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INVESTIGATIVE REPORT

Terror Management Theory in Dermatology: Skin Biopsy Influences Patient Compliance

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A skin biopsy is one of the most frequently performed procedures in the dermatology outpatient clinic, but doctors often do not consider the cognitive impact of the biopsy procedure. Based on "terror management theory," we reasoned that a skin biopsy increases patient compliance by unconsciously stimulating mortality salience. To study this hypothesis, trust toward doctors, authoritarian personality, mood, attitude toward recommendations, and intention to accept recommendations were compared between skin biopsy and non-skin biopsy groups of patients. Eighty-three patients participated in the study, and 78 responses were used for the analysis. The results showed that patients who had a skin biopsy had a more positive attitude toward doctors' recommendations and a higher intention to follow the recommendations. These effects were not moderated by the patient's own personality (patient trust and authoritarian personality). The outcome of this study implies that performing a procedure itself can subliminally influence a patient's attitude toward a doctor's recommendations. ***Key words: compliance; mortality salience; skin biopsy; terror management theory; adherence.***

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Understanding and enhancing patient compliance with physician-prescribed treatments are relevant aspects of medical care (1). Numerous factors have been suggested to be associated with patient compliance (2–4). However, most surveys of patient compliance in dermatology are cross-sectional studies focused on dermatological diseases and types of treatment (5–8). The procedures performed in dermatology have rarely been considered as compliance-determining factors.

A skin biopsy is one of the most frequently performed procedures in the dermatology outpatient clinic. For dermatologists, a skin biopsy is a very useful tool to diagnose dermatological diseases and determine treatment methods. However, doctors often do not consider the cognitive impact of the biopsy procedure. To analyse the cognitive impact of a skin biopsy, we considered the fact that skin biopsies subliminally remind the patient of cancer. When patients undergo a skin biopsy and await the outcome, they become curious about the pathology results and worry about the worst-case scenario (i.e. a diagnosis of skin cancer).

According to previous research in psychology, subliminal thoughts of cancer increase death-related thinking, and thinking of one's own death can affect human behaviour (9). According to terror management theory, people feel fear when confronted with their mortality, and individuals alter their behaviour in order to protect themselves from fear of death (10–12). In order to resolve the fear, individuals endorse a cultural world-view that gives meaning, order, and permanence to the self. A cultural world-view means "humanly created and transmitted beliefs about the nature of the reality shared by groups of individuals" (13). By following cultural values and engaging in culturally prescribed behaviour, one can pursue the meaning of existence and perpetuity. As a result, mortality salience increases the endorsement of a cultural world-view.

Thus, we reasoned that a skin biopsy subliminally reminds a patient of cancer, and increases death-related thinking and mortality becomes salient. Because mortality is salient, patients who undergo a skin biopsy would have a greater tendency to accept the recommendations of doctors, whose authority is acknowledged by culture. This is a hypothesis based on terror management theory, assuming that a skin biopsy increases patient compliance by unconsciously stimulating mortality salience. In the current study, the relationship between skin biopsy and acceptance of a recommendation was investigated, together with the influence of a patient's own personality (patient trust and authoritarian personality). The moderating effects of personalities on the relationship between a skin biopsy and the acceptance of a recommendation were also studied.

MATERIALS AND METHODS

Design

A single factor between-subjects design (skin biopsy vs. no skin biopsy) was used. A skin biopsy, performed one week before the

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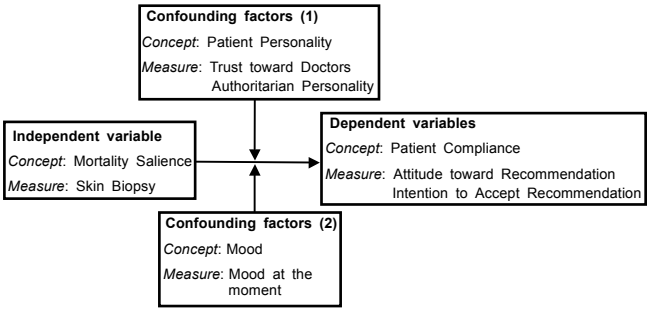

Fig. 1. Hypothetical conceptual model to study the influence of mortality salience on patient compliance.

survey, was used as the stimulus (Fig. 1). Patients were requested to answer the survey, which measured their trust towards doctors, authoritarian personality, and current mood. At the end of the survey packet, patients read a scenario as follows: "You have a severe and chronic skin disease, and your doctor recommends a newly developed treatment method for you. He tells you that this method can reduce treatment time, but it is more expensive than traditional treatment and safety is not fully guaranteed." After reading the scenario, the patients rated the attitude toward the doctor's recommendation and the intention to follow the recommendation. Written informed consent was obtained from all participants in this study, but the institutional review board approval was waived because this study was not a clinical trial, but an investigation entirely based on a survey.

Patients

A total of 83 patients who attended the dermatology outpatient clinic in a university hospital between 1 November 2008 and 30 January 2009 participated in the study. As 5 patients failed to complete the survey, 78 responses were used for the analysis. Men constituted 41% and women constituted 59% of the total respondents. Respondents ranged from 18 to 81 years of age; 40% of the respondents were 18–30 years of age, 29% of the respondents were 31–50 years of age, and 31% of the respondents were > 51 years of age (Table I). There were no significant demographic differences between the skin biopsy and no skin biopsy groups of patients. The distributions of dermatological diagnoses of patients also showed no significant differences between groups ($p > 0.10$ for Fisher's exact test).

Table I. *Patient demographics*

	Skin biopsy	No skin biopsy
n/N (%)	41/78 (52.6)	37/81 (47.4)
M/F ratio	0.64 (16/25)	0.76 (16/21)
Mean ± SD age, years (range)	42 ± 18.9 (18–81)	37.7 ± 15.0 (18–69)
Dermatological diagnoses, *n*		
Epidermal naevi and tumours	15	13
Dermal and subcutaneous tumours	7	4
Eczema	8	8
Erythema and urticaria	5	5
Infectious diseases	4	4
Pigmentary disorders	1	2
Psoriasis	1	1

M: male; F: female; SD: standard deviation.

Measures

Trust toward doctors. Trust is widely acknowledged as an essential ingredient in patient-physician relationships (12). Based on the measurement of patient trust developed from medical research (14, 15), we included five items measuring trust towards doctors. Participants were asked to indicate the extent to which they agree with the following statements using a seven-point scale. "I believe that doctors perform only medically necessary tests and procedures," "keep personally sensitive medical information private," "perform necessary medical tests and procedures regardless of cost," "put my health and well-being above keeping down the health plan's cost (reverse scale)," and "I trust judgement about my medical care."

Authoritarian personality. A person with an authoritarian personality is predisposed to follow traditional, conventional values (16). Together with trust toward doctors, it represents the aspects of personality influencing compliance with medical treatment. Min (17) has developed a measurement of authoritarian personalities based on the scale generated by Andorno et al. (16). This scale consists of 35 items measuring conventionalism, authoritarian obedience, authoritarian aggressiveness, anti-introspectionism, stereotypical thinking, belief in power, cynicism, and sexism. Five items measuring authoritarian obedience were used to measure authoritarian personality in this study.

Mood. Mood is a potential confounder affecting the answer to the survey at the moment. To assess whether performing a skin biopsy induced an unintended mood effect, patients responded to the 20 items measuring their mood (PANAS-X; 18). This measurement consists of 10 positive items (e.g. exciting, active, and proud) and 10 negative items (e.g. guilty, frightening, and irritating).

Attitude toward recommendation. The attitude toward the recommendation is one of the dependent variables measuring patient compliance. Patients responded to three seven-scale questions that were used for measuring the attitude toward the offer in previous marketing studies (19, 20).

Intention to accept recommendations. As another dependent variable, the intention to accept recommendations was measured by asking the following two questions: "I will follow the recommendations of the doctor," and "There is a possibility of following the recommendations of the doctor." The patients responded on a scale of 1–7, where 1 = "strongly disagree" and 7 = "strongly agree."

Statistical analysis

Software (SPSS, Version 15.00, SPSS Inc., Chicago, IL, USA) was used to conduct the statistical analyses and data were considered significant at the 0.05 level. Data analysis included the two-tailed Student *t*-test, 2 × 2 analysis of variance (ANOVA) test and Fisher's exact test. Cronbach's α coefficients revealed that all construct reliabilities exceed 0.70, indicating an acceptable level of internal consistency (Table II; 21).

Table II. *Results of reliability test*

	Number of items	Cronbach's α
Trust towards doctors	5	0.814
Authoritarian personality	5	0.763
Positive affect	10	0.870
Negative affect	10	0.937
Attitude	3	0.840
Intention	2	0.915

RESULTS

Mood

Analysis of variance on the positive items of the PANAS-X (mean skin biopsy = 3.63 (SD = 0.97) vs. mean no skin biopsy = 3.54 (SD = 0.87)) and negative items (mean skin biopsy = 2.63 (SD = 1.19 vs. mean no skin biopsy = 2.61 (SD = 1.06)) indicated that mood scores did not appear to differ between those who underwent skin biopsy and those who did not (F (1, 0.201), ns and F (1, 0.011), ns, respectively). Therefore, one can conclude that the results of this study were not caused by mood differences between the two conditions.

Main effects

The main purpose of this study was to investigate the effect of performing a skin biopsy on acceptance of a doctor's recommendation. A *t*-test for two independent samples (skin biopsy vs. no skin biopsy) was utilized, and the result revealed that patients who performed the skin biopsy had a more positive attitude toward a doctors' recommendations (4.91 vs. 3.62, $p < 0.001$) and a higher intention to follow the recommendations (5.29 vs. 4.14, $p < 0.001$).

Moderating effects

A 2 × 2 ANOVA (skin biopsy vs. no skin biopsy; and personal trait: high vs. low using a median split) was conducted to test the moderating effects of a patient's trust toward doctors and authoritarian personality.

Effects of trust toward doctors. The results showed that the biopsy and trust towards a doctor had a significant main effect on attitude toward a doctor's recommendation and intention to follow the recommendation. Patients who trust doctors expressed a more positive attitude towards a doctor's recommendation (4.87 vs. 3.81, $p < 0.05$) and a higher intention to follow the recommendation (5.18 vs. 4.42, $p < 0.05$). However, trust towards doctors did not moderate the effect of performing biopsy on dependent variables. In other words, patients who underwent a skin biopsy revealed a more positive attitude towards a doctor's recommendation and a higher intention to follow the recommendation irrespective of the trust towards doctors (Tables III and IV).

Effects of authoritarian personality. According to the results, the biopsy had a significant main effect on both the attitude towards a doctor's recommendation and the intention to follow the recommendation. In addition, an authoritarian personality had a significant main effect on the intention to accept a doctor's recommendation (5.29 vs. 4.27, $p < 0.05$). Patients with a higher authoritarian personality expressed a higher intention to follow a doctor's recommendation. However, no moderating effect was found from the analysis. Regardless of the authoritarian personality, patients who underwent a skin biopsy revealed a more positive attitude towards a doctor's recommendation and a higher intention to follow the recommendation (Tables IV and V).

DISCUSSION

Most of the compliance studies in dermatology have focused on dermatological diseases and types of treatment (5–8). However, compliance might be related not only to the clinical severity of the disease and the type of treatment, but also to the psychological or psychiatric well-being of the patient (1). Renzi et al. (1) showed that psychiatric morbidity is significantly and independently associated with poor medication adherence in dermatology. However, we reasoned that compliance is influenced not only by major issues, such as psychiatric morbidity, but also by subtle psychological changes with medical procedures. Based on terror management theory, we investigated whether performing a skin biopsy, which is a frequently performed procedure in dermatology, could influence patient compliance.

The terror management theory posits that people feel fear when confronted with their mortality, and individuals behave to protect themselves from fear of death. The will to survive and the knowledge of transient life results in an unsolvable conflict, and this conflict is often referred to as terror. When mortality is salient,

Table III. *Effects of trust towards doctors: ANOVA results*

Independent variables	Dependent variables	Degree of freedom	Mean square	F-value	*p*-value
Attitude toward recommendation	A. Mortality salience	1	15.645	16.163	0.000*
	B. Trust toward doctors	1	4.778	4.936	0.029*
	A × B	1	0.112	0.116	0.734
	Error	74	0.968		
Intention to accept recommendation	A. Mortality salience	1	12.115	10.345	0.002*
	B. Trust toward doctors	1	4.879	4.166	0.045*
	A × B	1	0.533	0.455	0.502
	Error	74	1.171		

*$p < 0.05$.
ANOVA: analysis of variance.

Table IV. *Effects of trust towards doctors and authoritarian personality: means (standard deviations) for dependent variables*

Patient personality		Dependent variables	No skin biopsy	Skin biopsy
Trust toward doctors	Low trust toward doctors	Attitude toward recommendation	3.52 (0.99)	4.46 (1.08)
	High trust toward doctors		4.00 (1.18)	5.12 (0.87)
	Low trust toward doctors	Intention to accept recommendation	4.05 (1.24)	4.77 (1.11)
	High trust toward doctors		4.44 (1.21)	5.54 (0.83)
Authoritarian personality	Low authoritarianism	Attitude toward recommendation	3.52 (1.00)	4.82 (0.98)
	High authoritarianism		3.83 (1.11)	5.00 (0.99)
	Low authoritarianism	Intention to accept recommendation	3.88 (1.25)	5.10 (0.87)
	High authoritarianism		4.67 (1.03)	5.48 (1.07)

individuals endorse a cultural world-view that gives meaning, order, and permanence to self. A cultural world-view means "humanly created and transmitted beliefs about the nature of reality shared by groups of individuals" (13). By following cultural values and engaging in culturally-prescribed behaviour, people can pursue the meaning of their existence and perpetuity. As death means a disconnection between oneself and the world, and a possibility of this disconnection arouses terror, individuals can alleviate terror by strengthening a sense of belonging to society. Moreover, culture provides protection to individuals who follow cultural standards, and individuals regard their life as more meaningful when they follow the value of culture. As a result, mortality salience increases the endorsement of a cultural world-view.

This theory is generally studied in psychology (10–13) and marketing (22–24), but it also has been applied to medicine. Arndt et al. (9) examined the cognitive association between thoughts of cancer and thoughts of death. According to their study, thoughts of cancer increase death-related thinking, and thinking of one's own death affect human behaviour. Interestingly, whereas having people explicitly think about cancer did not increase death-thought accessibility, subliminal cancer priming did produce such an effect. Thus, we reasoned that a skin biopsy could be a stimulant of mortality salience because it subliminally reminds patients of the possibility of a cancer diagnosis. The results of this study showed that performing a skin biopsy led patients to have a greater tendency to follow a doctor's recommendations.

Previous research on terror management theory has shown that individual differences moderate how a person reacts to mortality salience. The effect of mortality salience on defending a cultural world-view does not occur when an individual's own version of the cultural world-view does not accord with a cultural world-view (11). It has also been shown that authoritarians are more likely affected by mortality salience (12). In this light, we investigated the moderating effects of a patient's trust towards a doctor, and an authoritarian personality on the effect of mortality salience. However, this research showed that the effect of a skin biopsy on the acceptance of recommendations was not moderated by the effects of the patient's own personalities (patient trust and authoritarian personality). This result implies that the effect of a skin biopsy is so strong that it overwhelms personality factors. Even patients who did not believe doctors and look down on authority showed a greater tendency to follow a doctor's recommendations after a skin biopsy.

This study had limitations. Patient compliance was assessed as a hypothetical construct and psychological concepts were examined using an indirect method. The relatively small sample size also limited the statistical power of this study.

However, the results of this study still have important implications for clinical practice. To make the best decisions for patients, shared decision-making between doctors and patients is an important issue; it can be accomplished only when patients can express their own opinions without any pressure. According to this study, performing a procedure such as a skin biopsy

Table V. *Effects of authoritarian personality: ANOVA results*

Independent variables	Dependent variables	Degree of freedom	Mean square	F-value	p-value
Attitude toward recommendation	A. Mortality salience	1	27.463	26.814	0.000*
	B. Authoritarian personality	1	1.116	1.090	0.300
	A × B	1	0.076	0.075	0.785
	Error	74	1.024		
Intention to accept recommendation	A. Mortality salience	1	18.642	15.977	0.000*
	B. Authoritarian personality	1	6.120	5.245	0.025*
	A × B	1	0.763	0.654	0.421
	Error	74	1.167		

*$p < 0.05$.
ANOVA: analysis of variance.

can mentally pressurize patients to follow a doctor's recommendations. Thus, careful consideration about psychological impact is needed when doctors recommend a procedure. Performing a procedure itself can unintentionally disturb the relative positioning of doctors and patients when shared decision-making is necessary.

The authors declare no conflict of interest.

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