;physical opportunity: (1) communication between providers and patients; (2) objective condition restriction; social opportunity: (1) stigma; (2) social support; reflective motivation: (1) self-efficacy; (2) sense of health benefits; (3)personal and family responsibilities; automatic motivation: (1) posttraumatic growth; (2) fear of disease progression.

Conclusion: This study adopted a novel approach to understanding factors affecting

health promotion behaviour among patients with aortic dissection.Future interventions on health promotion require a holistic approach, including a focus on social support, posttraumatic growth, and effort to limit stigma.

Keywords: qualitative research; COM-B model; aortic dissection ; health promotion behaviour; influencing factors.

STRENGTHS AND LIMITATIONS OF THIS STUDY

This study used the COM-B model to analysis of the factors influencing health promotion behaviour in patients with aortic dissection.

This study employed maximum variation sampling to recruit patients with diverse demographic and disease characteristics, thus allowing a wider range of perspectives to be included in the analysis.

This study relied on patients' self-reported data, which may be influenced by memory bias and social desirability bias.

1 INTRODUCTION

Aortic dissection (AD) is a relatively rare but disastrous emergency macrovascular disease and is caused by tearing of the lining of the aorta. Clinically, according to whether the dissection involves the root of the artery, the ascending aorta or the aortic arch, it can be divided into Stanford type A and B. The incidence of AD in China is 2.78/100,000[1].In recent years, with the rapid development of diagnosis and treatment technology, the survival rate of AD patients has been greatly improved. However,AD survivors still face many challenges,such as postoperative complications, impaired physical function, reduced quality of life, and psychological

trauma[2-4].

Health promotion behaviour refers to a series of behavioural activities taken by individuals in order to achieve the best health state and realize self-worth. Health promotion is considered a cost-effective means of reducing cardiovascular events and mortality[5] . Health promotion behaviour that have been recommended for patients with AD include dietary control, physical activity, cessation of smoking, medication adherence, and adherence to medical recommendations (including monitoring blood pressure and body weight daily)[6]. Unfortunately, although the significance of health promotion for patients with AD has been recognized, the health promotion behaviour of AD patients is still not adequately implemented. Studies showed that nearly 67.2% of patients with type B did not control their blood pressure at the guideline recommended level and 54.9% of patients with type A and 43.9% of patients with type B experienced insufficient exercise after the disease[7-8].Understanding the influencing factors of health promotion behaviour in AD patients can help them initiate and maintain health behaviour. However, there are few studies on the health promotion behavior of AD patients.

Research suggests the use of theoretical frameworks can be most effective when understanding behaviour,with the ability, opportunity, motivation, behaviour model (COM-B model) being a recommended approach[9]. The advantage of the COM-B model is that it provides a novel and comprehensive approach to explain the barriers and facilitator factors of behaviour change and provide a basis for the design of behavioural interventions. Therefore, COM-B model has been applied to many

clinical problems[10-12], but has not yet been applied to the health promotion behaviour of AD patients. The aim of this study was to use the COM-B model to describe influencing factors to health promotion behaviour from the perspective of AD patients.

2 METHODS

Patient and public involvement

None

Design

A qualitative study was conducted with one-to-one and face-to-face interviews with AD patients using a semi-structured question guide. The study was reported according to the consolidated criteria for reporting qualitative research guidance.

Setting

This study took place at the Fujian Medical University Union Hospital, which is one of the largest public comprehensive tertiary hospitals in southeast China's Fujian Province. Cardiac surgery department was certified as a National Regional Medical Center for Cardiovascular Diseases, which performs more than 3000 cardiovascular surgeries annually. Aortic dissection, heart failure, valvular heart disease, coronary heart disease and congenital heart disease are typical patient cohorts in this center.

Sampling and recruitment

Purposive and convenience sampling was employed to select the potential participants through the outpatient and ward of cardiac surgery department of Fujian Medical

University Union Hospital from October 2022 to February 2023. Inclusion criteria were diagnosed with Stanford Type A or Type B AD (Stanford Type A AD was defined as any non-traumatic dissection involving the ascending aorta. Stanford Type B AD was defined as any non-traumatic dissection involving the descending aorta.), older than 18 years of age, and had diagnosed with the disease for at least 3 months. Patients suffered from severe mental illness or cognitive impairment were excluded. The maximum variation sampling technique was also applied to recruit a heterogeneous sample of participants across gender, age, education levels, place of residence, classification of AD and time of AD diagnosis. The sample size required was determined when saturation of themes was achieved.

Data collection

The interview guide (online supplemental file 1) was based on literature, group discussion and a preliminary pilot study with two patients. The interviews were conducted in an independent and quiet clinic. Prior to the interview, participants were clearly explained the purpose of the study. Written informed consent was obtained from those participants who were willing to participate in the study, and socio-demographic data were collected. Interviews were facilitated in the Chinese by JG and QP (Master's Degree). Both were clinical fellows with qualitative research training. The interviewers had not been involved in the patients' care at any point prior to the study. No one was present except the participants and researchers. The interviews lasted for 30–60 min, were audio-recorded. After the interviews, the participants had the opportunity to check the transcripts, and unclear answers were

clarified during a second interview.

Data analysis

Interviews were transcribed verbatim in the source language to reduce the risk of translation inconsistency, which may affect data analysis. The transcripts were analysed inductively and deductively by content analysis approach, and extracts themes using the COM-B Model as the framework. Data were managed using NVivo v.11 software. The quotations were translated into English by professional translators who were not part of the research team using the forward-backward method[13].

3 RESULTS

Participants' characteristics

Table 1 shows the characteristics of the participants. The sample included 16 participants (25 participants were approached but 9 did not fulfil inclusion criteria or refused participation), including 10 men (67.50%) and 6 women (32.50%). Ages ranged from 23 to 75 years (mean 47.06, SD = 14.53). Patients had been diagnosed with AD for a minimum of 4 months to a maximum of 7 years.

Table 1. Participant characteristics (n = 16)

Variables	
Age, years (range)	47.06 (23-75)
Time of AD diagnosis, months(range)	23.66 (4-84)
Gender	
Male	10 (62.5)
Female	6 (27.5)
Education levels	
Primary school or below	3(18.75)
Middle school	7(43.75)

High school	3(18.75)
College or above	3(18.75)
Place of residence	
City	7 (43.75)
Rural	9 (56.25)
classification of AD	
Stanford Type A	9 (56.25)
Stanford Type B	7 (43.75)

Themes

The themes and subthemes based on the COM-B model are presented in table 2.

Table 2. Themes and subthemes

COM-B model	Themes	Subthemes
Capability	Psychological	Lack of disease knowledge
	Physical	Physical function limitation
		Fatigue
		Limited access to disease knowledge
Opportunity	Physical	Communication between providers and patients
		Objective condition restriction
	Social	Stigma
		Social support
Motivation	Reflective	Self-efficacy
		Sence of health benefits
		Personal and family responsibilities
	Automatic	Posttraumatic growth

Capability

Psychological capability

Sub themes under psychological capability comprised of:

Lack of disease knowledge

Many patients lacked the necessary knowledge and understanding of the various causes and risks of aortic dissection.

I have never heard of this disease. I've always been healthy. Could there be a mistake? (No. 3)

Due to the lack of knowledge about the disease, and patients were concerned about the adverse reaction of exercise, which may lead to recurrent AD events or sudden death.

I used to run all the time, but now I dare not, because I am afraid of the recurrence of the disease if I exercise too much. (No.14)

In addition, patients and their families have misconceptions due to lack of knowledge, which is not conducive to adopting a healthy lifestyle.

I got this disease because I was too fat, so I eat some vegetarian food every day, and basically don't eat meat. (No.9)

Physical capability

Sub themes under physical capability comprised of:

Physical function limitation

Many of the patients were elderly, whose physical function declined, and often combined with chronic diseases, which limited their activities.

I would like to try the recommended exercise, but I'm old with low vision.Besides,I had a stroke two years ago and I couldn't walk steadily, so I could only do simple activities with my upper limbs. (No.7)

Fatigue

Patients are often frustrated by not being able to return to their pre-illness state, which is manifested in a loss of role due to fatigue, and some patients have feelings of guilt and self-blame due to their dependence on family and friends after experiencing fatigue symptoms.

I'm worried I won't be able to get back to the way I was before I got sick, andI need more time to rest now. (No. 2)

Patient returning to work may also be affected by fatigue, making it difficult to maintain their previous ability to work. In addition, patients said that fatigue symptoms also affected their social interaction, and some patients even avoided social activities.

I used to be able to work all day, but now I feel tired after only a short period of work. (No. 8)

Limited access to disease knowledge

Many patients lacked the ability to acquire knowledge through multiple channels, and medical staffs were the main way for them to acquire disease-related health knowledge and skills.In particular, elderly or less educated patients lacked access to multimedia information such as the Internet and mobile phones.

There is no other access to knowledge, I use the elderly mobile phone, also do not surf the Internet, sometimes I also want to know more about this disease, but there is no place to read. (No.16)

Opportunity

Physical opportunity

Communication between providers and patients

Poor communication between medical staffs and patients was found. Many patients complained that their medical staff did not tell them enough disease information about their diagnosis, medicine, and recommended behaviour modification.

My doctor didn't elaborate… he said, "You have to take the medicine, just write the name of the medicine and go away without any explanation. (No.9)

Objective condition restriction

The health promotion behaviour of AD patients was influenced by economy, residence, medical conditions, reimbursement system, and COVID-19 pandemic.

I've always wanted to go for a check-up, but the hospital in my city has limited medical services, so I had to go to the provincial capital. It's cumbersome and expensive to go there and back. (No.14)

Social opportunity

Stigma

People were afraid to disclose their disease because of social stigma. AD patients are generally considered weak and unable to live normally. Stigma attached to AD may have influenced social activity and health seeking behaviours that lead to social isolation and complications in subsequent treatment. This is more obvious in young patients.

I am afraid that my relatives and friends might tease me about my disease, and therefore prefer being alone ... I feel inferior and ashamed. (No. 3)

It is really humiliating to have this disease at a young age, and I didn't want to be labeled as a patient, so I didn't take my medication and follow up on time, which led to a recurrence. (No. 11)

Social support

Family support is the most important support resource for patients with AD, which can effectively stimulate their potential health consciousness and greatly promote health behaviour change.

Since my illness, my mother attaches great importance to it, she changed soybean oil into healthier olive oil, and cooking has become light. They support me so much, I must change myself! (No. 15)

Due to the similar feeling and experience of disease, peer support can stimulate patients' internal motivation and play a positive role in their disease management and psychological health.

I didn't want to disturb others, so I joined the patients' association. I felt that I had

found an organization that could share joys and sorrows and was not afraid of being teased. We supervise and encourage each other, so far I have never touched a drop of alcohol. (No. 2)

I felt depressed and pessimistic at first, until I saw that the ward mate in the next bed who were sicker than me were so positive and optimistic that I thought I should be like them. （No.15）

Motivation

Reflective motivation

Self-efficacy

Trauma event is the trigger of self-efficacy. High levels of self-efficacy can stimulate patients' subjective initiative, and have a significant impact on patients' compliance and self-management ability.

I used to eat what I wanted, regardless of the consequences. Now I firmly control myself. (No.14)

However, patients with low self-efficacy expressed lack of determination to overcome various obstacles and poor confidence in their ability to follow health behaviour.

I know I should do more exercise every day, which is good for my health, but I'm just lazy and don't want to move. (No.3)

To be honest, I can't control my gluttonous mouth. The short term can last, and the long term is really difficult for me. I'm afraid I can't. (No.13)

Sence of health benefits

Most patients said that physical benefits and mental relaxation were their motivations

for adhering to health promotion behaviours.

I used to have high blood pressure and blood sugar, and I didn't take any medicine. I always felt tired. Now I have a light diet and taking medicine on time, my health is much better. (No.9)

I do Tai Chi every morning, and I feel relaxed, my hands and feet are more flexible, and I don't think at random all day. (No.5)

While a few patients expressed a negative attitude towards health promotion behaviours because they could not perceive the benefits from it.

On the doctor's advice, I stopped drinking for a while, but I didn't see any benefit. On the contrary, sometimes drinking wine can relieve fatigue. (No.8)

Personal and family responsibilities

Some patients mentioned that taking health promotion behaviour is a kind of responsibility to individuals and families. Under this responsibility, they have the obligation to maintain health behaviour.

As a breadwinner, I must take good care of my body and keep my blood pressure under control. I can't take another hit like this. (No.6)

Automatic motivation

Posttraumatic growth

As a serious disease trauma, AD patients are prone to post-traumatic stress disorder, and will also produce a series of positive changes, namely post-traumatic growth. The majority of patients said that they re-examined the meaning of life, changed their concept and value pursuit of life, and learned to be content.

The disease is a warning to me. I used to work hard to make money, but it ruined my health. It's meaningless and not worth it. (No.13)

It's no use being afraid. Just be calm and positive ... I feel extremely grateful compared with the patients who have been killed by this disease. (No. 9)

Fear of disease progression

AD has a high mortality and complication rate. The psychological burden of fear of disease progression prompted most patients to take effective secondary and tertiary preventive measures to control or eliminate risk factors for recurrent aortic dissection.

It's a terrible disease. I was on the verge of death. Fortunately, I survived. I dared not be careless, so I have more regular rest and diet. (No.9)

Although the recovery is good now, the doctor said it might recur. The disease is like a time bomb. I don't know when it will come back, so I pay special attention to my living habits. (No.2)

4 DISCUSSION

To our knowledge, this is the first qualitative study to apply the COM-B model to explore the influencing factors of health promotion behaviour in patients with AD. These findings will contribute to the development of an appropriate and feasible behaviour change intervention for patients with AD to promote their health behaviour.

Capability factors

The lack of knowledge and misconceptions about AD were major factors affecting patients' psychological capability. Previous quantitative studies showed that many AD patients express a lack of understanding and desire for further knowledge[8].

Knowledge and cognition play an important role in changing behaviour. According to the intervention function of the behaviour change wheel[9], the capabilities of patients with AD can be enhanced by providing education and and coping strategy training. Therefore, medical staffs can conduct health education for AD patients according to the factual information of the specific condition, such as the causes and symptoms of the disease, drug knowledge, improvement of lifestyle habits, exercise intensity and risk prevention, to increase their knowledge and cognition[14].

Physical function limitation and fatigue were identified as a barrier for health promotion behaviour under the component of physical capability. Many AD patients were elderly. Due to significantly decreased physical function, forgetfulness and poor eyesight, the patients found it difficult to perform diet and exercise rehabilitation as recommended. Therefore, medical staff should carefully evaluate patients' physical conditions and encourage patients to begin by setting up an affordable and safe health behaviour goal based on their physical health status. Besides, fatigue appeared to be a significant barrier.The study on fatigue in AD is limited. This study found that fatigue leads to a series of complex psychological experiences such as frustration and self-blame, and also creates challenges in AD patients' daily life, employment and social life. Therefore, medical staff should focus on the screening and assessment of fatigue in AD patients [15], and develop strategies such as cognitive behavioural therapy[16], including psychological education, daily activities, energy conservation and cognitive reconstruction, which can be used to enhance patients' cognition and coping ability to fatigue.

Opportunity factors

There are various physical opportunities barriers related to the time,economy, residence,healthcare systems and public health emergencies could lead to delayed diagnosis and irregular follow-ups. Behaviour change intervention for people with limited resources needs to be tailored and governments need to develop policies that improve the availability and affordability of health choices to reduce health disparities[17].In addition, telemedicine services can be implemented to overcome barriers to distance and access to care[18].

Communication between providers and patients was identified as a barriers for health promotion behaviour under physical opportunity theme. We found that medical staff did not meet meeting patients' needs for communication and adequate information, and patients are mostly limited to understanding what changes should be made, and lack the actionable and personalized self-management skills to achieve good behaviour change. This may be due to staff being clinically busy, time constraints and lack of communication skills. communication-skills training should therefore be developed for medical satff so they can implement strategies to overcome communication barriers with patients [19]. In addition, counseling services can also be provided by training dedicated health care personnel or nurses to ease the need for doctor-patient communication that is hampered by human resource shortages and work overload[20].

Stigma was identified as a barriers under social opportunity theme. This study found that due to the stigma, AD patients often exclude interaction with others and have

different degrees of alienation from the surrounding people and society . In addition, stigma also affects the compliance behavior of patients, who are often unwilling to take medication regularly or even refuse treatment. These findings suggest that interventions should focus on education, modelling and enablement to reduce stigma among people with AD.

As an indispensable part of individual health promotion, social support affects the formation and persistence of health behaviours.In this study, AD patients felt the care and support from family, peers and medical staff, which met their emotional and information needs to a certain extent, and promoted the establishment of health behaviour. Therefore, medical staff should pay attention to the disease needs of AD patients, provide targeted emotional and informational support, and actively mobilize families and communities to help patients cope with the various physical and psychological challenges. In addition, peer support intervention can be used to alleviate the psychological distress and improve self-management of AD patients [21].

Motivation factors

We found that self-efficacy is an important factor for the health promotion behaviour of AD patients, which is consistent with other research results[22]. Our finding further emphasizes that regular motivational support from health professionals such as medical specialists, nutritionists, psychotherapists is highly beneficial for AD patients to foster positive and sustained health promotion behaviour. Zheng et al[23] constructed a nurse-led lifestyle intervention program based on health promotion

model, including face-to-face education session, educational booklet and telephone follow-ups, which effectively improved self-efficacy and implementation of health promotion behaviour in patients with metabolic syndrome. Therefore, medical staffs should provide ongoing educational support and practical advice helped AD patients overcome the anticipated and perceived barriers in behaviour changes, guide patients to perceive the benign experience of implementing health promotion behaviour and increase thier motivation and confidence .We also found that health benefit, personal and family responsibilities and fear of disease progression were important motivations for practicing health promotion behaviour in AD patients. Patients stated that their fear of disease progression was the driving force behind changing their health behaviour. When they began to experience positive physical and mental benefits from health behaviour change, they become more willing to adopt health promotion behaviour. On the contrary, it will directly affect their attitude and adherence to health promotion behaviour. Interestingly, this study found that AD patients' motivational change was a process of calculating risk, which is similar to a previous study on sexual health behaviour that suggested that risk-benefit analysis affects motivation risk [11]. These findings show that the intervention should focus on the education of health consequences and dynamically respond to AD patients' risk-benefit analysis to enhance their motivation.In addition, posttraumatic growth was identified as a facilitator. AD patients are prone to anxiety, depression and posttraumatic stress disorder due to pain and sense of near death in the course of the disease and the threat of various cardiovascular risk events after the disease[4-8]. This study found that the

traumatic experience of AD can also lead to positive changes and growth in self-awareness, interpersonal experience and life values. Few studies have examined posttraumatic growth in patients with AD. Studies have shown that post-traumatic growth can significantly reduce the stress symptoms of cancer patients, and have a positive impact on their mental health and quality of life[24]. Therefore, medical staffs should pay enough attention to the posttraumatic growth phenomenon of AD patients, actively explore their positive growth and changes, and improve posttraumatic growth level through corresponding interventions, such as acceptance and commitment therapy[25] and mindfulness-based stress reduction therapy[26], to promote their health behaviour change.

LIMITATIONS

This study has some limitations. Firstly, the study was qualitative and failed to explore the extent to which ability, opportunity, and motivation factors influenced patients' health promotion behaviour. Secondly, the study relied on patients' self-reported data, which may be influenced by memory bias and social desirability bias.In addition, the study had a small sample and patients were recruited from the hospital, while patients from other settings, such as communities, were not recruited. Thus generalizability of these findings to other other settings may be limited. Therefore, it is necessary to conduct quantitative and longitudinal studies with large samples in the future to further explore the research results.

5 CONCLUSIONS

This study adopted a qualitative approach and conducted in-depth interviews with 16

AD patients to analyse their health promotion behaviour based on the COM-B model. This study demonstrated that Psychological Capability, Physical and Social Opportunity, and Reflective and Automatic Motivation are crucial for explaining health promotion behaviour in patients with AD. These findings can be applied to design interventions for practice and further research, promoting the better implementation of health promotion.

Data availability statement

Data are available on reasonable request. Original data are available on request by emailing the first author, who will delete any personal identification information.

Ethics statements

Patient consent for publication

Not applicable.

Ethics approval

This study involves human participants and the study was approved by the Ethics Committee of the Fujian Medical University Union Hospital (2022KY189). All participants provided written informed consent before participating in the study.

AUTHOR CONTRIBUTIONS

Liangwan Chen and Yanjuan Lin designed the study. Jia Gao and Qiong Pan performed data collection and analysis and wrote the original draft of the manuscript. Sailan Li ,Shaolin Chen and Baolin Luo were involved in the data analysis. Liangwan Chen and Yanjuan Lin revised the draft critically.All authors commented on the manuscript and approved the final manuscript.

ACKNOWLEDGEMENTS

The authors are very thankful to the participants, for their contributions to this study.

FUNDING STATE

This study was supported by grants from Toint Funds of Science and Technology of Fujian Province (2021Y0023)) and the The Fifth Batch of Hospital Key Discipline Construction Projects-Clinical Nursing (2022YYZDXK01).

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1. Tang X, Lu K, Liu X, et al. Incidence and Survival of Aortic Dissection in Urban China: Results from the National Insurance Claims for Epidemiological Research (NICER) Study [J]. Lancet Reg Health West Pac, 2021, 17(100280. doi: 10.1016/j.lanwpc.2021.100280
2. Sharma A, Manunga JM, Stanberry L, et al. Is Compliance With Guideline Recommended Follow-Up After Aortic Dissection Associated With Survival? [J]. Ann Thorac Surg, 2022, 113(3): 846-852. doi: 10.1016/j.athoracsur.2021.04.010
3. Eranki A, Wilson-Smith A, Williams ML, et al. Quality of life following surgical repair of acute type A aortic dissection: a systematic review [J]. J Cardiothorac Surg, 2022, 17(1): 118. doi: 10.1186/s13019-022-01875-x
4. Pasadyn SR, Roselli EE, Artis AS, et al. From Tear to Fear: Posttraumatic Stress Disorder in Patients With Acute Type A Aortic Dissection [J]. J Am Heart Assoc, 2020, 9(9): e015060. doi: 10.1161/jaha.119.015060
5. Tsao CW, Aday AW, Almarzooq ZI, et al. Heart Disease and Stroke Statistics-2023 Update: A Report From the American Heart Association [J]. Circulation, 2023, 147(8): e93-e621. doi: 10.1161/cir.0000000000001123
6. Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines [J]. J Am Coll Cardiol, 2019, 74(10): 1376-1414. doi: 10.1016/j.jacc.2019.03.009
7. Tu J, Wang F, Yin F, et al. The relationship between quality of life and health promotion behavior in patients with type B aortic dissection: a cross-sectional study [J]. J Cardiothorac Surg, 2023, 18(1): 23. doi: 10.1186/s13019-023-02124-5
8. Chaddha A, Kline-Rogers E, Braverman AC, et al. Survivors of Aortic Dissection: Activity, Mental Health, and Sexual Function [J]. Clin Cardiol, 2015, 38(11): 652-659. doi: 10.1002/clc.22418
9. Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions [J]. Implement Sci, 2011, 6(42. doi:

10.1186/1748-5908-6-42

10. Ee C, MacMillan F, Boyages J, et al. Barriers and enablers of weight management after breast cancer: a thematic analysis of free text survey responses using the COM-B model [J]. BMC Public Health, 2022, 22(1): 1587. doi: 10.1186/s12889-022-13980-6

11. Madhani A, Finlay KA. Using the COM-B model to characterize the barriers and facilitators of pre-exposure prophylaxis (PrEP) uptake in men who have sex with men [J]. Br J Health Psychol, 2022, 27(4): 1330-1353. doi: 10.1111/bjhp.12605

12. O'Donovan B, Mooney T, Rimmer B, et al. Advancing understanding of influences on cervical screening (non)-participation among younger and older women: A qualitative study using the theoretical domains framework and the COM-B model [J]. Health Expect, 2021, 24(6): 2023-2035. doi: 10.1111/hex.13346

13. Al-Amer R, Ramjan L, Glew P, et al. Translation of interviews from a source language to a target language: examining issues in cross-cultural health care research [J]. J Clin Nurs, 2015, 24(9-10): 1151-1162. doi: 10.1111/jocn.12681

14. Lang X, Feng D, Huang S, et al. How to help aortic dissection survivors with recovery?: A health promotion program based on the comprehensive theory of health behavior change and literature review [J]. Medicine (Baltimore), 2023, 102(7): e33017. doi: 10.1097/md.0000000000033017

15. Velvin G, Johansen H, Østertun-Geirdal A, et al. Fatigue in patients with syndromic heritable thoracic aortic disease: a systematic review of the literature and a qualitative study of patients' experiences and perceptions [J]. Orphanet J Rare Dis, 2023, 18(1): 119. doi: 10.1186/s13023-023-02709-2

16. Lanctôt KL, Lindsay MP, Smith EE, et al. Canadian Stroke Best Practice Recommendations: Mood, Cognition and Fatigue following Stroke, 6th edition update 2019 [J]. Int J Stroke, 2020, 15(6): 668-688. doi: 10.1177/1747493019847334

17. Alageel S, Alhujaili M, Altwaijri Y, et al. Barriers and facilitators to adopting healthier lifestyle among low-income women in Saudi Arabia: A qualitative study [J]. Health Expect, 2023, 26(3): 1202-1212. doi: 10.1111/hex.13735

18. Batsis JA, DiMilia PR, Seo LM, et al. Effectiveness of Ambulatory Telemedicine Care in Older Adults: A Systematic Review [J]. J Am Geriatr Soc, 2019, 67(8): 1737-1749. doi: 10.1111/jgs.15959

19. Cvetanovska N, Jessup RL, Wong Shee A, et al. Patients' perspectives of factors influencing active participation in healthcare interactions: A qualitative study [J]. Patient Educ Couns, 2023, 114(107808. doi: 10.1016/j.pec.2023.107808

20. Kappes M, Espinoza P, Jara V, et al. Nurse-led telehealth intervention effectiveness on reducing hypertension: a systematic review [J]. BMC Nurs, 2023, 22(1): 19. doi: 10.1186/s12912-022-01170-z

21. Lorthios-Guilledroit A, Filiatrault J, Richard L. What are the factors associated with the implementation of a peer-led health promotion program? Insights from a multiple-case study [J]. Health Educ Res, 2019, 34(6): 578-591. doi: 10.1093/her/cyz028

22. Brouwer-Goossensen D, den Hertog HM, Mastenbroek-de Jong MA, et al. Patient perspectives on health-related behavior change after transient ischemic attack or ischemic stroke [J]. Brain Behav, 2021, 11(4): e01993. doi: 10.1002/brb3.1993

23. Zheng X, Yu H, Qiu X, et al. The effects of a nurse-led lifestyle intervention program on cardiovascular risk, self-efficacy and health promoting behaviours among patients with metabolic syndrome: Randomized controlled trial [J]. Int J Nurs Stud, 2020, 109(103638. doi: 10.1016/j.ijnurstu.2020.103638

24. Liu Z, Doege D, Thong MSY, et al. The relationship between posttraumatic growth and health-related quality of life in adult cancer survivors: A systematic review [J]. J Affect Disord, 2020, 276(159-168. doi: 10.1016/j.jad.2020.07.044

25. Li H, Wong CL, Jin X, et al. Effects of Acceptance and Commitment Therapy on health-related outcomes for patients with advanced cancer: A systematic review [J]. Int J Nurs Stud, 2021, 115(103876. doi: 10.1016/j.ijnurstu.2021.103876

26. Witek Janusek L, Tell D, Mathews HL. Mindfulness based stress reduction provides psychological benefit and restores immune function of women newly diagnosed with breast cancer: A randomized trial with active control [J]. Brain Behav Immun, 2019, 80(358-373. doi: 10.1016/j.bbi.2019.04.012

Semi-structured interview guide

1 What do you think about this disease? How did your lifestyle change after being diagnosed with this disease?

2 What factors do you think have been driving your lifestyle change? Why?

3 What are the interventions that have helped you promote a healthy lifestyle? How are these measures obtained?

4 Did you receive advice about a healthy lifestyle in the hospital? Are you planning to follow this advice?

5 Have you encountered any difficulties in maintaining health promotion behaviour? How is it handled?

6 Can you talk about the life changes and health promotion changes you experienced when you were diagnosed with an aortic dissection? What other ways do you think you might use to promote health in the future?

BMJ Open

Influencing factors of health promotion behaviour in patients with aortic dissection: A qualitative study using the COM-B model

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2023-076181.R2
Article Type:	Original research
Date Submitted by the Author:	13-Oct-2024
Complete List of Authors:	Gao, Jia; Fujian Medical University Union Hospital, Department of Cardiac Surgery Nursing Pan, Qiong; Fujian Medical University Union Hospital, Department of Nursing Li, Sai; Fujian Medical University Union Hospital, Department of Cardiac Surgery Nursing Chen, Shaolin; Fujian Medical University Union Hospital, Department of Cardiology Nursing Luo, Baolin; Fujian Medical University Union Hospital, Department of Cardiac Surgery Nursing Chen, Liangwan; Fujian Medical University Union Hospital, Department of Cardiac Surgery Lin, Yanjuan; Fujian Medical University Union Hospital, Department of Nursing；Department of Cardiac Surgery Nursing
Primary Subject Heading:	Nursing
Secondary Subject Heading:	Qualitative research, Public health
Keywords:	QUALITATIVE RESEARCH, Nursing Care, CARDIOLOGY

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

TITEL PAGE

Title: Influencing factors of health promotion behaviour in patients with aortic dissection: A qualitative study using the COM-B model

Order of Authors:

Jia Gao [1],Qiong Pan[2], Sailan Li [1], Shaolin Chen[3], Baolin Luo[1], Liangwan Chen[4] *, Yanjuan Lin [1,2]*

*: Yanjuan Lin and Liangwan Chen are co-corresponding authors.

Author affiliations:

1 Department of Cardiac Surgery Nursing, Fujian Medical University Union Hospital, Fuzhou, China

2 Department of Nursing, Fujian Medical University Union Hospital, Fuzhou, Fujian Province, China

3 Department of Cardiology Nursing， Fujian Medical University Union Hospital, Fuzhou, Fujian Province, China

4 Department of Cardiac Surgery, Fujian Medical University Union Hospital, Fuzhou, China

Corresponding Author:

Yanjuan Lin

(1) Department of Nursing, Fujian Medical University Union Hospital, Fuzhou, Fujian Province, China.

(2) Department of Cardiac Surgery Nursing, Fujian Medical University Union Hospital, Fuzhou, Fujian Province, China. Fax: +8683344034, Tel: +86059186218581, Email: fjxhyjl@163.com

Liangwan Chen

Department of Cardiac Surgery, Fujian Medical University Union Hospital, Fuzhou, Fujian

Province, China. Fax: +86059183301393, Email: fjxhlwc@163.com

Influencing factors of health promotion behaviour in patients with aortic dissection: A qualitative study using the COM-B model

Abstract

Objectives: This study aimed to understand influencing factors of health promotion behaviour in patients with aortic dissection (AD) using the capability, opportunity, motivation, behaviour (COM-B) model of behaviour.

Design: A descriptive qualitative design was adopted. Data were collected using face-to-face semistructured interviews and analyzed using directed content analysis.

Setting: Fujian Medical University Union Hospital

Participants: A purposive sample of 16 AD patients were recruited.

Results: The themes and subthemes were identified: psychological capability: (1)lack of disease knowledge; physical capability: (1)physical function limitation; (2) fatigue;physical opportunity: (1) limited access to disease knowledge; (2) communication between providers and patients; (3) objective condition restriction; social opportunity: (1) stigma; (2) social support; reflective motivation: (1) self-efficacy; (2) perceived benefits; (3)personal and family responsibilities; automatic motivation: (1) posttraumatic growth; (2) fear of disease progression.

Conclusion: This study adopted a novel approach to understanding factors affecting

health promotion behaviour among patients with AD. Interventions can be implemented using the Behaviour Change Wheel framework and our findings to improve health promotion behaviour in this patient population.

Keywords: qualitative research; COM-B model; aortic dissection ; health promotion behaviour; influencing factors.

Strengths and limitations of this study

1.This study used the COM-B model to analysis of the factors influencing health promotion behaviour in individuals with aortic dissection.

2.This study employed maximum variation sampling to recruit patients with diverse demographic and disease characteristics, thus allowing a wider range of perspectives to be included in the analysis.

3.This study relied on patients' self-reported data, which may be influenced by memory bias and social desirability bias.

Introduction

Aortic dissection (AD) is an infrequent yet severe cardiovascular condition caused by a tear in the inner layer of the aorta[1]. According to the Stanford system, AD can be categorized into Stanford type A (involving the ascending aorta) and type B (not involving the ascending aorta). The incidence of AD in China is 2.78/100,000[2].

In recent years, with the advancement of diagnostic and treatment techniques, the survival rate of AD has steadily improved[3]. However, AD survivors still face many

challenges such as postoperative complications, impaired physical function, reduced quality of life, and psychological trauma[4-7].

Health promotion behaviour refers to a series of behavioural activities undertaken by individuals to achieve the best health state and realize self-worth. Studies have shown that effective health promotion behaviour interventions can improve cardiac function in individuals with cardiovascular disease, enhance their quality of life, and reduce the risk of disease recurrence[8-11]. Health promotion behaviour that has been recommended for patients with AD include dietary control, physical activity, cessation of smoking, medication adherence, and adherence to medical recommendations ((such as monitoring blood pressure and body weight daily)[12]. However, despite the clear importance of health behaviour following an AD , patients' adherence to these medical recommendations remains suboptimal [5-13].

Dentifying the determinants of health promotion behaviour in patients with AD, especially modifiable and intervenable factors, is critical to inform the development of evidence-based interventions. However, there are few studies on the influencing factors of health promotion behaviour in AD patients. Research suggests the use of theoretical frameworks can be most effective when understanding behaviour,with the ability, opportunity, motivation, behaviour model (COM-B model) being a recommended approach[14]. The advantage of the COM-B model is that it provides a novel and comprehensive approach to explain the barriers and facilitator factors of behaviour change and provide a basis for the design of behavioural interventions. Therefore, COM-B model has been applied to many clinical problems[15-17], but has

not yet been applied to the health promotion behaviour of AD patients. The aim of this study was to use the COM-B model to describe influencing factors of health promotion behaviour from the perspective of AD patients.

Methods

Patient and public involvement

None

Design

A qualitative descriptive study using semi-structured interviews was conducted[18]. This study was reported according to the consolidated criteria for reporting qualitative research guidance[19].

Setting

This study took place at Fujian Medical University Union Hospital, which is one of the largest comprehensive tertiary hospitals in Fujian Province, located in southeast China. The hospital has been designated as a National Regional Medical Center for Cardiovascular Diseases. The Department of Cardiac Surgery performs more than 3000 cardiac surgeries annually, covering the patient cohort of a variety of cardiovascular diseases such as heart transplantation, aortic dissection, heart failure, heart valve disease, coronary artery disease, and congenital heart defects.

Sampling and recruitment

Case-study sampling with maximum variation was employed to select potential participants from the outpatient and ward of the cardiac surgery department at Fujian

Medical University Union Hospital between October 2022 to February 2023. Eligible participants were contacted individually and informed about the study on-site by attending physicians and researchers. Inclusion criteria for this study were as follows: a diagnosis of Stanford Type A or Type B AD (Stanford Type A AD was defined as any non-traumatic dissection involving the ascending aorta, and Stanford Type B AD was defined as any non-traumatic dissection involving the descending aorta), age over 18, and a minimum disease duration of 3 months. Patients with severe mental illness or cognitive impairment were excluded.The sample size was determined based on the achievement of theme saturation. A total of 16 patients were interviewed for the study and assigned identification numbers No.1-No.16 to maintain confidentiality. This study received review and approval from the Ethics Committee of Fujian Medical University Union Hospital (2022KY189).

Data collection

Individual semi-structured face-to-face interviews were adopted for data collection. The interview guide (online supplemental file 1) was based on literature, group discussions, and a preliminary pilot study with two patients. The interviews were conducted in an independent and private room to address the participants' privacy concerns. Prior to the interview, participants were provided with a clear explanation of the study's objectives. Written informed consent was obtained from voluntary participants, and socio-demographic data were collected. Interviews were facilitated in in Mandarin Chinese by JG and QP (Master's Degree). Both were clinical fellows with qualitative research training. The interviewers had no prior involvement in the

patients' care prior to the study. No one was present except the participants and researchers. The interviews lasted for 30–60 min, were audio-recorded. The research team took field notes during data collection. After the interviews, the participants had the opportunity to check the transcripts, and unclear answers were clarified in a second interview. There were no repeated interviews for this study.

Data analysis

Data collection and data analysis were conducted simultaneously. All transcripts were imported into NVivo V.11.0 software and were independently coded by the first and the second authors. Any discrepancies were discussed by the research group to reach consensus. The analysis was conducted using the directed content analysis approach[20]. The steps of analysis included the followings: (a) The transcripts that reflected the influencing factors of health promotion behaviour of AD patients were used as the minimum analysis units. (b) The initial data were reviewed and read repeatedly. (c) The COM-B model was used as a framework to categorize the unit of analysis. (d) The significant ideas and concepts in the data were coded and marked, and similar codes were classified into corresponding categories to form themes and sub-themes. (e) The results were interpreted and analyzed, and the link between the data and the results was formed. The quotations were translated into English by professional translators who were not part of the research team using the forward-backward method[21].

Rigour

The rigour of this study was achieved in these following ways: First, the COREQ

criteria were used to guide the reporting of this study [11]. Second, a heterogeneous sample was deliberately chosen to ensure adequate representation of diverse perspectives and experiences. Additionally, field notes were consistently maintained to ensure comprehensive and detailed data collection. Finally, two researchers conducted independent data analysis and discussed with the research team to form the final coding and themes.

Results

Participants' characteristics

Table 1 shows the characteristics of participants. The sample included 16 participants (25 participants were approached but 9 did not fulfill inclusion criteria or refused participation), including 10 men (67.50%) and 6 women (32.50%). Ages ranged from 23 to 75 years (mean 47.06, SD = 14.53). The patients had been diagnosed with AD for a minimum of 4 months to a maximum of 7 years.

Table 1. Participant characteristics (n = 16)

Variables	
Age, years (range)	47.06 (23-75)
Time of AD diagnosis, months(range)	23.66 (4-84)
Gender	
Male	10 (62.5)
Female	6 (27.5)
Education levels	
Primary school or below	3(18.75)
Middle school	7(43.75)
High school	3(18.75)

College or above	3(18.75)
Classification of AD	
Stanford Type A	9 (56.25)
Stanford Type B	7 (43.75)

Themes

The themes and subthemes based on the COM-B model are presented in table 2.

Table 2. Themes and subthemes

COM-B model	Themes	Subthemes
Capability	Psychological	Lack of disease knowledge
	Physical	Fatigue
		Physical function limitation
Opportunity	Physical	Limited access to disease knowledge
		Communication between providers and patients
		Objective condition restriction
	Social	Stigma
		Social support
Motivation	Reflective	Self-efficacy
		Perceived benefits
		Personal and family responsibilities
	Automatic	Posttraumatic growth
		Fear of disease progression

Capability

Capability refers to an individual's physical and psychological capability to engage in relevant activities. Psychological capability refers to the knowledge and psychological skills involved in necessary thinking processes. Physical capability refers to physical skills, strength or endurance.

Psychological capability

lack of disease knowledge

Many patients exhibited a lack of essential knowledge and understanding regarding the diverse causes and associated risks of AD. Some patients expressed that they had been completely unaware of AD prior to this experience.

I had never heard of this disease.I had consistently regarded myself as being in good health. Could it potentially be a misdiagnosis by the doctor? (No. 3,female, mid 30s)

Some patients were aware of the importance of dietary modification and physical activity in promoting their general well-being. However, their knowledge in these areas was inadequate. Due to a lack of nutritional knowledge, some patients adopted harmful dietary patterns.

I attributed my illness to obesity. Consequently, I rigorously followed a vegetarian diet and markedly decreased my meat consumption. (No. 9, male, late 50s)

Some patients reported that they did not know about the kind of exercises required for this and expressed their concern about potential adverse effects following physical activity.

I used to run regularly, but I recently stopped due to concerns about the potential

risk of over-exercising triggering a relapse. (No.14, female, early 20s)

Physical capability

Fatigue

Some patients indicated that the physical symptoms associated with the disease, such as fatigue, considerably hinder their ability to participate in daily activities, thus detrimentally affecting their quality of life and mental well-being.

Previously, I was capable of working continuously throughout the day, yet currently, I easily feel fatigued after only a short period of work. (No. 8, female, late 40s)

Physical function limitation

Some patients reported that they faced many challenges when starting the health promotion program due to decreased physical function and comorbidities.

I am eager to participate in the suggested exercises. However, my advanced age and visual impairments pose considerable challenges. Furthermore, following a stroke I suffered two years ago, my mobility has been negatively impacted, making it difficult to maintain a consistent daily exercise regimen. (No.7, male, mid 70s)

Opportunity

Opportunity refers to external factors that enable or prompt the behaviour, including physical opportunity (time, resources, etc.) and social opportunity (perceptions, interpersonal influence, etc.).

Physical opportunity

Limited access to disease

Due to insufficient exposure to AD , medical staff emerged as the primary source of

disease knowledge for patients. Many patients, particularly the elderly and those with lower levels of educationa, faced challenges in obtaining information from diverse sources.

My formal education is constrained , and I am neither literate nor able to access the internet.Therefore, I primarily acquire knowledge through interactions with healthcare professionals such as doctors and nurses. (No.4, female, early 50s)

Communication between providers and patients

It was observed that there was inadequate communication between medical staff and patients. Most patients complained that they could not obtain sufficient information about their diseases and treatments from medical staff, as they were occupied with their work most of the time.

The doctor only told me that I need to take these medications for life. I wanted to know more details from them, but they were always very busy. (No.9, male, late 50s)

Objective condition restriction

Due to financial and geographical constraints, patients were restricted to choosing nearby hospitals, and they were unable to access higher-quality medical services.

I had originally intended to go to the hospital. however, I chose to remain silent as I understood our situation at home and acknowledged that we could not afford the necessary treatment. (No.16, male, early 50s)

Social opportunity

Stigma

Some patients were afraid to disclose their disease because of social stigma. People

with AD are often considered weak and unable to live normally.

I am afraid that my relatives and friends might tease me about my disease, so I prefer to be alone.I feel inferior and ashamed. (No. 3, female, mid 30s)

Social support

Most patients identified the importance of social influence via support from family and friends as important facilitators of health behaviour participation.

My mother specially learned nutrition knowledge , and combined with my taste preferences and physical conditions, carefully selected various kinds of healthy food for me. (No. 11, male, late 20s)

Sincere support from peers can offer significant emotional and psychological assistance, thereby enabling patients to approach their condition with a more optimistic perspective.

I joined the patients association, where I met numerous members who faced similar challenges. We provided mutual support and encouragement. This collective strength significantly bolstered my confidence in recovery. (No. 2, male , early 30s)

Motivation

Motivation refers to the brain processes that energize and direct behaviour,which is divided into reflective motivation (planning and evaluation) and automatic motivation (emotions, impulses, etc.).

Reflective motivation

Self-efficacy

Self-efficacy was most common mentioned as a barrier or facilitator of health-related

behaviour change. A high level of self-efficacy could effectively stimulate patients' subjective initiative, motivating them to actively adopt and maintain health behaviour rather than merely complying passively.

The process of smoking cessation was inherently challenging. Whenever I experienced a craving for smoking, I redirected my attention by listening to music. (No.12, male , late30s)

Conversely, patients with low self-efficacy tended to take no action or give up easily when facing challenges.

Controlling excessive eating has always been a formidable challenge for me. It might be possible to persist for a while, but not in the long. (No.13, male, early 40s)

Perceived benefits

Some patients reported that they experienced observable effects such as significant weight loss, improved physical condition or a reduction in medication prescriptions, which were beneficial and facilitated health behavior change.

I practiced Tai Chi every morning, which helped me achieve physical and mental relaxation, and enhanced my body coordination and mental clarity. (No.5, male, early 60s)

Personal and family responsibilities

Some patients exhibited a strong intrinsic motivation to engage in behaviour change, which was driven by personal and family responsibilities.

As the primary financial provider for my family, I could not afford to endure similar

health crises again. I had to take effective measures to protect my health. （No.6, male, late 30s）

Automatic motivation

Posttraumatic growth

Although AD is a stressful, challenging, and traumatic event, this difficult experience may promote personal growth for AD survivors, known as posttraumatic growth. Some patients reported that the diagnosis and surgery had provided them with motivation to engage in new possibilities for health behaviour to avoid future complications and appreciate the value of life.

My illness has served as a catalyst for personal growth and has made me realize the importance of appreciating life, because you never know what's going to happen. (No. 2, male , early 30s)

Fear of disease progression

Some patients expressed that their fear of disease progression motivated them to take effective secondary and tertiary prevention strategies in order to control or eliminate risk factors associated with complications.

AD was a significant wake-up call. I'm afraid of a relapse, so I tried to eat healthier to prevent it. (No.12, male, late 30s)

Discussion

To our knowledge, this is the first qualitative study to apply the COM-B model to explore the influencing factors of health promotion behaviour in patients with AD.

These findings will contribute to the development of an appropriate and feasible behaviour change intervention to promote behaviour change in patients with AD.

Capability

The psychological capability of patients was primarily hindered by inadequate knowledge and misconceptions regarding AD.Consistent with previous study[22] , AD patients in this study often had an insufficient understanding of the disease, its progression, and its management, coupled with a desire for further knowledge. Knowledge and cognition play a crucial role in seeking treatment and changing behaviour. These abilities can be effectively enhanced by providing knowledge education and coping strategy training based on the Behaviour Change Wheel[14]. This study found that barriers related to physical capability, such as treatment side effects, fatigue, and comorbidities, were the main limitations to engaging in health promotion behaviour, similar to previous findings in other population[23-24]. Fatigue is a common symptom experienced among patients with AD and has a severe impact on quality of life[25]. Patients reported experiencing fatigue that interfered with their ability to participate in daily life activities, resulting in an inability to live and working normally. Fatigue was also associated with a range of psychological disorders, such as anxiety, and cognitive impairment[26-27].Given the impact of fatigue, measuring and attending to fatigue may be important in promoting early intervention. Interventions should focus on cognitive behavioural therapy, exercise-related interventions, or energy management to alleviate fatigue[28-29].Comorbidities were a frequently barrier for patients to participate in

health promotion[30].It is crucial to tailor personalized health promtion programs for AD patients with specific comorbidities.

Opportunity

In this study, we identified that specific physical opportunities associated with healthcare systems and medical staff may contribute to delays in diagnoses and irregular follow-ups. To improve the healthcare system, continued financial and healthcare support is needed, as well as increased establishment of mobile health service platforms, telemedicine, and other accessible forms of healthcare. Communication between providers and patients was identified as one of the most important barriers to behaviour change in terms of physical opportunity. Consistent with prior study, this study found that staff failed to meet patients' needs for communication and adequate information[31].This may be due to the staff's demanding workloads or a lack of time and consultation skills. In China, the shortage of human resources and the heavy workload have seriously hindered the effective communication between medical staff and patients. Therefore, training in communication skills should be provided to medical staff to enable them to implement strategies to overcome communication barriers with patients. An alternative solution to this problem may be to use mobile phone text message to enhance treatment compliance[32], or to train allied health professionals or nurses in counselling services[33]. Although stigma has been identified as a barrier to seeking care and adhering to treatment[34], to the best of our knowledge, this study is the first to document the adverse impact of stigma on health promotion behaviour change in

patients with AD. Some patients reported that it is difficult to talk about their concerns with friends due to fears of being perceived as disabled, viewed differently, and treated unfairly. Therefore, addressing the psychological burden, improving disclosure skills, and raising public awareness of AD are essential. Studies have adopted the health stigma and discrimination framework in diverse contexts to address barriers associated with stigma in behaviour change[35].Social support was the primary barrier or facilitator in health behaviour change [36]. Consistent with prior study, this study found that especially partners and family play an indispensable role in disease management and support[37]. Furthermore，peer support was important[38]. Therefore, family and peers involvement should be considered as an important intervention point for improving health behaviour change.

Motivation

Self-efficacy was a significant determinant influencing behaviour change and maintenance within AD ,which is in line with the findings of previous studies[39]. Patients with low self-efficacy reported a lack of confidence in their ability to adhere to dietary recommendations and engage in physical activity. Therefore, interventions should focus on improving self-efficacy to promote long-term behaviour change. This can be achieved through behaviour change techniques, such as setting specific goals and self-monitoring [40]. Perceived benefits were identified as facilitators related to reflective motivation. This is consistent with previous studies in chronic disease and cancer populations[41-42]. Interestingly, fear of disease progression was a motivating factor for health behaviour change in AD patients.Some patients indicated that fear of

AD recurrence is often present and leads to motivation to make changes to promote their health in order to reduce risk of recurrence. Previous studies have also emphasized that the fear of disease progression is one of the common psychological reactions and facilitators to patients with stroke[43-44]. This study found that changes in patient motivation were a process of calculated risk, similar to the findings of a sexual health behaviour study, where risk-benefit analyses influence motivation[16]. Therefore, patients' awareness of personal risks and the impact of potential disease should be raised to motivate them to adhere to health behaviour at an early stage. Furthermore, posttraumatic growth was identified as a facilitator. After a traumatic illness experience, AD survivors showed closer intimate relationships, positive changes in spirituality, and an increased appreciation of life. Such finding is consistent with previous studies conducted in cancer populations[45-46]. Previous studies also have shown that posttraumatic growth is strongly associated with health-related behaviour changes, such as improved diet and physical fitness, and cessation of risky behaviours[47-48]. So far, interventions have focused on other patient and survivor groups, and more research is needed to learn more about particularities in survivors of AD. A recent meta-analysis focusing on cancer patients showed that psychosocial interventions including supportive group psychotherapy and multiple health behaviour change interventions increased posttraumatic growth[49].

Limitations

This study has some limitations. Firstly, this study was qualitative and failed to explore the extent to which ability, opportunity, and motivation factors influenced patients' health promotion behaviour. Secondly, this study relied on patients' self-reported data, which may be influenced by memory bias and social desirability bias.In addition, this study had a small sample and patients were recruited from the hospital, while patients from other settings, such as communities, were not recruited. Thus generalizability of these findings to other other settings may be limited. Therefore, it is necessary to conduct quantitative and longitudinal studies with large samples in the future to further explore the research results.

Conclusions

This study adopted a qualitative approach and conducted interviews with 16 AD patients to analyse the influencing factors of their health promotion behaviour based on the COM-B model. This study demonstrated that Psychological Capability, Physical and Social Opportunity, and Reflective and Automatic Motivation are crucial factors for explaining health promotion behaviour in patients with AD. These findings can be applied to design interventions for practice and further research, so as to promote better implementation of the health behaviour.

Data availability statement

Data are available on reasonable request. Original data are available on request by emailing the first author, who will delete any personal identification information.

Ethics statements

Patient consent for publication

Not applicable.

Ethics approval

This study was approved by the Ethics Committee of Fujian Medical University Union Hospital (2022KY189). All participants provided written informed consent before participating in the study.

Author contributions

Yanjuan Lin acted as the guarantor. Liangwan Chen and Yanjuan Lin designed the study. Jia Gao and Qiong Pan performed data collection and analysis and wrote the original draft of the manuscript. Sailan Li ,Shaolin Chen and Baolin Luo were involved in the data analysis. Liangwan Chen and Yanjuan Lin revised the draft critically.All authors commented on the manuscript and approved the final manuscript.

Acknowledgements

The authors are very thankful to the participants, for their contributions to this study.

Funding state

This study was supported by grants from Toint Funds of Science and Technology of Fujian Province (2021Y0023)) and the The Fifth Batch of Hospital Key Discipline Construction Projects-Clinical Nursing (2022YYZDXK01).

Conflict of interest

The authors declare no conflict of interest.

References

1. Isselbacher EM, Preventza O, Hamilton Black J, 3rd, et al. 2022 ACC/AHA guideline for the diagnosis and management of aortic disease: A report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines [J]. J Thorac Cardiovasc Surg, 2023, 166(5): e182-e331. doi: 10.1016/j.jtcvs.2023.04.023

2. Tang X, Lu K, Liu X, et al. Incidence and Survival of Aortic Dissection in Urban China: Results from the National Insurance Claims for Epidemiological Research (NICER) Study [J]. Lancet Reg Health West Pac, 2021, 17(100280. doi: 10.1016/j.lanwpc.2021.100280

3. Pape LA, Awais M, Woznicki EM, et al. Presentation, Diagnosis, and Outcomes of Acute Aortic Dissection: 17-Year Trends From the International Registry of Acute Aortic Dissection [J]. J Am Coll Cardiol, 2015, 66(4): 350-358. doi: 10.1016/j.jacc.2015.05.029

4. Chemtob RA, Fuglsang S, Geirsson A, et al. Stroke in acute type A aortic dissection: the Nordic Consortium for Acute Type A Aortic Dissection (NORCAAD) [J]. Eur J Cardiothorac Surg, 2020, 58(5): 1027-1034. doi: 10.1093/ejcts/ezaa197

5. Chaddha A, Kline-Rogers E, Braverman AC, et al. Survivors of Aortic Dissection: Activity, Mental Health, and Sexual Function [J]. Clin Cardiol, 2015, 38(11): 652-659. doi: 10.1002/clc.22418

6. St Pierre EC, Orelaru F, Naeem A, et al. Quality of Life Worsens After Surgical Repair of Acute Type A Aortic Dissection [J]. Semin Thorac Cardiovasc Surg, 2022, 34(2): 399-407. doi: 10.1053/j.semtcvs.2021.03.040

7. Pasadyn SR, Roselli EE, Artis AS, et al. From Tear to Fear: Posttraumatic Stress Disorder in Patients With Acute Type A Aortic Dissection [J]. J Am Heart Assoc, 2020, 9(9): e015060. doi: 10.1161/jaha.119.015060

8. Celano CM, Healy BC, Jacobson LH, et al. An adaptive text message intervention to promote psychological well-being and reduce cardiac risk: The Text4Health controlled clinical pilot trial [J]. J Psychosom Res, 2024, 177(111583. doi: 10.1016/j.jpsychores.2023.111583

9. Bae JW, Woo SI, Lee J, et al. mHealth Interventions for Lifestyle and Risk Factor Modification in Coronary Heart Disease: Randomized Controlled Trial [J]. JMIR Mhealth Uhealth, 2021, 9(9): e29928. doi: 10.2196/29928

10. Bernal-Jiménez M, Calle G, Gutiérrez Barrios A, et al. Effectiveness of an Interactive mHealth App (EVITE) in Improving Lifestyle After a Coronary Event: Randomized Controlled Trial [J]. JMIR Mhealth Uhealth, 2024, 12(e48756. doi: 10.2196/48756

11. Zhu Y, Zhao Y, Wu Y. Effectiveness of mobile health applications on clinical outcomes and health behaviors in patients with coronary heart disease: A systematic review and meta-analysis [J]. Int J Nurs Sci, 2024, 11(2): 258-275. doi: 10.1016/j.ijnss.2024.03.012

12. Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines [J]. Circulation, 2019, 140(11): e596-e646. doi: 10.1161/cir.0000000000000678

13. Tu J, Wang F, Yin F, et al. The relationship between quality of life and health promotion behavior in patients with type B aortic dissection: a cross-sectional study [J]. J Cardiothorac Surg, 2023, 18(1): 23. doi: 10.1186/s13019-023-02124-5

14. Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions [J]. Implement Sci, 2011, 6(42. doi: 10.1186/1748-5908-6-42

15. Ee C, MacMillan F, Boyages J, et al. Barriers and enablers of weight management after breast

cancer: a thematic analysis of free text survey responses using the COM-B model [J]. BMC Public Health, 2022, 22(1): 1587. doi: 10.1186/s12889-022-13980-6

16. Madhani A, Finlay KA. Using the COM-B model to characterize the barriers and facilitators of pre-exposure prophylaxis (PrEP) uptake in men who have sex with men [J]. Br J Health Psychol, 2022, 27(4): 1330-1353. doi: 10.1111/bjhp.12605

17. O'Donovan B, Mooney T, Rimmer B, et al. Advancing understanding of influences on cervical screening (non)-participation among younger and older women: A qualitative study using the theoretical domains framework and the COM-B model [J]. Health Expect, 2021, 24(6): 2023-2035. doi: 10.1111/hex.13346

18. Sandelowski M. Whatever happened to qualitative description? [J]. Res Nurs Health, 2000, 23(4): 334-340. doi: 10.1002/1098-240x(200008)23:4<334::aid-nur9>3.0.co;2-g

19. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups [J]. Int J Qual Health Care, 2007, 19(6): 349-357. doi: 10.1093/intqhc/mzm042

20. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis [J]. Qual Health Res, 2005, 15(9): 1277-1288. doi: 10.1177/1049732305276687

21. Al-Amer R, Ramjan L, Glew P, et al. Translation of interviews from a source language to a target language: examining issues in cross-cultural health care research [J]. J Clin Nurs, 2015, 24(9-10): 1151-1162. doi: 10.1111/jocn.12681

22. Acosta S, Kumlien C, Forsberg A, et al. Engaging patients and caregivers in establishing research priorities for aortic dissection [J]. SAGE Open Med, 2019, 7(2050312118822632. doi: 10.1177/2050312118822632

23. Doughty HC, Hill RA, Riley A, et al. Barriers to and facilitators of physical activity in adults living with and beyond cancer, with special emphasis on head and neck cancer: a systematic review of qualitative and mixed methods studies [J]. Support Care Cancer, 2023, 31(8): 471. doi: 10.1007/s00520-023-07925-x

24. Alsop T, Cassimatis M, Williams KL, et al. Perspectives of people with myasthenia gravis on physical activity and experience of physical activity advice from health professionals in the Australian context: a qualitative study [J]. Disabil Rehabil, 2024, 1-8. doi: 10.1080/09638288.2024.2338877

25. Breel JS, de Klerk ES, Strypet M, et al. What Really Matters to Survivors of Acute Type A Aortic Dissection-A Survey of Patient-Reported Outcomes in the Dutch National Aortic Dissection Advocacy Group [J]. J Clin Med, 2023, 12(20): doi: 10.3390/jcm12206584

26. Dinh PC, Jr., Monahan PO, Fung C, et al. Cognitive function in long-term testicular cancer survivors: Impact of modifiable factors [J]. JNCI Cancer Spectr, 2024, doi: 10.1093/jncics/pkae068

27. Penson A, Walraven I, Bronkhorst E, et al. Chronic fatigue in childhood cancer survivors is associated with lifestyle and psychosocial factors; a DCCSS LATER study [J]. ESMO Open, 2023, 8(6): 102044. doi: 10.1016/j.esmoop.2023.102044

28. Barakou I, Sakalidis KE, Abonie US, et al. Effectiveness of physical activity interventions on reducing perceived fatigue among adults with chronic conditions: a systematic review and meta-analysis of randomised controlled trials [J]. Sci Rep, 2023, 13(1): 14582. doi: 10.1038/s41598-023-41075-8

29. Mustian KM, Alfano CM, Heckler C, et al. Comparison of Pharmaceutical, Psychological, and Exercise Treatments for Cancer-Related Fatigue: A Meta-analysis [J]. JAMA Oncol, 2017, 3(7): 961-968. doi: 10.1001/jamaoncol.2016.6914

30. Hartman YAW, Kenkhuis MF, Stelten S, et al. Demographic, clinical, and sociocognitive determinants related to physical activity and dietary intake in patients with ovarian cancer: A cross-sectional study [J]. Gynecol Oncol, 2024, 183(39-46. doi: 10.1016/j.ygyno.2024.03.007

31. Cvetanovska N, Jessup RL, Wong Shee A, et al. Patients' perspectives of factors influencing active participation in healthcare interactions: A qualitative study [J]. Patient Educ Couns, 2023, 114(107808. doi: 10.1016/j.pec.2023.107808

32. Belete AM, Gemeda BN, Akalu TY, et al. What is the effect of mobile phone text message reminders on medication adherence among adult type 2 diabetes mellitus patients: a systematic review and meta-analysis of randomized controlled trials [J]. BMC Endocr Disord, 2023, 23(1): 18. doi: 10.1186/s12902-023-01268-8

33. Kappes M, Espinoza P, Jara V, et al. Nurse-led telehealth intervention effectiveness on reducing hypertension: a systematic review [J]. BMC Nurs, 2023, 22(1): 19. doi: 10.1186/s12912-022-01170-z

34. Scott N, Crane M, Lafontaine M, et al. Stigma as a barrier to diagnosis of lung cancer: patient and general practitioner perspectives [J]. Prim Health Care Res Dev, 2015, 16(6): 618-622. doi: 10.1017/s1463423615000043

35. Stangl AL, Earnshaw VA, Logie CH, et al. The Health Stigma and Discrimination Framework: a global, crosscutting framework to inform research, intervention development, and policy on health-related stigmas [J]. BMC Med, 2019, 17(1): 31. doi: 10.1186/s12916-019-1271-3

36. Tincopa MA, Wong J, Fetters M, et al. Patient disease knowledge, attitudes and behaviours related to non-alcoholic fatty liver disease: a qualitative study [J]. BMJ Open Gastroenterol, 2021, 8(1): doi: 10.1136/bmjgast-2021-000634

37. Cardol CK, Boslooper-Meulenbelt K, van Middendorp H, et al. Psychosocial barriers and facilitators for adherence to a healthy lifestyle among patients with chronic kidney disease: a focus group study [J]. BMC Nephrol, 2022, 23(1): 205. doi: 10.1186/s12882-022-02837-0

38. Wan X, Chau JPC, Mou H, et al. Effects of peer support interventions on physical and psychosocial outcomes among stroke survivors: A systematic review and meta-analysis [J]. Int J Nurs Stud, 2021, 121(104001. doi: 10.1016/j.ijnurstu.2021.104001

39. Holloway A, Watson HE. Role of self-efficacy and behaviour change [J]. Int J Nurs Pract, 2002, 8(2): 106-115. doi: 10.1046/j.1440-172x.2002.00352.x

40. Silveira SL, Riemann-Lorenz K, Heesen C, et al. Current and Long-Term Physical Activity Among Adults with Multiple Sclerosis in the United States: COM-B Variables as Explanatory Factors [J]. Int J Behav Med, 2021, 28(5): 561-574. doi: 10.1007/s12529-020-09946-w

41. Rogers SN, Lowe D, Midgley AW. Patients' views of physical activity whilst living with and beyond head and neck cancer [J]. Int J Oral Maxillofac Surg, 2022, 51(3): 323-331. doi: 10.1016/j.ijom.2021.05.006

42. McCarthy M, Yan J, Jared MC, et al. Cardiovascular health in emerging adults with type 1 diabetes [J]. Eur J Cardiovasc Nurs, 2022, 21(3): 213-219. doi: 10.1093/eurjcn/zvab062

43. Townend E, Tinson D, Kwan J, et al. Fear of recurrence and beliefs about preventing recurrence in persons who have suffered a stroke [J]. J Psychosom Res, 2006, 61(6): 747-755. doi: 10.1016/j.jpsychores.2006.09.006

44. White CL, Barrientos R, Dunn K. Dimensions of uncertainty after stroke: perspectives of the stroke survivor and family caregiver [J]. J Neurosci Nurs, 2014, 46(4): 233-240. doi: 10.1097/jnn.0000000000000066

45. Matsui T, Taku K. Relationship between posttraumatic growth and help-seeking behavior in use

of psychosocial support services among patients with cancer [J]. J Cancer Surviv, 2023, doi: 10.1007/s11764-023-01418-w

46. Wang Z, Chen X, Zhou J, et al. Posttraumatic growth in colorectal cancer survivors: A systematic review [J]. Clin Psychol Psychother, 2023, 30(4): 740-753. doi: 10.1002/cpp.2838

47. Hefferon K, Grealy M, Mutrie N. Post-traumatic growth and life threatening physical illness: a systematic review of the qualitative literature [J]. Br J Health Psychol, 2009, 14(Pt 2): 343-378. doi: 10.1348/135910708x332936

48. Morris BA, Shakespeare-Finch J, Scott JL. Posttraumatic growth after cancer: the importance of health-related benefits and newfound compassion for others [J]. Support Care Cancer, 2012, 20(4): 749-756. doi: 10.1007/s00520-011-1143-7

49. Roth GA, Mensah GA, Johnson CO, et al. Global Burden of Cardiovascular Diseases and Risk Factors, 1990-2019: Update From the GBD 2019 Study [J]. J Am Coll Cardiol, 2020, 76(25): 2982-3021. doi: 10.1016/j.jacc.2020.11.010

Semi-structured interview guide

1. What is your perspective on this disease? What health behaviour changes have you made since your diagnosis?

2. What are some countermeasures to help you promote a healthy lifestyle? How are these measures obtained?

3. What factors do you consider to have influenced your changes in health behaviour? Please elaborate on the reasons.

4. Have you encountered any obstacles in the adoption and maintenance of health promotion behaviour? How have these obstacles been addressed?