

Risky business: The effects of an individualized health information intervention on health risk perceptions and leisure time physical activity among people with spinal cord injury

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Abstract

Background: Individuals with spinal cord injury (SCI) are at an increased risk for inactivity-related diseases such as heart disease, type 2 diabetes, and obesity. According to protection motivation theory, perceptions of disease risk predict motivation to engage in health-protective behaviors such as leisure time physical activity (LTPA).

Objective: The purposes of this study were to (1) examine changes in perceived risk for disease following an individualized health information intervention and (2) examine changes in perceived risk for disease as a predictor of changes in LTPA.

Methods: Perceived risk for disease and LTPA were measured at baseline among 62 people with SCI. Objective disease risk information (e.g., waist circumference, BMI, blood glucose) was collected and individual risk information was mailed to each participant. Perceived risk for disease and LTPA were remeasured 1 and 2 weeks following receipt of individualized information, respectively.

Results: Changes in perceived risk of heart disease and obesity were dependent on objective risk status. There were no significant changes in perceived risk of diabetes. Changes in perceived risk of heart disease negatively predicted, while changes in perceived risk of diabetes positively predicted, changes in LTPA. Changes in obesity did not significantly predict changes in LTPA.

Conclusions: Among people with SCI, individual health-risk information can change perceptions of disease risk. Increased perceived risk of diabetes may motivate LTPA, while increased perceived risk of heart disease may encourage avoidance behavior regarding LTPA. © 2011 Elsevier Inc. All rights reserved.

Keywords: Physical activity; Health risk perceptions; Protection motivation theory; Health information; Spinal cord injury

Following spinal cord injury (SCI), physiologic and life-style changes can result in poor health. Accordingly, individuals with SCI are at an increased risk for inactivity-related diseases such as heart disease, type 2 diabetes, and obesity [1]. Regular participation in leisure time physical activity (LTPA; physical activity done during one's free time; e.g., sports and exercise) has the ability to reduce the risk of inactivity-related disease among people with SCI [1-3]. Yet, 50% of people with SCI do no LTPA whatsoever [4]. Initiatives to increase LTPA participation among people with SCI are necessary to optimize the health of this population.

Are people with SCI aware of their increased risk for inactivity-related disease? The answer is unknown, but important, as inaccurate perceptions of disease risk can have health consequences. In general, people have an optimistic

bias when it comes to estimating their personal risk for disease [5]. The optimistic bias refers to the tendency for people to view personal risk as lower than that of similar others [6]. It is common regarding various diseases (e.g., heart disease, obesity, diabetes) and has been termed an "illusion of invulnerability" [7-9]. Optimistic, or unrealistic, perceptions may seriously thwart efforts to engage in risk-reducing behaviors [6]. For example, individuals with the most unrealistically optimistic perceptions of health-related risks were found to have the greatest decreases in exercise behavior across a 6-week study period [10]. Indeed, individuals who underestimate disease risk may be less motivated to engage in health-protective behaviors than those who have accurate perceptions of disease risk.

Can an individualized health-risk information intervention increase disease risk perceptions among people with SCI who are objectively at risk for disease?

Interventions aimed at increasing risk perceptions could be valuable for motivating health behavior, particularly

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among individuals objectively at risk for disease. In the current study, objective risk is defined as the presence of physiological disease risk factors. We are unaware of any research examining the effect of information interventions on perceptions of disease risk among people with SCI. Among the general population, however, *generalized* and *individualized* health-risk information interventions have been used to manipulate perceived risk.

Generalized health information refers to risk information that is not specific to the recipient, such as: “If a young adult does not engage in regular exercise, atherosclerosis is already causing progressive narrowing of the coronary artery” [11]. Alternatively, *individualized* health information is objective risk information that is specific to the recipient, such as: “Your waist circumference is 110 cm. People with a waist circumference greater than 102 cm are at risk for type 2 diabetes.” Most health-risk information studies have used *general* health information.

Several studies suggest that general health information interventions are not successful at changing perceived risk for disease and overcoming the optimistic bias [11–13]. Furthermore, in cases where general health information has successfully changed perceived disease risk, the intervention did not have sufficient impact to alter LTPA. For example, Milne and colleagues used *general* health-risk information to manipulate perceived risk for heart disease among undergraduate students. Although the intervention resulted in increased risk perceptions, there was no effect on exercise behavior. Perhaps an intervention based on *individualized* health-risk information could impact perceived disease risk sufficiently to evoke changes in LTPA.

Indeed, it has been stated that a strongly persuasive information intervention is required to overcome optimistic bias [12]. Participants may not find *general* health information personally relevant [14]. Conversely, given its personal relevance, *individualized* health-risk information could be more successful at changing perceived disease risk. We are unaware of any research that has directly compared the effectiveness of generalized versus individualized health information in altering perceived risk for disease. However, two review articles suggest that tailoring health information to individuals’ risk factors can increase realistic risk perceptions in comparison to generic information [15,16]. Consistent with this notion, individualized health-risk feedback has successfully increased perceived risk of stroke and cancer among people who had initially underestimated their risk [17]. In addition, the greatest changes in perceived disease risk following individualized health feedback have been observed among individuals with higher-than-average disease risk [17,18]. Accordingly, objective disease risk may moderate the effects of an individualized health-risk information intervention, such that the intervention has a larger effect on individuals objectively at risk compared to those not objectively at risk.

Do changes in perceived disease risk predict changes in LTPA?

The notion of risk perception as a cognitive process influencing health behavior is recognized in several theories of health behavior change including the protection motivation theory (PMT) [2]. PMT asserts that individuals are more likely to engage in a health protective behavior when their perceived risk of an adverse health outcome is high. PMT has been used to predict health-protective behaviors and to develop and understand persuasive communications aimed at changing health behaviors [19]. PMT considers *protection motivation* (i.e., intention) as the most proximal predictor of health behavior. In turn, *threat appraisal* and *coping appraisal* are thought to predict *protection motivation*. *Rewards*, *perceived vulnerability* (i.e., perceived disease risk) and *perceived severity* are the components of *threat appraisal*, while *response efficacy* (i.e., beliefs about the effectiveness of a given health behavior in reducing disease risk), *self-efficacy*, and *response costs* comprise *coping appraisal*.

Although each construct of PMT is important for understanding motivation for health-protective behavior, the current study focuses only on the vulnerability/perceived disease risk construct. A review of exercise studies based on PMT determined that threat components of the PMT (i.e., perceived risk) are salient predictors of LTPA behaviors among populations with chronic disease and disability [20]. Therefore, perceived disease risk may have a particularly important influence on health behavior change for many individuals with SCI. If people with SCI underestimate their risk for inactivity-related disease, this may partially explain the dismal rates of LTPA participation within the SCI population.

In other populations, there are mixed findings regarding the role of perceived disease risk in motivating LTPA. Studies have found a positive [11,21], negative [22], or nonsignificant [12,23] relationship between perceived disease risk and exercise. We are aware of only one study that has used *individualized* health information to manipulate perceived disease risk and subsequently test the effect on LTPA behavior [17]. In that study, changes in perceived risk for heart attack were not significantly related to changes in LTPA among healthy adults. However, the study was statistically underpowered to detect this relationship.

The equivocal findings have led some researchers to conclude that threat variables, such as perceived disease risk, have little salience when predicting LTPA [24]. However, a major limitation of the extant research is that the majority of LTPA studies have employed cross-sectional [22] or nonexperimental longitudinal designs [24] and have not manipulated perceived disease risk. Given that people tend to underestimate perceived disease risk, without manipulation, risk perceptions may be inaccurate and unreliable predictors of LTPA. Further, these are not appropriate designs for theory testing [25]. Another limitation is that among the few studies that have used an experimental design, most have

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