

Psycho-Perceptual aspects of Positive Behaviour among Patients with Head and Neck Cancer

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The present study uses the insight of behavioural and cognitive research to propose that illness beliefs and type D personality play a crucial role in altering the health behaviours among the patients with head and neck cancer. Sixty-six in-patients (stage I and II) were selected from two different hospitals of Assam, in the North-east region of India. Thirty-four in-patients were males (51.50%) and thirty-two were females (48.50%) with age groups below 45 years (37.90%) and above 45 years (62.10%) were selected based on head and neck cancer features. The participants were assessed using various questionnaires: brief illness perception questionnaire, type D personality scale and positive health changes questions. The results of the study showed certain causal factors of the illness such as bad habits, physical injury/accidents/infections, environmental exposure, religious causes, and luck. In addition, positive health changes were reported after the diagnosis of their illness: healthy food habits, regular exercise, a decrease in tobacco/betel-nuts/smoking, better sleep, proper hygiene, and therapy. Correlation analysis revealed various significant relationships among the selected dimensions. The result of hierarchical regression analysis was significant, revealing that in model I, treatment control ($\beta = .62, p = .009$) and understanding of illness ($\beta = .90, p = .01$) impacts positive health changes. In model II, along with the previous dimensions, consequence ($\beta = .34, p = .03$), concern ($\beta = .50, p = .005$), social inhibition ($\beta = .28, p = .02$) and negative affectivity ($\beta = .38, p = .007$), were statistically significant to positive health changes. The study contributes fresh insight about factors that could promote positive health behaviours among cancer patients.

Keywords: head and neck cancer, illness perception, type D personality, positive health changes, in-patients

Globally, cancer is one of the major causes of mortality among other chronic diseases (Momenimovahed & Salehiniya, 2019). Even in the face of a good progression of diagnosis and treatment, there is an increase in the prevalence of cancer and its detrimental effect (Akbari, 2010) and is the single obstacle to enhancing life expectancy in the 21st century. By 2018, more than 18.1 million new cases and 9.6 million cancer deaths were projected worldwide. Combining both the sexes, more than nearly one-half (57.3%) of cancer deaths occurred in Asia since more than 50% of the population inhabit there (Bray et al., 2018).

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Diagnosis of cancer causes psychological pressure where patients undergo the fear of uncertainty about the future (Dankert et al., 2003) contributing to numerous problems in physical, functional, psychological/cognitive, social, economic, spiritual and family dimensions exposing the patients to a wide array of threats, trouble, and potential losses (Alonzo, 2000).

Clinically, significant difficulties are highlighted among certain groups of cancer patients, mostly ignoring a very sensitive area of head and neck cancer. The National Cancer Institute defined head and neck cancers as disease originating and appearing in the head or neck region such as the nasal cavity, sinuses, lips, mouth, salivary glands, throat or larynx (Macfarlane et al., 2012). Head and neck cancer vary depending upon the sex, country and its sub-types (Chaturvedi et al., 2013; Subhashraj et al., 2009). Head and neck cancer are found to be increasing in India with approximately 30-40% of all cancers (Sharma et al., 2016; Sharma et al., 2019), highest among the north-east states of India including Assam, Manipur, Mizoram, Tripura, and Nagaland with an incidence rate of 54.48% (Bhattacharjee et al., 2006). The causes of head and neck cancer seem to be very complex, and the epidemiological evidence has pointed out several risk factors that increase head and neck cancer such as smoking of tobacco/cigarette/bidis (Dhull et al., 2018; Sharma et al., 2019; Torrente et al., 2011), alcohol consumption (Bagnardi et al., 2001; Dhull et al., 2018), chewing betel nut/quid (Montero & Patel, 2015; Sharma et al., 2019), environmental factors such as viral infection (Negri et al., 2000). Therefore, understanding the behaviour is essential for the patients as well as the professionals to modify into positive health behaviours. In our day to day life, there has been constant struggle sandwiched between the needs or desires of an individual and the demand of the external forces. Regardless of personal illness, people find effective ways of accepting such situations (Sadjadian et al., 2011) and adopt healthy lifestyle behaviours because it leads to a better quality of life by lowering the risk of lifestyle-related chronic diseases (Kanera et al., 2016).

Health Behaviour Change

Health behaviour can be referred to as any kind of behaviour that impacts an individual's physical and mental health. Behaviour such as smoking, alcohol consumption, physical inactivity, or unhealthy eating is often recurring and is described as behaviour patterns (Michie et al., 2011). This behaviour pattern contributes to various non-communicable diseases such as cancer, stroke, and respiratory disease-causing ill health and early death (World Health Organisation, 2009). Therefore, it is important for people to change their behaviour and adopt positive health behaviours after the diagnosis of the illness to prevent further progression. However, receiving a cancer diagnosis has been called a 'teachable moment' (Demark-Wahnefried et al., 2005, p. 5914). Despite that, why are there patients still not adopting positive health behaviours even after the diagnosis of a life-threatening illness? However, few studies have demonstrated cancer patients making positive health behaviour changes after the diagnosis of cancer (Mullens et al., 2004; Hawkins et al., 2010). Studies showed that the patients made positive dietary changes after the diagnosis of the illness (Salminen et al., 2004) as well as several health behaviours (e.g. striving for a healthy weight, eating more fruits and vegetables and increasing physical activity) produced possible benefit by extending disease-free or overall survival (Doyle et al., 2006). Modifiable health behaviours such as reducing smoking and alcohol intake while increasing physical activity and dietary behaviour affects the incidences of chronic conditions (Ayodapo & Olukokun, 2019; Li et al., 2018).

Making positive behaviour changes to the illness depend on a series of factors, such as the individual's belief about the illness, the psychological and emotional inferences of the disease, specific characteristics of the disease such as symptoms, and its progression, communication with the family members, as well as many socio-cultural factors. Previous studies have shown that gender and age are associated with health behaviour, Park and Gaffey, (2007) observed that patients with young age were associated with adopting positive health behaviours. Women use health care services more often than men, with frequent visits to the care centers, and are more likely to seek advice and attend educational session on healthy lifestyle (Bertakis et al., 2000; Deeks et al., 2009). As females are more concerned with body image than males, this might encourage them for more positive health changes (Cash & Grasso, 2005; Quittkat et al., 2019). Additionally, men and women with age greater than 51 years were more likely to have screening health checks, due to health fears associated with ageing (Deeks et al., 2009) with contrary results highlighting no significant age group difference on healthcare behaviour (Lim et al., 2019). Moreover, according to the global adult tobacco survey, out of 34.6% of adults in India, 47.9% male and 20.3% female consume tobacco (Malik et al., 2018). A study has shown that the incidence of head and neck cancer is related to the major risk factors such as tobacco, betel quid chewing, and smoking cigarette (Mehrotra et al., 2005). Therefore, adopting positive health behaviours is the first and foremost step to be taken by the cancer patients. Lee et al.(2019) found that information provided for betel nut chewing cessation and prevention of oral cancer encourages the patients to change their health behaviour, in addition to quitting alcohol and tobacco use.

Different approaches are used to study behavioural health changes such as psychodynamic theory, learning theory, and humanistic theory. Though the cognitive approach is the centre of research in most of the areas of social, clinical, and organisational psychology, but currently it has an extreme influence in health psychology to understand the behavioural changes (Weinman & Petrie, 1997). According to the social-cognitive approach, behaviour is seen as a function of the belief and self-regulation process, where an individual eradicates the dysfunctional pattern of thinking and behaviour, and implement adaptive pattern elucidating a bidirectional relationship (Conner, 2010; Sarkar et al., 2018)

Common Sense Model of Self-Regulation (CSM-SR) of Health and Illness Behaviour (Leventhal, 1970)

Health behaviour can be understood in the context of the perception of illness. As a result, positive illness perception is linked to higher self-care ability and behaviour such as rehabilitation participation, diet, exercise, and smoking (Leventhal, 1970; Broadbent et al., 2009). The association between illness perception and health behaviour can be explained through the common-sense model of self-regulation theory (Leventhal, 1970; Leventhal et al., 2003). The model is used to understand the role of illness perceptions that assist to adapt to the health threat by developing cognitive and emotional representations of their illness. The model focuses on several adaptive mechanisms such as illness-related schema, based on knowledge, beliefs, possible problems, and solutions (Breland et al., 2012) that cause changes in the behaviour. In the case of illness, patients cluster their ideas around several themes, (a) identity: the label placed on the disease by the patient and the symptoms associated with it; (b) cause: the individual's ideas about how one gets the disease; (c) consequence: the perceived physical, social, financial and emotional effects of the disease; (d) timeline: expectations about the duration and course of the disease; (e) personal control: individuals

belief on how much the person would have control over their illness; (f) treatment control: individuals belief on how much the treatment would have to control over their illness; (g) Understanding illness factor: patients understanding of the illness; (h) concern: concern experiences regarding the condition of the illness, and (i) emotional representation: the extent to which the patients experience the symptoms of depression, fear or anxiety (Broadbent et al., 2006). The model helps to identify the individual's attitude towards the threatening condition thereby helping in a better understanding of the behaviour. For patients with chronic conditions, threat-related illness representation, and emotional representation are related to worst health behaviour outcome (Hagger et al., 2017). The model predicts self-care seeking behaviour and other health care behaviour such as visit the doctors, get enough information about their present illness health, and pays attention to the needs of the illness and health by generating labels for the reported symptoms (Kim, 2018). Therefore, improving understanding about the illness representation will enhance the effort to better health behaviour outcomes (McAndrew et al., 2018). However, there are possible mechanisms to understand the association of illness perception and positive health changes in cancer patients, which remained to be tested.

Type D Personality

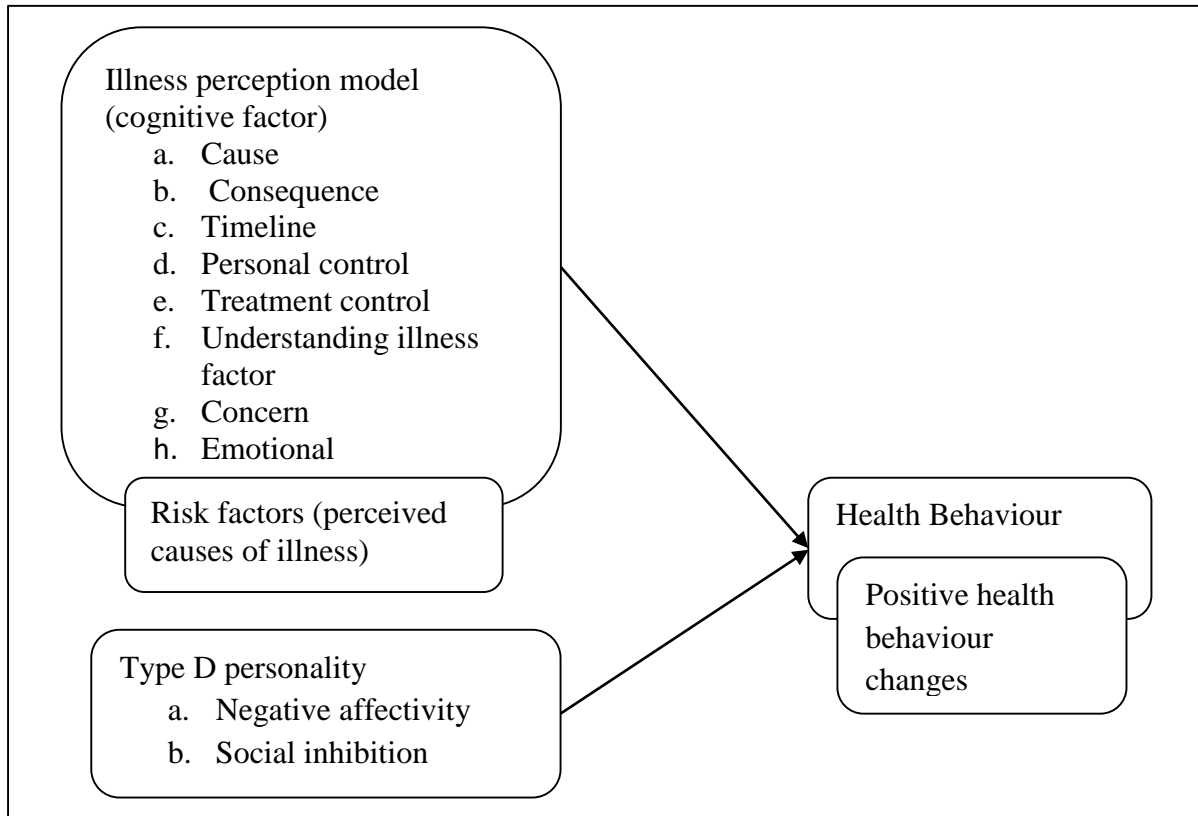
It is important to find a better way to identify those patients with impaired health status. Therefore, individual differences are important in this context. One such trait might be type D or distressed personality, which emerged in the 1990s. Type D personality is defined as a combination of two stable personality constructs: negative affectivity (NA) and social inhibition (SI). Negative affectivity is a tendency to experience negative feelings and social inhibition is the tendency to experience boundaries in behavioural interactions and emotional expressions (Denollet, 2005). Type D survivors have lower levels of general health, less physical activity like exercise and less walking, more smoking (Mols et al., 2012) as type D personality is associated with health-damaging behaviours. A study conducted by Kwon and Kang (2018) revealed that type D coronary artery disease patients have low health behaviours such as lower on regular exercise, regular breakfast, resting after work, and balance diet. Moreover, type D individuals are more engaged in negative health behaviour such as consumption of alcohol and smoking cigarettes (Ginting et al., 2014). However, there is a lack of research investigating the relationship between type D personality and positive health changes among cancer patients.

This is an important area of research as illness perception at an early stage of cancer (stage I and stage II) might facilitate in improving the health thereby, increasing the longevity of the patients. In India, there is an excessively higher incidence of head and neck cancer patients (Bhattacharjee et al., 2006). While taking into account the north-east parts of India, these states are turning to be the repository of head and neck cancer. According to the National Cancer Registry Programme (2016), northern and western Assam such as Kamrup, Dibrugarh, Barpeta, and Nalbari districts have the highest incidences of cancer (Varshney, 2015). Hence, there is an urgent requirement to provide an opportunity for patients to create cognitive and emotional representations of their illness. This will help them make sense to manage the illness and have a better environment for adaptation. Head and neck cancer can be considered as a 'tip of iceberg' situation because the actual difficulties are much bigger than the reflected existing literature.

Anchored to the prior researches and explanations, a hypothetical model (figure 1) has been proposed demonstrating the relationship between common sense model of illness perception, type D personality, and health changing behaviour. The proposed model will assist to give the impression of the significance of health behaviour change among the patients with head and neck cancer.

Figure 1

Hypothetical Model of Psycho-Perceptual Determinants of Behavioural Changes (Based on the Models of Leventhal, 1970; and Denollet, 2005)



The hypotheses proposed for this research are:

- H1: There would be a significant inter-relationship among the selected dimensions of illness perception, Type D personality, and health behaviour changes among the cancer in-patients.
- H2: Selected dimensions of illness perception would significantly predict health behaviour changes among the cancer in-patients.
- H3: Selected dimensions of Type D personality would significantly predict health behaviour changes among the cancer in-patients.
- H4: There would be a significant gender difference in health behaviour changes among the cancer in-patients.
- H5: There would be a significant age difference in health behaviour changes among the cancer in-patients.
- H6: There would be a significant substance use difference in health behaviour changes among the cancer in-patients (have included studies in the previous section)

Method

Study Design and Participants

A questionnaire survey design was employed for the present study to examine the psycho-perceptual aspects of positive health changes among in-patients with head and neck cancer (HNC), India. In India, there is an excessively higher incidence of head and neck cancer patients as compared to other common malignancies (Bhattacharjee et al., 2006). Therefore, newly diagnosed head and neck cancer participants were recruited from the various hospitals situated in Assam, a north-east state of India. The sample was delimited to the participants who were reachable and restricting the possibility of randomization. Participants were selected from two different institutes of Assam- (a) Guwahati Medical College, and (b) North-East Cancer Institute, Assam, India. For the present study, 66 clinical samples (Early-stage: Stage I and II) were taken comprising of 34 males and 32 females, head and neck cancer in-patients. The age of the participants has been grouped accordingly: <45 years and >45 years (total mean age = 51.68; SD = 15.26). Using purposive sampling technique data was collected during the year 2019. The overall collection of data took almost three months. Participants with a diagnosis of early-stage cancer more than a year, not receiving any anti-cancer therapy such as chemotherapy and/or radiotherapy currently, patients without any current/history of major psychiatric illness and patients having the ability to verbalize and write were considered for the study.

The data was collected from a smaller sample of head and neck cancer in-patients since the frequency of the early staged patients admitted in the selected hospitals was limited in number. Most of the cancer cases go undetected for a very long time due to the lack of appropriate screening procedure and genetic biomarkers (Pardoll, 2012). Moreover, people avoid seeking medical care can occur at any point of time, such as detecting asymptomatic disease, noticing symptoms, and seeking only after interpreting the significant need (Scott & Walter, 2010). Therefore, the results will remain relevant and important to improve the patient's health behaviour as it will generalize the smaller number of identified early staged cancer population.

The ethical clearance was taken from the Medical Ethics Committee of the hospitals in 2019 with number: NO.GMC/CH/39/2017/Pt-II/52. After the approval from the director, participants' recruitment was started. The admitted cancer in-patients (Stage I and II) were individually contacted with the help of the hospital employees. During this initial contact, the admitted patients were made familiar with the purpose, content, and benefits of the study as well as assured of anonymity and confidentiality of the information. The consent of participants was taken before the collection of data. Self-report questionnaires were used for data collection. Additionally, the participants who rejected to participate were not taken for the study.

Measures

Brief Illness Perception Questionnaire (Brief IPQ)

Brief Illness Perception Questionnaire (Brief IPQ) developed by Broadbent et al., (2006) assesses 9 dimensions: Consequences, Timeline, Personal control, Treatment control, Identity, Concern, Understanding, and Emotional response each with one item rated on a 0-10 response scale. The last item is on perceived causes of illness (open-ended question), in which the respondents list the three most important causal attributes of their illness. The reliability of the 8 items ranges from 0.42 to 0.73.

Dutch 14-item Type D Personality Scale (DS14)

Dutch 14-item Type D Personality Scale (DS14) is a self-report questionnaire used for the study to assess personality traits (Denollet, 2005). It consisting of 2 dimensions (i.e. negative affectivity and social inhibition) with 14 items, and each dimension with 7 items. (a) *Negative affectivity*: the tendency to experience negative feelings regardless of situation or time; for example: “I make contact easily when I meet people”, (b) *Social inhibition*: the tendency to experience limitations in emotional expressions and behavioural interactions. For example: “I am often irritated”. The items of the scale are measured on a five-point Likert scale ranging from 0 (false) to 4 (true). An individual is categorized as a Type D personality if the total score is 10 or higher for both the dimensions. The reliability of the scale is 0.88 for negative affectivity and 0.86 for the social inhibition scale.

Positive Health Changes (PHCs) Question

Positive Health Changes (PHCs) Question assess the health behaviour change (Label et al., 2012) and are measured using the 2-item indicator: (a) “I take better care of my health,” and (b) “I have made some PHCs” (this item allowed space to describe adopted behavioural changes). The scoring of the 2 items was done on a 4 point Likert scale, 1 (not at all) to 4 (completely). The reliability of the scale is 0.86

Results

Descriptive Statistics

The total number of the participants was 66 in-patients, with 34 males and 32 females. Demographic data is presented in Table 1.

Table 1
Demographic Characteristics of the Samples

Variables	Sub-category	Male (n=34)		Female (n=32)	
		<i>n</i>	%	<i>n</i>	%
Age	Above 45 years	23	67.20	19	59.40
	Below 45 years	11	32.70	13	40.60
Occupation	Govt. Employee	13	38.30	8	28.60
	Business/entrepreneurship	10	29.00	3	09.80
	Others	8	23.80	6	20.00
	Unemployed	3	08.90	12	41.50
Education	Literate	6	17.00	9	28.00
	Middle class	8	22.60	5	15.50
	Up to 10 th class	7	21.80	11	34.30
Marital status	Graduate	13	38.50	7	22.20
	Married	24	69.30	21	66.20
	Unmarried	4	12.40	3	09.50
Stage of illness	Others	6	18.30	8	24.30
	Stage I	11	32.30	12	36.80
Substance use	Stage II	23	67.60	20	63.20
	Chewing betel-nut	13	38.80	12	37.80
Substance use	Chewing /smoking	5	14.10	6	19.60
	Multiple use (2 and more)	12	34.00	4	12.90
	None	4	13.10	10	29.70

Various causal attributes of cancer have been extracted from the responses of the participants by using the open-ended question of the IPQ-brief questionnaire which is documented in Table 2. Selected responses were categorized based on the identified themes: (a) bad habits such as intake of harmful substances (tobacco, betel-nut), irregular food intake, poor hygiene, lack of physical exercise, poor lifestyle leading to weight gain/ loss (34.10%); b) physical injury/accidents/infections (20.30%); (c) environmental exposure such as the use of plastic, chemicals in the food, harmful inhalation of smoke (14.90%); (d) religious cause such as *karma* (belief that a person's action in this life will decide the future lives), punishment by the God (14.90%); (e) luck or fate (11.20%) and (f) don't know (04.60%). For the purpose of analysing the causes in the study, the patient's first three answers were considered to be the most important causes. These findings facilitate in assuming how participants differ in conceptualizing the causes of illness.

Table 2

Perceived Risk Factors for the Onset of Cancer as Reported by the Cancer In-Patients

Causes	n (%)
Bad habits	29 (34.10)
intake of harmful substances (tobacco, betel-nut)	
irregular food intake	
poor hygiene	
lack of physical activity	
poor lifestyle leading to weight gain/loss	
Physical injury/accidents/infections	17 (20.30)
Environmental exposure	13 (14.90)
plastic	
chemicals in the food	
harmful inhalation of smoke	
Religious cause such as karma, punishment by God	13 (14.90)
Luck/fate	10 (11.20)
Don't know	4 (04.60)

The survivors of the head and neck cancer in-patients reported making several health behaviours changes during the course of treatment. As seen in table 3, the most frequently reported positive health changes are food habits (29.40%), followed by regular exercise (20.30%) and cessation of substance use behaviour (15.70%), better sleep quality (8.60%), maintaining proper hygiene (8.60%), meditation and therapy (7.40%), getting proper rest (5.00%) and active participation in social activities/groups (5.00%).

Table 3

Positive Health Changes Among the Early-Stage Cancer In-Patients

Positive Health Changing Behaviour	n (%)
Healthy food habits	48 (29.40)
Regular physical activity	34 (20.30)
Cessation or decrease of tobacco/betel-nut/smoking/alcohol intake	26 (15.70)
Better sleep quality	15 (8.60)
Maintaining proper hygiene	15(8.60)
Meditation and Therapy	12 (7.40)
Getting rest	08 (5.00)
Active participation in social activities/groups	08 (5.00)

Note. Eight positive health changing behaviour were identified; highest frequency among healthy food habits (48) and lowest among active participation in social activities (08).

Hypotheses Testing

The developed hypothesis is analysed using correlation analysis. Table 4 summarizes the inter-correlation between illness perception, type D personality, and health behaviour changes. The in-patients who recognized their illness as chronic conditions reported more serious consequences, had poorer beliefs regarding treatment control, understanding of illness, and showed more emotional responses such as fear, anxiety, and stress. Those who viewed their illness as controllable reported positive belief regarding better health behaviours and worse negative affectivity. The in-patients showing elevated concern regarding the illness portrayed greater emotional responses and negative affectivity. Moreover, understanding of the illness reported greater behavioural change among the in-patients. Thus, H1 of the study is supported to an extent.

Table 4

Inter-Correlation Coefficients among Different Dimensions of Illness Perception, Type D Personality and Positive Health Changes Among the Cancer In-Patients.

Dimensions	1	2	3	4	5	6	7	8	9	10	11
Consequence	1										
Timeline	.27*	1									
Personal control	-.41**	-.06	1								
Treatment control	-.21	-.78**	.06	1							
Identity	.35**	.12	-.08	.23	1						
Concern	.13	.21	.22	.06	.15	1					
Understanding	-.43**	-.40**	.43**	.22	.14	.08	1				
Emotional responses	.24*	.70**	.02	.19	.12	.30*	.10	1			
Social inhibition	.15	.15	.03	.12	.21	.21	.05	.02	1		
Negative affectivity	.30*	.18	-.02	-.67**	.22	.32**	.18	.04	.25*	1	
Behavioural change	.19	.05	.20	.27*	.12	.05	.25*	.12	-.24*	.14	1

Note. N = 66; * $p < 0.05$; ** $p < 0.01$

Results of the hierarchical multiple regression analyses concerning behavioural changes are presented in the table 5. In the first step, illness perception variables such as treatment control and understanding significantly predicted positive health changes, and the regression model was found to be significant contributing 29% of the variance to positive health changes. A high level of treatment control and understanding is related to greater positive health changes among the in-patients.

In the second step, consequences, concern, social inhibition, and negative affectivity accounted for an additional 17% of the variance in positive health changes contributing significantly to the model. This indicated that in-patients who reported serious consequences and greater concern about the illness are related to better functioning of positive health changing behaviour. However, higher-level of social inhibition and negative affectivity were related to poor functioning of positive health changing behaviour among the in-patients. Thus, H2 and H3 of the study are supported to an extent.

Table 5
Prediction of Positive Health Changes by Illness Perception

Positive Health Changes (PHC)						
Model I			Model II			
(I) Illness perception	β	t	p	β	t	p
Consequence	.29	1.76	.08	.34*	2.24	.03
Timeline	-.49	-1.63	.10	-.41	-1.51	.13
Personal control	.42	1.89	.06	.34	1.74	.08
Treatment control	.62**	2.74	.009	.57**	2.85	.007
Identity	-.41	-1.45	.16	.88	-1.62	.13
Concern	.32	1.82	.07	.50**	3.00	.005
Understanding	.90**	2.63	.01	-.40**	2.92	.006
Emotional responses	-.15	-.71	.48	-.13	-.65	.51
(II) Type D personality						
Social inhibition				-.28*	-2.35	.02
Negative affectivity				-.38**	-2.84	.007
R ²	.29			.47		
R ² change	.29			.17		
F	2.15*			3.54**		

Note. N=66; * $p < .05$; ** $p < .01$; Two-staged hierarchical regression analysis of perceived illness and Type D personality on positive health changes.

The result in table 6 indicated no significant gender difference ($t = 1.45, p = .15$) as well as no significant age difference ($t = .92, p = .35$) in health behaviour change. Thus, H4 and H5 of the study are not supported. However, a significant substance use difference was found in health behaviour change. The post hoc analysis showed that patients chewing betel-nut and involved in multiple users adopted healthy behaviours ($F = 2.93, p = .04$). Thus, H6 of the study is supported.

Table 6
Means, SD and t-value Among Cancer In-Patients on Health Behaviour Changes

Variable	Group	n	Mean	SD	df	F-value	Sig/Non-sig
Health behaviour change	Male	34	4.50	1.33	64	1.45	.15 (non-sig)
	Female	32	4.96	1.28			
Health behaviour change	Above 45 years	39	4.60	1.33	64	.92	.35 (non-sig)
	Below 45 years	27	4.92	1.28			
Health behaviour change	Chewing betel-nut	25	5.25	.88	63	2.93	.04 (sig)
	Chewing/smoking tobacco	11	3.94	1.55			
	Multiple users	16	5.11	1.19			
	None	14	4.87	1.45			

Note. * $p < .05$; ** $p < .01$

Discussion

The primary objective of the present study was to understand how perceived illness and type D personality are related to in-patients' positive health changes after the diagnosis of cancer. The study also examined the various positive health behaviours adopted by the participants and the causal factors related to their illness. Most of the results supported the hypotheses of the study.

Regarding the open-ended question of the IPQ-brief questionnaire reported in table 2, various cancer causal attributes have been extracted such as environmental exposure, bad habits such as intake of harmful substances, irregular food intake, poor hygiene, lack of physical exercise, poor lifestyle leading to weight gain/ loss, physical injury/accidents/infections, religious cause, luck or fate. Similar studies were conducted by Castro et al. (2012) and Price et al. (2012). The results of identified causal attributes were emotional causes, modern life, post-traumatic causes, biological malfunctioning, genetic factors, old age, work-related causes, and failure life choices, which were not in line with the findings of the present study. However, the present study showed that regardless of in-patients undergoing similar illness, their causal attributions of illness greatly differed, thereby, increasing challenges for the in-patients to make assumptions on how they perceive the illness.

Taking into account the various health behaviour changes adopted in table 3, the most frequently reported positive health changes were food habits, regular exercise, and substance use behaviour followed by other behaviours. This confirms a study by Label et al. (2013) who stated that the in-patient's encouragement for positive health behaviour decreases stress and increases connectivity with people thereby, increasing social support. Other like Potsdam study (Ford et al., 2009) and INTERHEART study (Yusuf et al., 2004) also demonstrated that fulfilling factors such as reducing smoking, exercising 3.5 hr/week and maintaining a healthy diet leads to a lower risk of cancer. Few of the positive health changes, such as meditation, therapy and active participation in social activities/groups were documented in the present study which could be considered beneficial for in-patients. Health care professionals are needed to understand how the health behaviour changes could be made that remains persistent over time.

Furthermore, the inter-correlation results among different variables showed in table 4 were similar to a study conducted by Marcos et al. (2007). The results found that eating disorder patients who identified their illness as a chronic condition reported serious consequences, experienced emotional responses and perceived their illness as curable. Price et al. (2012) conducted a similar study among palliative care patients on the domains of illness perception and the findings were in line with the present study. Therefore, it could be inferred that in-patients suffering from various chronic conditions might experience similar kinds of beliefs and health behaviours that might affect their health conditions. Health related perceptions were found to be engaged in motivating health behaviour changes.

The impact of illness perception and type D personality on health behaviour portrayed in Table 5 could be explained through the self-regulation system theory of health. According to the model demonstrated by Leventhal (1970), individuals first form the representation of the illness such as identity, concern, consequence, understanding, fear, etc. These representations help them to adopt certain behaviours to cope and adjust to it and finally they evaluate the effectiveness of their own health behaviour. The regression findings demonstrated that

selected dimensions of illness perception predicted positive health changes. The present findings differed with the earlier study conducted by Frostholm et al. (2005) where identifying symptoms, illness worry, and emotional distress did not predict positive health changes. However, the belief in severe consequences was found to be similar in both the studies. This belief in severe consequences among cancer patients would encourage them to perform healthy behaviour. Previous studies demonstrated that patients with a positive perception of illness will adapt to higher self-care ability such as participation in rehabilitation centres, better diet, exercise and smoking (Park et al., 2014). Therefore, belief in treatment control, better understanding and higher concern about the illness might encourage them for improved healthy behaviour. Moreover, the present study also portrayed the association of type D personality i.e. negative affectivity and positive health changes. The patients with type D personality have negative thoughts regarding their illness (Denollet, 2005) and negatively correlate health changes (William et al., 2011). Cancer patients with type D personality are less likely to take medications, which might lead to adverse outcomes. They are found to perform less health-enhancing behaviour such as eating a good diet, regular exercise and taking regular medicine (William et al., 2011). They might experience negative feelings towards self and others, thereby, restricting them from social activity that hinders the pathway for positive change leading to more destructive behaviours among them.

Results portrayed in table 6 could be provided with explanation for the non-significant differences. Male and female cancer in-patients belonging to both the age groups (below and above 45 years old) basically had comparable outcomes, which might facilitate them to take similar steps for self-care management in order to live a healthy life. This might be the reason that no differences were found related to positive health changes in the present study regarding gender and age. However, the high mean score of female in-patients and in-patients below 45 years suggested that they might be highly motivated to change their behaviour and perform positive behaviours to eradicate any adverse consequences of the illness. A significant difference was found among the various substance use especially between chewing betelnut and none, and multiple users and none. Studies show that consuming tobacco (chewable and non-chewable) is responsible for majority of oral cancer. Studies have shown that incidence of HNC is related to the major risk factors such as betel quid chewing, tobacco and alcohol (Ketabat et al., 2019; Lee et al., 2018). Betel nut chewing with lime is one of the highest traditional risk factors for HNC in India (Naik & Naik, 2012).

Roger's (1975) protective motivation theory (PMT) would provide better insight into the domains of the behaviour-change. The theory describes how and why an individual is motivated to react potentially towards perceived threats. However, today PMT is often applied to understand the responses of people with health threats. The model is evaluated in two aspects: threat appraisal and coping appraisal. On the basis of perceived threats of patients towards cancer, threat appraisal might comprise of perceived severe consequences of illness, less treatment control and understanding of the illness, and perceived vulnerability. On the other hand, during coping appraisal the patients might identify their threats and danger, thereby increasing fear arousal. Thus, countering the fear with effective mitigation options such as engaging in positive health behaviour changes. The model processes by means of cognitive patterns. Additionally, with reference to the model, intrapersonal source of information such as personality and prior experiences might contribute to patient's knowledge of threat and willingness to engage in behaviour health changes (Hinkle, 2015; Westcott et al., 2017). However, this framework could also be used among the chronic patients to understand the positive behavioural changes.

Since cognitive model assumes that behaviour is a function of belief system that an individual hold regarding the target behaviour, the individual with illness belief performs various actions to achieve the anticipated goal (Chin & Mansori, 2018). Therefore, illness perception might encourage for behavioural change among the patients where protective motivation theory might promote the overall practice.

Conclusion

The study contributes to various practical and academic implications. The study would provide theoretical implications by adding the conceptual model to the existing literature by highlighting the cognitive and behavioural aspect of a particular group of early staged head and neck cancer patients. Furthermore, assessing the causal factors of the illness would present the doctors/ professionals with useful information in dealing with the disease as well as the patients will be motivated to adopt healthy behaviours. As patients with type D personality are vulnerable to negative behaviour such as intake of alcohol, smoking, and chewing betel-nut holding back healthy behaviour even after the diagnosis of illness. Therefore, the study would help the professionals to carefully identify the personality of the patients, provide an environment for the patients to promote self-care, reduce stress and anxiety, improve self-esteem and thereby, managing to provide coping interventions. Moreover, although younger people are active than older people; the study found that both can work simultaneously for altering their health behaviour for long term outcomes. Lastly, the study explained that patients with substance use history are more motivated to modify their health behaviours as they might have a clear picture of their pain, symptoms, and disfigurement caused by cancer. Considering the health perception during the period of treatment, at the individual level, patient's understanding and knowledge about their illness, symptoms, and treatment would encourage them to maintain their health behaviour regarding sleep, avoid drinking, smoking, adopting a healthy diet, and increasing physical activity. At the community level, government and non-government organizations would take initiatives to integrate health-related policies. Along with it, cancer patients can make adaptive behavioural changes with the help of trained health care professionals.

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