

Health-promoting Lifestyle, Illness Control Beliefs and Well-being of the Obese Diabetic Women

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Abstract

The study examines the role of health-promoting lifestyle and illness control beliefs in well-being of obese diabetic women. Measures of illness control belief, health-promoting lifestyle and obesity-related well-being were given to 100 obese diabetic women selected from outdoors of hospitals in Varanasi. Analysis revealed patients' stronger belief in 'doctor-control' and 'supernatural-control' than 'self-control' of the disease. Nutrition, interpersonal relations, physical activity and stress management were given more importance in health promotion than spiritual growth-related practices. Belief in 'self-control' and 'doctor-control' of disease was negatively correlated with 'psychosocial discomfort', 'physical discomfort' and 'psychosocial impact' aspects of obesity, whereas 'supernatural-control' showed positive relationship with all aspects. All components of 'health-promoting lifestyle' were negatively correlated with 'physical discomfort', 'psychosocial discomfort'

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and 'psychosocial impact' aspects of obesity. Multiple regression analysis brought out 'self-control', 'supernatural-control', 'health responsibility', 'physical activity' and 'stress management' as significant predictors of 'well-being' of the obese diabetic women.

Keywords

Illness control beliefs, lifestyle, obesity, well-being

Introduction

Obesity is a major health problem, which has shown an alarming increase during the last decades (Ogden et al., 2006). It is found to be associated with diabetes, hypertension, atherosclerosis, gallbladder disease, arthritis, cardiovascular disease and cancer (Babu et al., 2018; Kenchaiah et al., 2002). In developing countries such as India, it is spreading like an epidemic. The number of obese people is expected to surpass hundreds of millions in the next two decades, (Ellulu, Abed, Rahmat, Ranneh, & Ali, 2014). The incidence is greater in urban than rural areas (Fall, 2001). Factors, such as sedentary lifestyle, reduced physical activity, consumption of saturated fats and sugar, which often accompany migration from rural to urban areas (Ebrahim et al., 2010), contribute not only to obesity but also to diabetes. These factors have been identified in many other studies of obesity (Marchioni, Voci, de Lima, Fisberg, & Slater 2007; Parr, Veierod, Laake, Lund, & Hjartåker, 2006).

Health Beliefs and Behaviour

People's sociocultural context influences every aspect of their life, including their views about fatness and thinness. It is in their respective sociocultural contexts that individuals acquire knowledge about various health problems and develop beliefs about their causes, controllability and outcomes. As a part of cognition (Gilbert, 1991), and also possibly of the neural system (Tandon, 2011), beliefs determine a variety of health-related behaviours and individuals' reactions to various health problems. Obesity is one of the health problems, which is characterised not only by certain beliefs but also by negative and stereotypical reactions from others in a society.

Studies of health beliefs and behaviours have been carried out with a large variety of populations, including even the remote rural and Adivasi groups of the Indian society. These studies focus on the analysis of individuals' beliefs about causality, control and consequences of a variety of health problems. In studies with remote rural Adivasi populations, Mishra (1997, 2009) found that people attributed causes of health problems either to themselves (e.g., careless attitude, bad habits) or to external factors (e.g., environmental hazards, god's wish). Often a coexistence of both set of factors has been reported (Mishra, 2015). In the Indian cultural context, concepts of god, spirits, *karma* and fate are transmitted to children as indispensable lessons, both in formal (e.g., school) as well as informal (e.g., family) settings. With this kind of socialisation background, it may be expected that individuals would consider external factors to be responsible not only for the causation but also for control of health problems.

There are many studies carried out in hospital settings in which the role of individual's belief about illness causation and control in the perceived consequences of illness has been examined. Some of our previous work (Awasthi & Mishra, 2011, 2013; Awasthi, Mishra, & Shahi, 2006; Mishra, Awasthi, & Singh, 2004) have focused on women's suffering from the cancer of cervix and diabetes. In the case of cancer, it was noted that the patients, who believed that a doctor can control their health problem (called 'doctor-control'), reported lesser psychological and interpersonal consequences, lesser pain of illness and greater hope for positive outcomes of illness than those who believed that they themselves could control the disease (called 'self-control'). In the case of diabetes, belief in 'self-control' was found to be related to less physiological and psychological consequences, less pain of illness and greater hope for positive outcomes. On the other hand, belief in 'doctor-control' was found to be related to less psychological consequences and greater hope for positive outcomes. These findings allow us to posit a similar pattern of relationship between control beliefs and psychological well-being in the case of obese women.

Studies carried out with obese people (Fox, Taylor, & Jones, 2000; Kaminsky & Gadaleta, 2002) reveal that in daily lives, they encounter many false beliefs and generalities about obesity. Behavioural scientists acknowledge the role of biological, behavioural and social factors in body weight (Yang, Kelly, & He, 2007), yet a belief commonly held in society is that body weight is malleable. Consequently, overweight individuals are often blamed for being lazy and not exercising self-control. Studies also confirm the existence of this belief in reporting

that the obese people cannot exercise self-control mechanisms (Anesbury & Tiggemann, 2000; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003).

Irrational beliefs and negative attitudes about obese individuals are widespread in societies so much so that ‘... ridicule and disparagement of obese individuals seems to remain a socially acceptable form of prejudice’ (Fabricatore & Wadden, 2004, p. 332). The obese people experience pressure to become thin, which generates among them a feeling of low self-control and poor self-esteem (Klaczynski, Goold, & Mudry, 2004). Klaczynski et al. (2004) investigated people’s attributions of causes to obesity and found that when stereotypes of obesity were primed, attribution to internal causes increased, whereas attribution to social causes remained the same. This indicates that being thin is an achievement of self-control, and being fat (the antithesis) is an outcome of lack of the same. The extent to which ‘self-control’ belief can contribute to the well-being of obese women is not much known.

Healthy Lifestyle and Health-related Quality of Life

Lifestyle refers to an individual’s distinctive and consistent way of life. A healthy lifestyle encompasses actions aimed at promoting wellness and preventing disease (Abel, 1991). In some studies, a healthy lifestyle has been reported to be helpful not only in preventing morbidity and premature mortality (Mokdad, Marks, Stroup, & Gerberding, 2004; Sallis & Owen, 1999, pp. 110–134) but also in enhancing health-related quality of life (HRQOL) among patients living with diabetes (Manson et al., 1991), multiple sclerosis (Stuifbergen, Seraphine, & Roberts, 2000), cardiovascular disease (Salyer, Flattery, Joyner, & Elswick, 2003) and neuromuscular disorders (Hofoss, 2004). In the case of Type 2 diabetes, unhealthy lifestyle has been reported to increase its prevalence in all socio-economic classes (De Sá Novato, Aurora, Grossi, & Kimura, 2007; Vadstrup, Frolich, Perrild, Borg, & Roder, 2009), making it an important concern in healthcare and clinical research (Chen et al., 2006).

Studies indicate that obesity adversely affects physical, psychological and social well-being of individuals suffering from Type 2 diabetes, coronary heart disease, stroke and cancer (Lean Michael, Han Thang, & Seidell Jacob, 1999). Obese men and women report a poorer physical functioning as compared to normal healthy counterparts (Lopez-Garcia et al., 2003).

While psychiatrists have reported severe psychological consequences of obesity (Kushner & Foster, 2000), in research studies, the effects of obesity are not clear. For instance, Mannucci et al. (1999) found a poor QOL in obese females, whereas others (Le Penn, Levy, Loos, Banzet, & Basdevant, 1998) found no evidence of psychological or social repercussions among the obese.

Indian studies focusing on illness causation beliefs generally reveal a co-existence of belief in internal and external causes in the psyche of cancer and diabetes patients (Awasthi & Mishra, 2007, 2008, 2011, 2013; Awasthi et al., 2006). Belief in both God and *karma* in the case of myocardial infarction (Agarwal & Dalal, 1993; Dalal, 2000), accident victims (Dalal & Pandey, 1988), as well as major and minor surgery patients (Broota, 1997) is well documented. In the case of obesity, it has been indicated that well-being may be associated with factors such as healthy lifestyle, control beliefs, self-efficacy and psychosocial distress (Sonntag et al., 2010), but research evidence in this respect is not conclusive, and almost absent in the Indian cultural context.

The studies discussed earlier indicate that very little work has been done linking illness control beliefs and healthy lifestyle to obesity-related well-being. The relationship of illness control beliefs and healthy lifestyle with health-related well-being has not been examined in samples of obese diabetic women. In the present study, we make an attempt to analyse the relationship of health-promoting lifestyles and illness control beliefs with obesity-related well-being in a sample of obese women suffering from diabetes. The focus on the obese diabetic women is for two reasons: (a) there is a progressive upward trend of obesity and diabetes among women in India and (b) obese diabetic women are likely to develop chronic illnesses (e.g., arthritis, coronary heart disease) three times more than women having normal or below normal body weight (Manson et al., 1990, 1991). There are also reports that obese women, not obese men, have a higher rate of depression and suicidal ideation than their normal-weight counterparts (Carpenter, Hasin, Allison, & Faith, 2000; Istvan, Zavala, & Weidner, 1992).

Guided by these concerns, the present study attempted to examine some psychological features of the obese women suffering from diabetes. The focus of the study is on obesity rather than diabetes. In the light of the findings obtained in our previous studies of women living with cancer and diabetes, and many others, reported in the preceding section, it was hypothesised that:

1. Belief in 'self-control' and 'doctor-control' of obesity would be associated with lesser psychosocial and physical discomfort as compared to belief in 'supernatural' control.
2. Health-promoting lifestyles would be associated with less psychosocial and physical discomfort of obesity.

Method

Participants

The study was conducted with 100 obese women ($BMI \geq 30$) suffering from Type 2 diabetes. A criterion-based sampling was carried out. Participants were selected from out-patient departments (OPD) of some medical centres and hospitals, but mainly from Sir Sundar Lal Hospital, BHU, located in Varanasi City. The participants were of urban background, belonged to nuclear or extended families, were married, had children and were home makers. All were educated (minimum high school, maximum postgraduate, mean years of schooling = 13.27, $SD = 2.60$), and none had evidence of gestational or Type1 diabetes. The participants had a history of obesity and diabetes after marriage. All were under medication of diabetes as well as obesity for at least 5 years, but none was hospitalised. The participants were selected from the age range of 30–45 years (mean = 37.31, $SD = 5.16$), mainly because of the prevalence of obesity reported in the adult population (Ogden et al., 2006). The socio-economic status of participants was middle-class (both upper and lower included), which was determined on the basis of their family income, level of education and husband's occupation.

It is to be noted at this point that the study was concerned only with behavioural aspects of obesity. The procedures applied in the study were non-invasive and non-intrusive physically or psychologically. Nevertheless, the study was carried out as per guidelines provided by the Ethics Committee of the Faculty of Science, Banaras Hindu University. Only the women, who willingly volunteered and consented for participation in the study, were included in the sample. They were promised for confidentiality of their responses and ensured to feel free to quit at any point of time during the study if they did not feel like participating in it. It is also to be noted that many of the criteria used in the selection or exclusion of participants were laid down by practical rather than theoretical considerations.

Measures

Health-promoting Lifestyle Profile II (HPLP II)

The HPLP II was developed by Walker and Hill-Polerecky (1996). It consists of 52 items divided into six subscales. The instrument measures six components of healthy lifestyle, namely, health responsibility (nine items), physical activity (eight items), nutrition (nine items), interpersonal relations (nine items), spiritual growth (nine items) and stress management (eight items). Health responsibility includes seeking educational and professional assistance to improve health and paying attention to one's health. Physical activity involves participating in regular exercise. The nutrition category includes items related to healthy meal patterns and food choices. Interpersonal relations involve intimacy and closeness with others. Spiritual growth includes items related to self-actualisation and being connected with a force greater than oneself. Stress management involves using behaviours to control stress and improve coping abilities.

Response choices range from 1 (never) to 4 (routinely). A score for overall health-promoting behaviours is determined by calculating the mean of each participant's responses to all 52 items. Scores for the six subscales are obtained similarly by calculating the mean of responses to the subscale items. The alpha coefficient of internal consistency for the total scale was found to be 0.94, whereas alpha coefficients for the subscales ranged from 0.79 to 0.87. The three-week test-retest reliability for the total scale was found to be 0.89.

Since the items included in the scale are very general in nature and applicable to any population, it did not require any cultural adaptation. However, the items required rendering from English to Hindi language (in which all participants were conversant), and meeting its various nuances (e.g., achieving semantic and normative equivalences, and minimising item bias in the new language version). The translation and back-translation procedure (Brislin, 1970) was adopted in developing Hindi version of the scale. The back-translated version (Hindi to English) was highly similar to the original HPLP II. The scale has been widely used in cross-cultural studies of health, and it has been found quite useful (Clement, Bouchard, Jankowski, & Perreault, 1995; Walker & Hill-Polerecky, 1996). The scale is available online free of charge for use for research purposes.

Obesity-related Well-being Questionnaire (ORWELL97)

In view of the focus of the study on the well-being of obese women, we used the ORWELL97. Developed by Mannucci et al. (1999), the questionnaire consists of 18 items. Three scores reported from the questionnaire

represent relevance (ORWELL 97-R), occurrence (ORWELL 97-O) and total score (ORWELL 97-T), which is the sum of R and O scores. Higher scores represent a low level of well-being. Each item is answered on a Likert-type scale ranging from 1 (not at all) to 4 (very much). Test–retest reliability and internal consistency for the total instrument are reported to be 0.92 and 0.83, respectively. The instrument measures two major factors related to quality of life, namely, the psychosocial aspects of obesity and physical discomfort related to obesity. Psychosocial aspects have two subscales: psychosocial discomfort (seven items) and psychosocial impact (six items). The discomfort subscale includes items such as feeling nervous, showing one’s body, derision, sadness, sexual attractiveness, apprehension and work. The impact subscale includes items such as social activities, self-esteem, feeling as though you are in danger, familial relationships, health concerns and social modelling.

The physical discomfort factor includes five items related to the symptoms of physical discomfort, such as shortness of breath, feeling sleepy, sweating and physical activity. In the present study, the internal consistency reliability of the ORWELL97 calculated by Cronbach’s alpha was 0.81. We have used data obtained under occurrence questions that represented obesity-related psychosocial discomfort and impact and physical discomfort.

As noted in the case of HPLP II, the items included in this scale were fairly general in scope and applicable to any population. Hence, the scale did not require any cultural adaptation. On the other hand, the items required rendering from English to Hindi language by using translation and back-translation procedure (Brislin, 1970) and meeting its various requirements. The back-translated version was highly similar to the original scale. The scale is available online free of charge for use for research purposes.

Illness Controllability Belief Measure

It consists of three items, which assess the degree to which the participant believes that the disease is controllable by ‘self’, ‘supernatural forces’ or a ‘doctor’ (Awasthi et al., 2006). Each item is rated on a 5-point scale, ranging from ‘not at all’ (1) to ‘very much’ (5). Test–retest reliabilities of the scales have been found to be 0.90, 0.93 and 0.91, respectively. Although it is a short scale, which may be subject to criticism, it has been used in many studies with patients suffering from cervix cancer (Awasthi & Mishra, 2008, 2011, 2013, 2015; Awasthi et al., 2006; Awasthi, Mishra, & Shahi, 2017) or diabetes (Awasthi & Mishra, 2007, 2010; Mishra et al., 2004), yielding fairly consistent and theoretically valid results.

Results

The results were analysed in terms of computation of mean scores, standard deviations and correlations. Multiple regression analysis was conducted to examine the amount of contribution of illness controllability beliefs and health-promoting lifestyle variables, which were conceptualised as predictors. Psychosocial discomfort, psychosocial impact and physical discomfort were used as criterion variables.

Illness Control Beliefs, Psychosocial Discomfort, Impact and Physical Discomfort

Means and standard deviations obtained on different measures are given in Table 1. The values of correlation of illness control beliefs and health-promoting lifestyles with psychosocial discomfort, impact and physical

Table 1. Mean Scores of Women Patients' on Various Measures of Illness Controllability Belief, Health-promoting Lifestyles and Obesity-related Well-being

Illness Controllability Belief	Mean	Standard Deviation
1. Self-control	2.39	1.36
2. Doctor-control	2.96	0.74
3. Supernatural-control	3.29	1.46
Health-promoting Lifestyles		
1. Health Responsibility	17.20	8.84
2. Physical Activity	17.95	7.40
3. Nutrition	18.12	7.45
4. Interpersonal Relations	18.10	7.26
5. Spiritual Growth	16.93	6.99
6. Stress Management	17.81	8.04
Obesity-related Well-being		
1. Psychosocial Aspects		
a. Psychosocial Discomfort	22.14	7.16
b. Psychosocial Impact	19.54	5.60
2. Physical Discomfort	16.96	4.11

Source: Authors' own.

Table 2. Correlations of Illness Controllability Belief and Health-promoting Lifestyles with Obesity-related Well-being Measures

Measures	Obesity-related Well-being		
	1. Psychosocial Aspects of Obesity		2. Physical Aspects of Obesity
	a. Psychosocial Discomfort	b. Psychosocial Impact	a. Physical Discomfort
Illness Controllability Belief			
1. Self-control	-0.89**	-0.83**	-0.83**
2. Doctor-control	-0.36**	-0.35**	-0.31**
3. Supernatural-control	0.81**	0.78**	0.80**
Health-promoting Lifestyles			
1. Health Responsibility	-0.91**	-0.86**	-0.88**
2. Physical Activity	-0.88**	-0.80**	-0.85**
3. Nutrition	-0.83**	-0.76**	-0.78**
4. Interpersonal Relations	-0.75**	-0.73**	-0.71**
5. Spiritual Growth	-0.83**	-0.79**	-0.78**
6. Stress Management	-0.87**	-0.83**	-0.85**

Source: Authors' own.

Note: * $p \leq 0.05$, ** $p \leq 0.01$.

discomfort measures are presented in Table 2. Except for the interpersonal relations measure, the distributions of scores on all other measures are normal.

The analysis revealed that 'self-control' belief was negatively correlated with psychosocial discomfort, impact and physical discomfort measures, suggesting that with self-control belief, the participants felt less psychosocial and physical discomfort, and also less psychosocial impact of obesity. 'Supernatural-control' belief was positively correlated with psychosocial discomfort, impact and physical discomfort measures. This indicated that the obese women with relatively strong supernatural-control belief experienced greater psychosocial and physical discomfort, and greater psychosocial impact of obesity.

Multiple Regression Analysis

As indicated previously, multiple regression analysis was carried out to examine the contribution of illness control beliefs and health-promoting

lifestyles (predictor variables) to the measures of health-related well-being, namely, psychosocial discomfort, psychosocial impact and physical discomfort (the criterion variables). Despite high correlation among the variables, it is not difficult to determine the status of variables as 'predictor' or 'criterion'. The most logical and expected flow of influence in this case is from patients' control beliefs and healthy lifestyles to well-being. A step-wise regression analysis model appeared more appropriate than the hierarchical model, because it was not possible to determine the theoretical hierarchy of predictor variables in terms of their effects. The outcomes of this analysis are presented in Table 3.

Belief in 'self-control' and 'supernatural-control' accounted for approximately 84 per cent of variance in the scores on psychosocial discomfort measure ($F_2, 97, 251.01, p < 0.01$) in which 'self-control' contributed approximately 79 per cent of variance in the scores. While 'self-control' ($b = -0.64$) made negative predictions (less psychosocial discomfort), the prediction from 'supernatural-control' ($b = 0.34$) was in the positive direction (greater psychosocial discomfort).

With respect to the prediction of psychosocial impact, results indicated that 'self-control' ($b = -0.57$) and 'supernatural-control' ($b = 0.36$) beliefs explained approximately 75 per cent of variance in the scores ($F_2, 97, 145.81, p < 0.01$). 'Self-control' belief contributed approximately 69 per cent to variance in the scores. 'Self-control' belief emerged as a negative predictor and 'supernatural-control' belief as a positive predictor of psychosocial impact.

On the physical discomfort measure, 'self-control' and 'supernatural-control' beliefs accounted for approximately 77 per cent of variance in the scores ($F_2, 97, 160.90, p < 0.01$) in which 'self-control' belief contributed approximately 69 per cent to variance in the scores. 'Self-control' belief ($b = -0.52$) made a negative prediction (reduced physical discomfort), while 'supernatural-control' belief ($b = 0.42$) made a positive prediction (enhanced physical discomfort).

On the psychosocial discomfort measure (Table 4), 'health responsibility' ($b = -0.68$) and 'physical activity' ($b = -0.24$) emerged as negative predictors, and accounted for approximately 84 per cent of variance in the scores ($F_2, 97, 249.87, p < 0.01$). 'Health responsibility' contributed approximately 83 per cent to variance in the scores.

On the psychosocial impact measure, 'health responsibility' ($b = -0.57$) and 'physical activity' ($b = -0.31$) explained approximately 75 per cent of variance in the scores ($F_2, 97, 146.19, p < 0.01$) of which 'health responsibility' alone accounted for approximately 74 per cent of variance in the scores. On physical aspect of obesity 'health responsibility' ($b = -0.59$) and 'physical activity' ($b = -0.31$) accounted for approximately 78 per cent

Table 3. Stepwise Regression Analysis Predicting Psychosocial Aspects and Physical Discomfort of Obesity from Illness Controllability Beliefs

Serial No.	Predictor Variables	Multiple R	R ²	R ² change	df	F	F-change	Beta
1. Psychosocial Aspects of Obesity								
a. Psychosocial Discomfort								
1.	Self-control	0.886	0.785	0.785	1, 98	358.568	358.568	-0.64
2.	Supernatural-control	0.915	0.838	0.053	2, 97	251.010	31.577	0.34
b. Psychosocial Impact								
1.	Self-control	0.831	0.691	0.691	1, 98	218.962	218.962	-0.57
2.	Supernatural-control	0.866	0.750	0.060	2, 97	145.809	23.155	0.36
2. Physical Discomfort of Obesity								
1.	Self-control	0.829	0.688	0.688	1, 98	215.899	215.899	-0.52
2.	Supernatural-control	0.877	0.768	0.081	2, 97	160.897	33.784	0.42

Source: Authors' own.

Note: * $p \leq 0.05$, ** $p \leq 0.01$.

Table 4. Stepwise Regression Analysis Predicting Psychosocial Aspects and Physical Discomfort of Obesity from Health-promoting Lifestyles

Serial No.	Predictor Variables	Multiple R	R ²	R ² change	df	F	F-change	Beta
1. Psychosocial Aspects of Obesity								
a. Psychosocial Discomfort								
1.	Health Responsibility	0.911	0.830	0.830	1, 98	477.453	477.453	-0.68
2.	Physical Activity	0.915	0.837	0.007	2, 97	249.866	4.624	-0.24
b. Psychosocial Impact								
1.	Health Responsibility	0.859	0.738	0.738	1, 98	276.336	276.336	-0.57
2.	Stress Management	0.867	0.751	0.013	2, 97	146.188	4.938	-0.31
2. Physical Discomfort of Obesity								
1.	Health Responsibility	0.879	0.771	0.771	1, 98	330.020	330.020	-0.59
2.	Physical Activity	0.885	0.783	0.012	2, 97	175.294	5.480	-0.31

Source: Authors' own.

Note: * $p \leq 0.05$, ** $p \leq 0.01$.

of variance in the scores ($F_2, 97, 175.29, p < 0.01$). Although both variables made negative predictions, 'health responsibility' alone accounted for approximately 77 per cent of variance in the scores.

Discussion

The findings of the study bring out 'self-control' belief and 'health responsibility' as the two most important variables accounting for health-related well-being of the obese diabetic patients. The contribution of 'supernatural-control' belief to all measures of well-being was small and negative. In the following sections, we will discuss these findings in some detail.

Control Beliefs and Well-being

Among the three control beliefs examined in the study, it was the 'self-control' belief that greatly accounted for less psychosocial discomfort, less psychosocial impact and experience of less physical discomfort. This finding is consonant with those reported in studies carried out with other kind of patients, which also indicate that people characterised by strong 'self-control' belief experience lesser psychosocial and physical discomfort (Dempster, McCarthy, & Davis, 2011; Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003; Theofilou, 2012).

That 'self-control' beliefs have positive outcomes in conditions of serious illness can be accepted as a general conclusion. The question is: why does it happen to be like that? There are two possibilities. One is that patients, who believe that their health and illness are under their own control, are more likely to engage in health-promoting and illness-preventing activities than those who believe that they are under the control of other factors (Rochelle & Fidler, 2013). A second possibility is that patients, characterised by 'self-control' beliefs, easily adjust to illness than those who do not believe much in 'self-control' (Lazarus, 1983; Taylor, Lichtman, & Wood, 1984). Although 'self-control' beliefs are sometimes considered as reflecting an 'illusion of control', for Taylor (2005), they are 'healthy illusions' as long as they create positive impact on patient's psychological adaptation and well-being. The results pertaining to 'self-control' belief can be interpreted in terms of Bandura's (1997) self-efficacy model of behaviour. Earlier, Lazarus (1983; also

Lazarus & Folkman, 1984) had noted controllability of situation as an important factor in the feeling of psychosocial and physical discomforts. Since 'self-control' belief reflects individuals' confidence in their capacity to adopt health-promoting lifestyles, it reinforces the feeling of self-efficacy, which can predict several health-related behaviours (e.g., metabolic control in diabetes, preventive dental practices, exercise habits, etc.; refer to Bandura, 1997). In patients suffering from chronic pain also, perceived self-efficacy has been found to predict treatment outcomes, such as increased exercise, reduced medication and improved mood states (Turk & Okifuji, 2002). It may be worthwhile to examine in another study the relationship between 'self-control' belief and 'self-efficacy' among the obese diabetic women.

Strong belief of individuals in 'supernatural-control' of health and illness has been a common observation of researchers in India. The theory of *karma* is often endorsed as an explanation of illness, both in theoretical writings (Radhakrishnan, 1926) and in empirical studies (Agarwal & Dalal, 1993; Awasthi et al., 2006; Dalal, 2000; Dalal & Pandey, 1988; Dalal & Singh, 1992; Gokhale, 1961). The theory holds that one's present sufferings are the result of the bad deeds of preceding lives (not only of the present life), and that suffering relieves people from the effects of such deeds (Awasthi & Mishra, 2013). Thus, 'supernatural-control' belief seems to alleviate patients from holding themselves accountable for illness, while they may still continue to adhere to treatment.

Cohen and Cairns (2012) have indicated that the search for meaning in life circumstances enhances people's well-being and encourages constructive reactions to serious illnesses. In terms of Lazarus and Folkman's (1984) theory, 'supernatural-control' beliefs may allow patients to reappraise their health problem and thereby achieve psychological adaptation. In the present study, 'supernatural-control' belief came up as a significant predictor of health-related well-being, but the prediction was for the experience of greater physical and psychosocial discomfort, indicating a poor psychological and social well-being.

How can we account for these contrasting findings reported with respect to the role of 'supernatural-control' beliefs in psychological adaptation of patients to their health problems? One explanation may be offered in terms of 'perceived threat' of the health problem. The problems of obesity and diabetes generally do not pose as serious threat (either immediate or long-term) to one's life as it is created under the conditions of myocardial infarction or a serious accident. Mishra (1997) has indicated that 'supernatural-control' mechanism get activated particularly under conditions in which people feel that they can do nothing

to change their existing condition. This proposition needs to be empirically examined in future studies.

Pargament (1999) has distinguished among three types of adaptation processes that may occur with religion and spirituality: (a) self-directing, in which people work without God; (b) collaborative, in which people work with God and (c) deferring, in which people wait for God to solve problems. He has described interactive, behavioural, emotional and motivational components of religion, each of which may affect well-being of patients in different ways. However, more specific assessment of religious and spiritual beliefs of obese diabetic women is required to understand the mechanisms that influence well-being, and to validate the outcomes of 'supernatural-control' belief noted in the present study.

The findings also indicate the existence of 'doctor-control' belief in participants. This belief was found negatively correlated with feelings of physical and psychosocial discomforts as well as psychosocial impact of obesity. In the regression analysis, however, 'doctor-control' belief did not turn out as a significant predictor of well-being. The role of doctors' attention and empathy in reducing patients' distress has often been reported in studies of cancer patients (Parchman & Burge, 2004; Zachariae et al., 2003). There is also the indication that 'doctor-control' belief promotes greater compliance and adherence to treatment, and results in less physical and psychosocial discomfort of patients (Levinson, Rotter, Mulloly, Dull, & Frankle, 1997). In this study, the absence of the role of 'doctor-control' belief in women's well-being suggests that this belief, instead of operating independently, works possibly through self-control mechanisms exercised by the obese patients. This possibility needs to be empirically tested in future research.

Health-promoting Lifestyles and Well-being

The hypothesis, that health-promoting lifestyles would be associated with less psychosocial and physical discomfort of obesity, was strongly supported by the findings. All components of healthy lifestyles were negatively correlated with psychosocial discomfort, physical discomfort and psychosocial impact measures of well-being. Other studies, which involve patients living with chronic illnesses, also report similar role of health-promoting lifestyles in HRQOL of Hofoss (2004), Manson et al. (1991) and Salyer et al. (2003).

In this study 'health responsibility' and 'physical activity' components of health-promoting lifestyle made significant contributions to psychosocial

and physical discomforts, whereas ‘health responsibility’ and ‘stress management’ made major contributions to psychosocial impact measure. These behavioural aspects are although fully under individuals’ control, their practice in daily life requires an optimal motivation. Knowing that somatic complaints and psychological problems are quite common among the obese patients (Fontaine, Cheskin, & Barofsky, 1996; Kolotkin, Meter, & Williams, 2001), motivating them to engage in such behaviours can be a positive step in the direction of enhancing their health-related well-being. Physical activity has been found to be associated with reduction of obesity in several studies (Ebrahim et al., 2010; Fahim et al., 2014; Jebb & Moore, 1999; Paeratakul, Popkin, & Ge, 1998; Thorpe & Browne, 2009). Thus, a clear suggestion emerging from our study, and also other studies, is that a lifestyle characterised by acceptance of health responsibility and engagement in physical activity can provide people with an effective way of dealing with the problems of obesity.

Implications

The findings of the study appear to have some practical implications. They indicate that health-promoting lifestyle may alleviate diabetic obese women from psychosocial and physical discomforts of obesity. Encouraging obese diabetic patients to accept the responsibility of their health and to engage in physical activity may be an effective step towards the enhancement of their health-related well-being. Such interventions will also be useful for reducing the incidence of obesity-related diabetes in high risk population of women.

Finding with respect to ‘self-control’ belief can be employed as a behavioural medicine to encourage the feeling of ‘self-efficacy’ among obese diabetic women. Patients may be trained in ‘self-regulation techniques’ with respect to dietary patterns, such as amount, time and other aspects of eating. An open and accepting relationship of doctors with their patients can strengthen patients’ self-control mechanisms, and go a long way in the management of obesity as well as Type 2 diabetes.

Limitations and Directions for Future Research

In this study, we have explored some important psychological dimensions of obese diabetic women associated with their well-being. However, there are certain limitations of the study to be kept in mind for future

research. It may be noted that we had made criterion-based selection of women in our sample, which limits the generalisation of findings. Also, we had followed a dual criterion (of obesity and diabetes) in the selection of women, implying co-morbidity in the sample. Thus, the findings can be applicable only for those women who are both obese and diabetic. It may be worthwhile to do a similar study with women who are either obese or diabetic. Since the concerns with obesity are fairly age- and gender-specific, there is need to work with males and females of age groups other than 30–45 years. Information about incidence and prevalence of obesity is missing in our data. We also feel that the analysis of data according to educational background of participants will reveal some more interesting facts about the role of control beliefs and healthy lifestyle in psychological well-being of obese women.

Despite these limitations, we can still place some confidence in the obtained results, since they are similar in many ways to those reported in other studies carried out with a wide variety of samples, such as working women (Duffy, Rossow, & Hernandez, 1996), pregnant women (Lin, Tsai, Chan, & Lin, 2009), workers (Zhang et al., 2011), university students (Wei et al., 2012) and even the Arabian Muslim women (Al Ma'aithah, Haddad, & Umlauf, 1999).

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References

- Abel, T. (1991). Measuring health lifestyles in a comparative analysis: Theoretical issues and empirical findings. *Social Science and Medicine*, 32(8), 899–908.
- Agarwal, M., & Dalal, A. K. (1993). Causal beliefs and psychological recovery of myocardial infarction patients. *Journal of Social Psychology*, 133(3), 385–394.

- Al Ma'aitah, R., Haddad, L., & Umlauf, M. G. (1999). Health promotion behaviors of Jordanian women. *Health Care for Women International*, 20(6), 533–546.
- Anesbury, T., & Tiggemann, M. (2000). An attempt to reduce negative stereotyping of obesity in children by changing controllability beliefs. *Health Education Research*, 15(2), 145–152.
- Awasthi, P., & Mishra, R. C. (2007). Role of coping strategies and social support in perceived illness consequences and controllability among diabetic women. *Psychology and Developing Societies*, 19(2), 179–197.
- . (2008). A comparative study of chronic illness beliefs of cancer and diabetic women. *Journal of Indian Health Psychology*, 3(1), 27–49.
- . (2010). Illness beliefs and their relationships with social support in women cancer patients. *Indian Journal of Applied Psychology*, 36(2), 317–327.
- . (2011). Illness beliefs and coping strategies of diabetic women. *Psychological Studies*, 56(2), 176–184.
- . (2013). Can social support and control agency change illness consequences? Evidence from cervix cancer patients. *Open Journal of Medical Psychology*, 2(3), 115–123.
- . (2015). Social support and illness beliefs in women cancer patients. *United Journal of Awadh Scholars*, 2(1–2), 43–52.
- Awasthi, P., Mishra, R. C., & Shahi, U. P. (2006). Health beliefs and behavior of cervix cancer patients. *Psychology and Developing Societies*, 18(1), 37–58.
- . (2017). *Illness beliefs, optimism, subjective well-being and post traumatic growth of cervix cancer patients*. In S. Dixit & A. K. Sharma (Eds.), *Psychosocial aspects of health and illness* (pp. 38–59). New Delhi: Concept.
- Babu, G. R., Murthy, G. V. S., Ana, Y., Patel, P., Deepa, R., Neelon, S. E. B., ... Reddy, K. S. (2018). Association of obesity with hypertension and type 2 diabetes mellitus in India: A meta-analysis of observational studies. *World Journal of Diabetes*, 9(1), 40–52.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman/Times Books/Henry Holt & Co.
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-cultural Psychology*, 1(3), 185–216.
- Broota, K. D. (1997). Belief and their functional significance. *Trends in Social Science Research*, 4(1), 133–139.
- Carpenter, K. M., Hasin, D. S., Allison, D. B., & Faith, M. S. (2000). Relationships between obesity and DSM-IV major depressive disorder, suicide ideation, and suicide attempts: Results from a general population study. *American Journal of Public Health*, 90(2), 251–257.
- Chen, H. P., Cohen, P., Kasen, S., Johnson, J. G., Berenson, K., & Gordon, K. (2006). Impact of adolescent mental disorders and physical illnesses on quality of life 17 years later. *Archives of Pediatrics & Adolescent Medicine*, 160(1), 93–99.
- Clement, M., Bouchard, L., Jankowski, L. W., & Perreault, M. (1995). Adoption of health promotion behaviors in first-year baccalaureate nursing students: Pilot study. *Canadian Journal of Nursing Research*, 27(4), 111–131.

- Cohen, K., & Cairns, D. (2012). Is searching for meaning in life associated with reduced subjective well-being? Confirmation and possible moderators. *Journal of Happiness Studies, 13*(2), 313–331.
- Dalal, A. K. (2000). Living with a chronic disease: Healing and psychological adjustment in Indian society. *Psychology and Developing Societies, 12*(1), 67–81.
- Dalal, A. K., & Pandey, N. (1988). Psychological recovery of the accident victims with temporary and permanent disability. *International Journal of Psychology, 23*(1–6), 25–40.
- Dalal, A. K., & Singh, A. K. (1992). Causal beliefs and recovery from surgery. *Psychology and Health, 6*(3), 193–203.
- Dempster, M., McCarthy, T., & Davis, M. (2011). Psychological adjustment to type 2 diabetes and relationship quality. *Diabetic Medicine, 28*(4), 487–492.
- De Sá Novato, T., Aurora, S., Grossi, A., & Kimura, M. (2007). Quality of life and self-esteem of adolescents with diabetes mellitus. *Acta Paulista de Enfermagem, 21*(4), 562–567.
- Duffy, M. E., Rossow, R., & Hernandez, M. (1996). Correlates of health-promotion activities in employed Mexican American women. *Nursing Research, 45*(1), 18–24.
- Ebrahim, S., Kinra, S., Bowen, L., Andersen, E., Ben-Shlomo, Y., Lyngdoh, T. et al. (2010). The effect of rural-to-urban migration on obesity and diabetes in India: A cross-sectional study. *PLoS Medicine, 7*(4), e1000268.
- Ellulu, M., Abed, Y., Rahmat, A., Ranneh, Y., & Ali, F. (2014). Epidemiology of obesity in developing countries: Challenges and prevention. *Global Epidemic Obesity, 2*. Retrieved from <http://dx.doi.org/10.7243/2052-5966-2-2>
- Fabricatore, A. N., & Wadden, T. A. (2004). Psychological aspects of obesity. *Clinics in Dermatology, 4*(22), 332–337.
- Fahim, M., Idris, M., Ali, R., Nugent, C., Kang, B., Huh, E., & Lee, S. (2014). Athena: A personalized platform to promote an active lifestyle and wellbeing based on physical, mental and social health primitives. *Sensors, 14*(5), 9313–9329.
- Fall, C. H. (2001). Non-industrialized countries and affluence. *British Medical Bulletin, 60*(1), 33–50.
- Fontaine, K. R., Cheskin, L. J., & Barofsky, I. (1996). Health-related quality of life in obese persons seeking treatment. *Journal of Family Practice, 43*(3), 265–270.
- Fox, K. M., Taylor, S. L., & Jones, J. E. (2000). Understanding the bariatric surgical patient: A demographic, lifestyle and psychological profile. *Obesity Surgery, 10*(5), 477–481.
- Gilbert, D. T. (1991). How mental system believe. *American Psychologist, 46*(2), 107–109.
- Gokhale, B. G. (1961). *Indian thought throughout the ages: A study of some dominant concepts*. Bombay: Asia Publishing House.

- Hagger, M. S., Chatzisarantis, N. L. D., Culverhouse, T., & Biddle, S. J. H. (2003). The process by which perceived autonomy support in physical education promotes leisure-time physical activity intentions and behavior: A trans-contextual model. *Journal of Educational Psychology, 95*(4), 784–795.
- Hofoss, D. (2004). Healthy living does not reduce life satisfaction among physically handicapped persons. *Patient Education and Counseling, 52*(1), 17–22.
- Istvan, J., Zavela, K., & Weidner, G. (1992). Body weight and psychological distress in NHANES I. *International Journal of Obesity and Related Metabolic Disorders, 16*(12), 999–1003.
- Jebb, S. A., & Moore, M. S. (1999). Contribution of a sedentary lifestyle and inactivity to the etiology of overweight and obesity: Current evidence and research issues. *Medicine and Science in Sports and Exercise, 31*(6), 533–545.
- Kaminsky, J., & Gadaleta, D. (2002). A study of discrimination within the medical community as viewed by obese patients. *Obesity Surgery, 12*(1), 14–18.
- Kenchaiah, S., Evans, J. C., Levy, D., Wilson, P. W., Benjamin, E. J., Larson, M. G., ... Vasan, R. S. (2002). Obesity and the risk of heart failure. *New England Journal of Medicine, 347*(5), 305–313.
- Klaczynski, P. A., Goold, K. W., & Mudry, J. J. (2004). Culture, obesity stereotypes, self-esteem, and the ‘thin ideal’: A social identity perspective. *Journal of Youth and Adolescence, 33*(4), 307–317.
- Kolotkin, R. L., & Meter, K., & Williams, G. R. (2001). Quality of life and obesity. *Obesity Reviews, 2*(4), 219–229.
- Kushner, R. F., & Foster, G. D. (2000). Obesity and quality of life. *Nutrition, 16*(10), 947–952.
- Lazarus, R. S. (1983). The costs and benefits of denial. In S. Bresnitz (Ed.), *Denial of stress* (pp. 1–32). New York, NY: International Universities Press.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York, NY: Springer.
- Lean Michael, E. J., Han Thang, S., & Seidell Jacob, C. (1999). Impairment of health and quality of life using new US federal guidelines for the identification of obesity. *Archives of Internal Medicine, 159*(8), 837–843.
- Le Penn, C., Levy, E., Loos, F., Banzet, M. N., & Basdevant, A. (1998). Specific scale compared with ‘generic’ scale: A double measurement of the quality of life in a French community sample of obese subjects. *Journal of Epidemiology Community Health, 52*(7), 445–450.
- Levinson, W., Rotter, D. L., Mulloly, J. P., Dull, V. T., & Frankle, R. M. (1997). Physician–patient communication: The relationship with malpractice claims among primary care physician and surgeons. *Journal of American Medical Association, 277*(7), 553–559.
- Lin, Y. H., Tsai, E. M., Chan, F. H., & Lin, Y. L. (2009). Health promoting lifestyles and related factors in pregnant women. *Chang Gung Medical Journal, 32*(6), 650–661.

- Lopez-Garcia, E., Banegas, J. R., Gutierrez-Fisac, J. L., Perez-Regadera, A. G., Diez-Ganan, L., & Rodriguez-Artalejo, F. (2003). Relation between body weight and health related quality of life among the elderly in Spain. *International Journal of Obesity*, 27(6), 701–709.
- Manson, J. E., Colditz, G. A., Stampfer, M. J., Rosener, Monson, R. R., Speizer, F. E. et al (1990). A prospective study of obesity and risk of coronary heart disease in women. *New England Journal of Medicine*, 322(13), 882–889.
- Manson, J. E., Rimm, E. B., Stampfer, M. J., Colditz, G. A., Willett, W. C., Krolewski, A. S., ... Speizer, F. E. (1991). A prospective study of physical activity and incidence of noninsulin-dependent diabetes mellitus in women. *Lancet*, 338(8770), 774–778.
- Mannucci, E., Ricca, V., Barciulli, E., Di Bernardo, M., Travaglini, R., Cabras, P. L., & Rotella, C. M. (1999). Quality of life and overweight: The obesity related well-being (ORWELL-97) questionnaire. *Addictive Behaviors*, 24(3), 345–357.
- Marchioni, D. M. L., Voci, S. M., de Lima, F. E. L., Fisberg, R. M., & Slater B. (2007). Reproducibility of a food frequency questionnaire for adolescents. *Cad Saude Publica*, 23(9), 2187–2196.
- Mishra, R. C. (1997). Family support and health care in a culturally changing village community in northern India. *Social Science International*, 13(1–2), 10–13.
- . (2009). Health cognition and practices. In A. Shukla (Ed.), *Culture, cognition and behavior* (pp. 264–276). New Delhi: Concept.
- . (2015). Socio-cultural and psychological adaptations in a culturally changing tribal community. *Psychological Studies*, 3(1), 7–13. (Journal of Central Department of Psychology, Tribhuvan University, Kathmandu, Nepal).
- Mishra, R. C., Awasthi, P., & Singh, S. K. (2004). Illness causation beliefs and perceived illness consequences in diabetic women. *Psychological Studies*, 4(2), 238–244.
- Mokdad, A. H., Marks, J. S., Stroup, D. F., & Gerberding, J. L. (2004). Actual causes of death in the United States. *The Journal of American Medical Association*, 291(10), 1238–1245.
- Ogden, C., Carroll, M., Curtin, L., McDowell, M., Tabak, C. et al. (2006). Prevalence of overweight and obesity in the United States, 1999–2004. *American Journal of Public Health*, 295(13), 1549–1555.
- Paeratakul, S., Popkin, B. M., & Ge, K. (1998). Changes in diet and physical activity affect the body mass index of Chinese adults. *International Journal Obesity Related Metabolic Disorders*, 22(5), 424–431.
- Parchman, M. L., & Burge, S. K. (2004). The patient–physician relationship, primary care attributes, and preventive services. *Family Medicine*, 36(1), 22–27.
- Pargament, K. I. (1999). The psychology of religion and spirituality? Yes and no. *International Journal for the Psychology of Religion*, 9(1), 3–16.

- Parr, C. L., Veierod, M. B., & Laake, P., Lund, E., & Hjartåker, A. (2006). Test-retest reproducibility of a food frequency questionnaire (FFQ) and estimated effects on disease risk in the Norwegian Women and Cancer Study (NOWAC). *Nutrition Journal*, 5(1), 4.
- Radhakrishnan, S. (1926). *The Hindu view of life*. Bombay: Blakie.
- Rochelle, T. L., & Fidler, H. (2013). The importance of illness perceptions, quality of life and psychological status in patients with ulcerative colitis and Crohn's disease. *Journal of Health Psychology*, 18(7), 972–983.
- Sallis, J. F., & Owen, N. (1999). *Physical activity and behavioral medicine*. Thousand Oaks, CA: SAGE.
- Salyer, J., Flattery, M., Joyner, P., & Elswick, R. K. (2003). Lifestyle and quality of life in long-term cardiac transplant recipients. *Journal of Heart and Lung Transplantation*, 22(3), 309–321.
- Sonntag, U., Esch, T., Hagen, L., Renneberg, B., Braun, V., & Heintze, C. (2010). Locus of control, self-efficacy and attribution tendencies in obese patients: Implications for primary care consultations. *Medical Science Monitor*, 16(7), 330–335.
- Stuifbergen, A. K., Seraphine, A., & Roberts, G. (2000). An explanatory model of health promotion and quality of life in chronic disabling conditions. *Nursing Research*, 49(3), 122–129.
- Tandon, P. N. (2011). Belief: A scientific perspective. In P. N. Tandon, R. C. Tripathi, & N. Srinivasan (Eds.), *Expanding horizons of the mind science(s)* (pp. 235–247). New York, NY: Nova Science Publishers.
- Taylor, S. E. (2005). On healthy illusions. *Daedalus*, 134(1), 133–135.
- Taylor, S. E., Lichtman, R. R., & Wood, J. V. (1984). Attributions, beliefs about control, and adjustment to breast cancer. *Journal of Personality and Social Psychology*, 46(3), 489–502.
- Teachman, B. A., Gapinski, K. D., Brownell, K. D., Rawlins, M., & Jeyaram, S. (2003). Demonstrations of implicit anti-fat bias: The impact of providing causal information and evoking empathy. *Health Psychology*, 22(1), 68–78.
- Theofilou, P. (2012). Quality of life and mental health in haemodialysis and peritoneal dialysis patients: The role of health beliefs. *International Urology and Nephrology*, 44(1), 245–253.
- Thorpe, S., & Browne J. (2009). *Closing the nutrition & physical activity gap in Victoria: Victorian aboriginal nutrition & physical activity strategy*. Melbourne: Victorian Aboriginal Community Controlled Health Organization.
- Turk, D. C., & Okifuji, A. (2002). Psychological factors in chronic pain: Evolution and revolution. *Journal of Consulting and Clinical Psychology*, 70(3), 678–690.
- Vadstrup, E., Frolich, A., Perrild, H., Borg, E., & Roder, M. (2009). Lifestyle intervention for type 2 diabetes patients: Trial protocol of The Copenhagen Type 2 Diabetes Rehabilitation Project. *BMC Public Health*, 9(1), 166.
- Walker, S. N., & Hill-Polerecky, D. M. (1996). *Psychometric evaluation of the health-promoting lifestyle profile II* (Unpublished manuscript). University of Nebraska Medical Center.

- Wei, C. N., Harada, K., Ueda, K., Fukumoto, K., Minamoto, K., & Ueda, A. (2012). Assessment of health-promoting lifestyle profile in Japanese university students. *Environmental Health and Preventive Medicine, 17*(3), 222–227.
- Yang, W., Kelly, T., & He, J. (2007). Genetic epidemiology of obesity. *Epidemiology Review, 29*(1), 49–61.
- Zachariae, R., Pedersen, C. G., Jensen, A. B., Ehrnrooth, E., Rossen, P. B., & von der Maase, H. (2003). Association of perceived physician communication style with patient satisfaction, distress, cancer-related self-efficacy and perceived control over the disease. *British Journal of Cancer, 88*(5), 658–665.
- Zhang, S. C., Wei, C. N., Fukumoto, K., Harada, K., Ueda, K., Ueda, A., et al. (2011). A comparative study of health-promoting lifestyles in agricultural and non-agricultural workers in Japan. *Environmental Health Preventive Medicine, 16*(2), 80–89.

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