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Religion and culture-related explanatory models of cancer and their association with wellbeing: a survey-based study in Sri Lanka

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Health beliefs are recognized as being important in predicting disease-related variables. Among health beliefs, explanatory models are observed to be strongly held beliefs. The personal etiological framework of an individual regarding his or her health condition is referred to as an explanatory model. In Asian countries, it has been observed that individuals have two parallel sets of explanatory models. One is based on the Western medical model, and another is based on cultural and religious beliefs. The current cross-sectional study expects to understand the religion and culture-based explanatory models among Sri Lankans. The study's first phase was conducted with 142 adults in Sri Lanka as an online survey. Multiple regression analysis was conducted to gauge the relationship between selected demographic variables and religious-cultural beliefs related to cancer. A short questionnaire was developed to record the religious-cultural beliefs related to cancer, following five mini-interviews. This was pre-tested before being used in the study. 50 cancer patients participated in the second phase, where their commonly held religion and culture-related explanatory models and their levels of well-being were correlated to understand if they had a significant impact on their well-being. An adapted version of the PERMA profiler was used to measure well-being. No statistically significant relationships were observed between the religious-cultural explanatory models of cancer and the disease-related variables. Thus, the prominent religious and cultural explanatory models of cancer can be seen as part of personal core beliefs in people, which are not normally affected or necessarily changed significantly via education, gender, or other disease-related circumstances. Further, beliefs related to karma appear to have a significant impact on well-being. Thus, karma and other religion- and culture-based explanatory models should be acknowledged in providing holistic care for cancer patients.

KEYWORDS: Explanatory models, Cancer, Wellbeing

INTRODUCTION

The cancer fact sheet issued by the WHO (World Health Organization) (1) in January 2014 states the incidence of cancer in 2012 was 14.1 million. At present, it is known to be a leading cause of death worldwide. Globocan 2020 states that the number of new cases of cancer in the world to be 19,292,789. In the recent past, the incidence of cancer has been rising in significant numbers. The estimated prevalence estimate is 50.5 million. In addition to this, the WHO states that "approximately 44% of cancer cases and 53% of cancer deaths occur in countries at a low or medium level of the Human Development Index" (BW S, CP W, World Cancer Report 2014) This observation is significant to Sri Lanka, as Sri Lanka has been categorized in the middle-income category until recently. With the current economic crisis,

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there is a possibility of the country being categorized as a low-income country too. Further, Sri Lankan data on cancer has observed an increase in the incidence of cancer in the country.

It has also been observed that, as a result of the “Westernization” of low- and middle-income countries as a result of globalization, rates and patterns of cancer in low- and middle-income countries are expected to follow those that are observed in countries with high Human Development Index (HDI) values. Following this, a decline in infection-related cancers and an increase in cancers related to reproductive, dietary, and hormonal risk factors are expected in the near future in low- and middle-income countries.

According to the current statistics, the crude incidence rate of cancer in Sri Lanka is 82.5 per 100,000. According to the national cancer program in Sri Lanka, one out of every ten people has a lifetime risk of developing cancer. (National Cancer Control Programme, 2015) Further, the statistics show an increase in rates of incidence in the country. A similar increase has been observed in the rates of cancer in Asia too. (Pfizer Medical Division, 2008)

With increased attention to quality of life in healthcare, there is a focus on providing holistic care for many physical and mental illnesses. It is important to understand the psychological aspects of patients as a prerequisite for providing holistic care. This is highly important in attempts to provide holistic care for cancer patients as well. Understanding the personal beliefs of a cancer patient is quite important, as these have a strong impact on the psychological response to the diagnosis and treatment of cancer. In addition to these psychological aspects, personality traits have also been implied as being important in the etiology of cancer (Kupper & Denollet, 2018)

Health psychological research has beyond doubt demonstrated that health beliefs play a significant role in different stages of a disease or illness. Their impact is observed in preventive measures, the course of illness, prognosis, and the outcome and subsequent quality of life in any health condition. Studies by Daher (2012) and Hoffman, Lent, and Raque-Bogdan (2012) have clearly shown how health beliefs affect etiological factors, prognosis, course of illness, ultimate outcome, and consequent quality of life in cancer patients.

Among the many types of health beliefs, explanatory models of illnesses have been observed to be important in the course of illness and the outcome of the disease. The personal etiological framework of the individual regarding an illness or disease is referred to as an explanatory model (EM). In other words, how a person may explain a disease-related condition is known as an EM. EMs have been observed to have a strong impact on treatment-seeking, the type of treatment sought, adherence to treatment, prognosis, and other illness-related outcomes (Marmarà, Marmarà, & Hubbard, 2017). EMs have been observed to have a significant impact on both mental and physical illnesses. (Jacob & Kuruvilla, 2018; Gunn et al., 2019) These can also have a strong impact on cancer patients due to the chronic nature of the disease and the common adverse effects experienced by patients following treatment. Therefore, understanding the EMs related to cancer can be important in providing cancer care.

Research related to EMs among Asian populations has indicated the presence of two categories of EMs that co-existed simultaneously. One category of EMs was based on Western medical models, while the other type was based on religious and cultural practices (Mathews et al., 2019) This could be a result of Asian countries adapting to Western medical models and treatment methods while retaining strongly held beliefs about their traditional religious-cultural belief systems and treatment methods. Therefore, understanding these parallel belief systems is important as both of these systems can impact treatment outcomes as well as the resulting quality of life.

Explanatory models (EMs) of cancer have not been extensively discussed in the Sri Lankan context due to cultural reasons, which has resulted in a lack of previous research on this important topic (Solomons et al., 2021). The lack of knowledge and understanding of EMs among healthcare personnel has a substantial influence on the quality of care provided to cancer patients in the nation. As a result, providing holistic care becomes challenging, making it more difficult to give patients the right kind of support and direction as they navigate their cancer journey. Hence, this research, which explores the various facets of EMs in the Sri Lankan context, is a crucial first step in filling this gap. By investigating this as-yet-undiscovered domain, this study aims to provide important new perspectives on the EMs that cancer patients have. This investigation has the potential to have a beneficial influence on holistic care approaches, allowing medical professionals to better comprehend and address the diverse requirements of cancer patients in Sri Lanka.

In addition to this, there are many expatriates of Sri Lankan and Asian origin living in Western countries. As religious and cultural beliefs are recognized as core beliefs, when they access health care services in the Western context in general and for cancer in particular, understanding their EMs can be immensely beneficial in providing holistic care.

Sri Lankans have been observed to have strong beliefs related to both the Western medical model and the religious and cultural practices of EMs related to cancer. While most individuals believe Western medical treatment to be the most important type of treatment, religious and cultural beliefs are seen as highly important as EMs of cancer. The most commonly held religious and cultural explanatory models of cancer among Sri Lankans are karma, destiny, and God's will (Solomons et al., 2021). The current paper attempts to explore whether these strongly held beliefs are affected by demographic and other disease-related factors.

Wellbeing and cancer-related beliefs

The impact of personal belief systems in the course of cancer has been demonstrated by the fact that these have been independently associated with survival in breast cancer patients (Schlottmann, 2018) Many healthcare systems in the world have begun to look at the importance of the well-being of cancer patients (Soler-Vila et al., 2005). The spiritual health of cancer patients has also been indicated by their well-being (Elliott et al., 2011). Spiritual health is strongly associated with culture and religion-related beliefs. According to current literature, health-related beliefs have been observed to be associated with quality of life and all other cancer-related variables. Therefore, the current study explored the types of religion and culture-related explanatory models and their relationship to well-being among a sample of cancer patients. The objective of this was to understand the EMs of the Sri Lankan population regarding cancer and how these EMs affected their overall well-being as cancer patients. At present, the healthcare system does not have a mechanism to take into consideration cancer patients' fundamental beliefs about their medical complications. This study expects to draw the attention of the healthcare system to these complex aspects of human beings and support them in providing more holistic care to cancer patients.

METHODOLOGY

The current study was a cross-sectional study. Ethical approval for the study was obtained from the Ethics Review Committee of the Faculty of Medicine of General Sir John Kotelawala Defence University (RP/2021/01). At all stages of the study, written informed consent was obtained from the participants.

During the first phase of the study (a one-month period in March 2021), the investigators conducted an online, survey-based study on the common religious and culture-based explanatory models among individuals with and without cancer. The principal investigator

used social media to recruit participants. Participants who were over 18 were allowed to respond to the survey. The survey requested that the participants rate their beliefs regarding cancer, which were related to the biomedical model and beliefs related to religious and cultural factors. Participants were also asked to rate their treatments of choice for themselves and their close family members in case they developed cancer. The treatments listed included choices related to the biomedical model and choices related to traditional treatment methods as well.

This study identified karma, destiny, and God's will in sequence to be the strongest religious cultural EMs in a convenient sample of (n=142) Sri Lankan adults (Solomons et al., 2021). During the second phase of the study, the data was further analyzed to find associations among the EMs and other sociodemographic variables. Among the sociodemographic variables that were analyzed were the level of education of the participant, the type of treatment the participant would choose if he/she or a close family member developed cancer, what the participant believed to be the most important type of treatment for cancer, and the participant's gender.

During the third phase of the study, three mini-interviews were conducted to further explore the cultural EMs of karma, destiny, and God's will, which were identified as the most strongly believed religious-cultural EMs during the first phase. As the locus of control people attached to these three EMs appeared to be important, a brief questionnaire was developed to measure the locus of control people attached to these EMs. It was pretested on five cancer patients and five individuals who did not have cancer to make sure the questionnaire was easily understood.

During the final phase (a two-month period in June and July 2022), a study was conducted among a convenient sample (n = 52) of cancer patients from the oncology department of the University Hospital of General Sir John Kotelawala Defence University (UHKDU), Werahera, to investigate associations between their religious-cultural EMs and their level of wellbeing. Adult patients who were decided to be suitable to participate in the study by the consultant oncologist were recruited following their consent. The level of well-being was measured via the PERMA profiler, which was adapted to Sinhala. The standard scoring guide provided by the original author of the scale was used for scoring. Cultural EMs were recorded using a self-developed, pretested questionnaire that included questions regarding their religious-cultural EMs and questions on whether they thought those EMs were amenable to change. These questions were added based on three mini-interviews conducted with two patients and one first-degree relative of a patient regarding the religious-cultural EMs. During the interview, it was clear that some perceived the EMs as changeable through their own actions and some perceived them as not changeable. Thus, some perceived the EMs to have an internal locus of control, while others perceived them to have an external locus of control. Therefore, a brief questionnaire was used to measure the patient's most strongly held religious-cultural explanatory models and their corresponding locus of control.

Sample

In the first and second phases, the sample size was 142 (n = 142). Out of the total sample, 72 participants responded in English, 29 responded in Tamil, and 39 responded in Sinhala. 05% of the sample had a current diagnosis of cancer. 20.7% had a first-degree family member with a diagnosis of cancer. The mean age of the sample was 36 years. 35% of the sample was male, while 65% was female. 33.6% of the sample had a postgraduate qualification. 29.3% had a degree, and 15.7% had a General Certificate of Education Advanced Level qualification.

During the third phase, the participants of the mini-interviews were recruited from the Oncology Department of UHKDU. Two patients and one first-degree relative of a cancer patient participated in these.

During the final phase, the sample consisted of 50 patients (n = 50) who were diagnosed with cancer and were receiving treatment at the Oncology Department of UHKDU. Out of them, 24% of the sample was male, while 76% of the sample was female. The mean age of the sample was 62 years. 28% of the sample had pursued education up to the General Certificate of Education Ordinary Level, and 30% of them had completed the General Certificate of Education Advanced Level. Participants who had a bachelor's or a master's degree were 8%, while 4% had PhDs. The mean income of the sample size was LKR 50,000 per month.

Scales of measurement

During the first phase of the study, a brief questionnaire was developed to record the different types of explanatory models related to cancer. The principal investigator conducted five mini-interviews to obtain an idea about both biological and religious-cultural explanatory models of cancer for the purpose of developing the questionnaire. This was pretested on a sample of 15 people from different educational backgrounds before being used in the study. An adapted version of the PERMA profiler was used to measure well-being. This has been adapted using the WHO-recommended, five-step methodology (World Health Organization, 2019) for Sri Lankan Sinhala speakers. Adaptation to Tamil was not carried out as there were no Tamil speakers in the chosen sample. During the final stage, a brief questionnaire was developed incorporating the most commonly held religious-cultural beliefs that were recognized during the first stage of the study, as were their corresponding loci of control.

RESULTS

A. Associations between sociodemographic variables and religious-cultural EMs

Multiple regression analyses were carried out between the variables of karma, destiny, God's will, and the demographic and disease-related factors of education, the type of treatment chosen if the participant had to obtain treatment for cancer, what is believed to be the most important treatment, and gender. The outcomes were as follows:

Table 1: Summary of coefficients between Explanatory Models and Sociodemographic Factors

EMs	Education	The type of treatment they would choose for themselves	What is believed to be the most important type of treatment?	Gender
Karma	b= -0.125 p = 0.187	b= 0.020, p= 0.832	Karma = b= 0.020, P= 0.832	b= -0.043, p = 0.651
Destiny	b= 0.104, p =0.308	b= -0.092, p= 0.362	b = -0.092, p = 0.362	b= 0.127, p =0.213
God's will	b= 0.053, p = 0.564	b= 0.104, p = 0.025)	b= 0a .227, p= 0.013)	b= -0.018, p = 0.843

The regression analysis between the three explanatory models and gender showed that the observed coefficients between the EMs and gender were not significant. There was no significant relationship observed between the EMs and educational level. The analysis between the EMs and the type of treatment chosen showed that the EMs of Karma and Destiny did not have a statistically significant relationship to the type of treatment chosen. The majority of the people who believed God's will to be their strongest religious and culture-based EM

chose Western medical treatment as their treatment of choice (n =12). The relationship between God's will and their treatment of choice appears to be statistically significant. A majority of the participants who believed in God's will as their main EM selected Western medical treatment as the most important treatment (n = 55). The relationship between God's will as the EM and the treatment that is thought of as the most important has a statistically significant relationship. The other two EMs did not display a statistically significant relationship to the most important treatment.

R2 values have not been reported in the current paper, as the main objective of the paper is to gauge the relationship between the variables studied rather than using it as a model for prediction.

B. Outcomes of the mini-interviews

During the mini-interviews, it was clear that some felt the three EMs of karma, destiny, and God's will were changeable, while others felt they were not changeable. It was an important finding related to the locus of control of the three EMs. It appeared that the corresponding emotions related to these three EMs were based more on the locus of control they attached to them than the belief itself. Especially as the health locus of control is believed to have a strong influence on disease severity, prognosis, and subjective feelings of well-being (Dopelt, Bashkin, Asna, & Davidovitch, 2022), the investigators felt that it was important for the researchers to understand whether these beliefs are commonly attached to an internal locus of control or an external locus of control.

Following this, a brief questionnaire to measure the locus of control of the EMs was developed based on the current psychometric measures that are used for measuring the locus of control. This was used in the final phase to measure the locus of control of the three most common religious-cultural EMs of cancer patients.

C. Association between religion and culture-based EMs, their associated locus of control, and level of wellbeing

There was a statistically significant, moderately negative correlation between the level of overall well-being and the locus of control of the EM of Karma ($r = -3.11$, $p = 0.05$). A significant correlation was not observed between the overall well-being and the EM of Karma ($r = - 0.06$, $p = 0.05$). However, the observed almost negligible correlation was statistically significant. The EM of destiny also demonstrated a statistically significant, moderately negative correlation with the overall level of well-being ($r = -0.31$, $p = 0.05$). The EM of God's will, or its measured locus of control, was not associated with the overall level of well-being at a statistically significant level.

PERMA values pertaining to the level of positive emotions ($r = -0.314$, $p = 0.05$) and the level of engagement ($r = -0.32$, $p = 0.05$) had a statistically significant, moderately negative relationship to the locus of control related to the EM of Karma. A statistically significant association was not observed between having the EM of karma and positive emotions.

A statistically significant, moderately negative, relationship was observed between having the EM of Destiny and having positive relationships ($r = -0.37$, $p = 0.01$). No other EM or their associated locus of control were significantly associated with scores related to positive relationships.

None of the EMs or their associated locus of control demonstrated a statistically significant relationship to scores related to having a sense of meaning and purpose in life, feelings of

accomplishment, negative emotions, physical health, and vitality, or scores related to loneliness.

Gender, age, and level of education did not demonstrate a statistically significant association with the overall well-being of the patients. Level of income demonstrated a moderate, positive correlation to the overall well-being of the patients ($r = 0.41$, $p= 0.05$).

DISCUSSION

A. Explanatory models as core beliefs

The current results are compatible with the current scientific knowledge based on human beliefs. Our core beliefs developed during childhood, when our minds were not logical and rational (Schlottmann, 2018). According to current cognitive theories, our logical skills and capacity for abstraction develop from about the age of 7–12 years and complete upon reaching adulthood (Plotnik & Kouyoumdjian, 2013). Much before this, we start gradually acquiring our lifelong beliefs. Most personal beliefs are long-term and do not change much during a lifetime. Our beliefs related to culture and religion started forming when we could not scrutinize them logically. Therefore, these beliefs appear to be strong and difficult to change in most human beings.

The analysis of the associations between the religious and culture-based EMs and the sociodemographic factors in the current study shows that the culture and religion-related EMs of cancer do not have a significant relationship with the participants' educational level or gender. Further, it shows that the EMs of karma and destiny do not have a significant relationship with the type of treatment the participants thought of as the most important type of treatment for cancer. Further, there was no significant relationship between the culture and religion-related EMs of cancer and the type of treatment the participants thought they would choose if they had to obtain treatment for cancer. This clearly indicates that the culture- and religion-related EMs of cancer are unaffected by the treatment choices they make. Thus, a patient with cancer may adhere to a Western medical treatment regime and, at the same time, believe the cause of the cancer to be his or her karma, destiny, or God's will. Thus, the patient may totally reject the Western biomedical explanatory models of cancer on which the current Western treatment model is based.

Usually, a person's belief system exerts a strong effect on their actions. Thus, people may be accepting Western medical treatments for cancer due to the reason that the Western treatment model is well-established with updated research and due to easy access. We can speculate that if such well-established treatment protocols are developed in traditional medicine with increased access, Sri Lankans may be more willing to choose these, as they match their personal explanations of cancer. This further explains why most Sri Lankans resort to traditional treatment methods and religious healing practices alongside Western medical treatment.

There is a statistically significant relationship between the EM of God's will and the choice of Western medical treatment. Participants who chose this EM as their strongest EM for cancer thought Western medical treatment to be the most important and stated that they would choose Western medical treatment as the treatment of choice if they had to obtain treatment for cancer. The belief in karma is common to both Buddhist and Hindu faiths in Sri Lanka. Therefore, it can be speculated that the majority of participants who held beliefs about God's will are of Catholic-Christian backgrounds. Catholicism and Christianity are believed to have been introduced to Sri Lanka with the Western invasions. Therefore, it could be that Western ideals and medical methods are seen as more compatible with their EMs.

Nevertheless, the majority of the sample accepted Western medical treatment as the most important treatment modality for cancer while believing that they would opt for both religious and culturally-based treatment methods and Western medical treatment if they had to obtain treatment for cancer (Solomons et al., 2021) This may also indicate the unwillingness of people to totally part with their core cultural and religious beliefs. Even though a person may choose a Western medical regime, the person also wants to supplement it with treatment methodologies that are compatible with their belief systems. This need may explain the recent proliferation of religious-cultural healing methods for various diseases in Sri Lanka.

This study aims to explore the complex relationship between religious-cultural explanations for cancer and adult well-being in Sri Lanka; nevertheless, it should be noted that there are no direct comparisons with previous research in this area due to a lack of similar prior research. The lack of a comparison analysis restricts how broadly the results can be contextualized and how they may be validated against established or opposing viewpoints. Despite this drawback, the research remains an independent examination of the complex structure of religious-cultural explanatory models and provides an adequate foundation for further comparative studies.

B. Explanatory models and wellbeing

It is interesting that the belief in karma as an explanatory model did not have a significant relationship to overall well-being or subscales of well-being. Yet, beliefs regarding whether karma can be changed or not were significantly associated with overall well-being. Believing that karma can be changed (locus of control) appears to be negatively associated with overall well-being. It could be that patients who believe that karma can be changed may assume responsibility for negative outcomes during cancer. In other words, patients perhaps feel that they should have done something better to change their karma to avert the negative consequences of karma. Therefore, the belief in karma itself does not explain the patient's emotional reactions to the diagnosis and treatment of cancer. It is important to understand the locus of control the patient attaches to understand the patient's emotions.

It is also interesting that the only other variable that was associated with the overall level of well-being was the EM of destiny. It appears that, irrespective of the associated locus of control, holding the belief of destiny as an explanatory model itself was negatively affecting the well-being of the patients.

The EM of God's will or its associated locus of control does not seem to have any significant relationship to any of the well-being-related variables. It could be that belief in God's will leads to more acceptance of the situation, and this may be why well-being is not significantly affected by this belief.

The level of positive emotions and engagement is negatively affected by holding the belief in Karma as an EM. This could be because the concept of Karma explains the current outcomes of a person's life in terms of their past actions pertaining to this life or previous births. Thus, current unfavorable life circumstances can be seen as mostly due to one's own actions. This may lead to more negative emotions. Further, this view may create negative emotions such as shame and guilt about the diagnosis of cancer as an effect of the person's past negative actions, and this could negatively affect engagement in day-to-day life activities.

It is interesting that, according to the current study, the EMs do not affect having a sense of meaning or positive relationships. Actually, understanding cancer in terms of karma may help the person have a better explanation of the situation for him/ herself. There are many cancer patients who feel that they are quite health-conscious individuals who try to maintain healthy lifestyles and are therefore unable to accept the bio-medical explanations of cancer. Even the

current research on bio-medical causes of cancer remains unclear. Thus, an explanation based on karma may provide meaning to the situation. Therefore, the overall sense of meaning in life may not be negatively affected.

In addition to this, people may be motivated to create more positive relationships to create better karma.

Gender or educational level does not seem to have a relationship with the measured level of well-being. Yet, it is interesting that income is positively related to the level of well-being. This is compatible with the current psychological research base, which recognizes economic hardships as a major reason for psychological issues. Economic hardships can lead to restrictions on treatment choices and the capacity to engage in positive activities, which may improve well-being and create more hardships in family circles, which may lead to more negative emotions being expressed. All these factors can directly affect the well-being of an individual with cancer.

It is also interesting that well-being is affected by economic concerns as opposed to factors related to education or gender.

Study limitations

The study has used convenient samples, and not using random samples is acknowledged as a limitation of the study. The current study looks at correlations, and there can be unidentified confounders.

Clinical implications

Karma is a strong belief system in Asian philosophies. There are people of Asian origin living in many different countries around the world. Irrespective of their country of residence, there is a high chance that most Asians will have some degree of belief in karma-related concepts. As belief in karma can have a strong impact on patient wellbeing, exploring or even intervening in these belief systems may improve patient wellbeing.

Further, as patients appear to choose Western medical treatment, even when they hold strong religion and culture-related EMs, the clinician's acceptance and acknowledgment of these beliefs may help patients of Asian origin to better adhere to Western medical treatments.

CONCLUSIONS AND FURTHER RESEARCH

Regardless of the treatment modalities patients choose their beliefs about why they have developed cancer remain highly related to their religious and cultural backgrounds. These religious and culturally based EMs do not change much with the gender of the person or their educational level. In addition to that, Sri Lankans appear to choose Western treatment models while also believing in culture and religion-based etiological factors and treatment methods. Thus, when providing cancer care, it is important that the clinician be able to understand the complex human being in front of them. As religious and cultural beliefs can be strong and not easily changed, the best approach for clinicians can be to acknowledge and accommodate them. As these are highly personal beliefs, such acknowledgment will greatly improve the rapport between the patient and clinician. This approach appears plausible because, despite these beliefs, patients also appear to believe Western medical treatment to be the most important type of treatment. Further, systematic research into these aspects will be of value in confirming the current findings.

When outcomes on wellbeing are considered, it appears that the belief in karma has a strong influence on patient wellbeing. Therefore, taking into consideration the presence of this belief in the patient may help the clinician better predict and understand the patient's well-being.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest.

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