

Concept of Perceived Task Difficulty: A Systematic Review

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Abstract

Aim: We conducted a systematic review of the literature related to the perception of the difficulty of treatments and its influence on treatment adherence in various populations.

Method: The literature published between 1970 and 2019 was searched using the databases Scopus, Pubmed, Embase, and Cochrane CENTRAL was conducted. This review has followed the Preferred Reporting Items for Systematic Review (PRISMA) guidelines. The quality of the evidence was assessed by Using Joanna Briggs Institute's critical appraisal tool. Studies that assessed the perception of task difficulty and were published in English were involved. Two reviewers reviewed the literature and any disagreements among these reviewers were resolved by a third reviewer.

Results: Twenty-nine articles were selected for this review. Selected articles described research that utilized a host of different populations such as HIV patients, diabetics, hemophilia patients, and some mental disorders. The participants involved in these studies were stroke patients, undergraduate students, children as young as six years of age, youths receiving mental health services, veterans, various professionals (e.g. occupational therapists), and elderly community members.

Conclusions: Individuals are best engaged in tasks with moderate difficulty levels. Perceived task difficulty is influenced by the individuals' information about the task, their emotions, and perceived self-ability. Therefore, these factors must be considered in health teachings so that it would influence the individuals' perceptions related to the difficulty of their treatments and help them to better engage/adhere with their treatment plans.

Introduction

Perceived task difficulty refers to an individual's beliefs about the level of effort needed to succeed at a particular assignment and how likely they would be to achieve their goals. Task difficulty was originally identified as having both the physical and mental energy required to perform a task. The response to task difficulty can be categorized along perceptual, physiological, and performance "continua". The perceptual response is fundamental to whether a task is attempted [1]. Task difficulty has been indexed by some quantitative measures of the percent correct in performance of that task, or as response time, typically the time between the appearance of imperative stimulus and the production of appropriate motor response. The perception of the difficulty of a task is subjective in nature and may be influenced by an individual's memory of its prior performance, personality traits including attitude, likes and dislikes, habits, expectations, emotional state, motivation, fatigue and importance of outcome.

Conceptually, task difficulty has been explained by Brehm to be an important function of mobilizing and utilizing the efforts to perform a task. Brehm categorizes tasks to be of mild, moderate and high difficulty level. The theory argues that motivational arousal or preparedness to mobilize and utilize efforts is increased as the task difficulty increases, unless the task difficulty is too high or the goal is not worth the effort in which case effort to accomplish the task ceases abruptly. The theory predicts that there will be highest motivational arousal in the moderate difficulty tasks and the relationship between engagement and difficulty of task will be moderated by the importance of the outcome [2].

Despite a lot of studies conducted on the concept of perceived difficulty of tasks, it has not been adequately summarized. A prior paper reviewed the concept of the perceived task difficulty, its definitions and measurement (REF); however, the focus was limited to the conceptualization of the concept of perceived task difficulty, it did not include how task difficulty has been studied in various disciplines. As maintaining good health is dependent on a range of self-care behaviors and positive health seeking behaviors understanding the construct of

task difficulty and its barriers and facilitators is important to develop theoretically derived interventions. Therefore, in the current paper, we will review and analyse the literature on task difficulty, its relationship with other variables including motivational arousal and perceived self-ability, and how this concept is studied in various healthcare disciplines.

Therefore, we aimed to investigate the research available in order to better understand the concept of perceived task difficulty and its relation to the motivational arousal or mobilization and utilization of efforts and perceived self-ability. We also aimed to review the research related to perceived task difficulty of healthcare services in general especially among the chronic disease patients living in community settings and its relationship with different variables for example, information about the treatment provided to the patients, side effects of the treatment, outcomes of therapies, and attitude towards therapies. Our overall goal is to find out what has been already studied about the perceived task difficulty and what the gaps in literature are.

Methods

Literature Search Strategy

Overview

Databases used to locate articles for review were Scopus, Pubmed,

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Rehabdata, Psycinfo and Web of Science for the date range between 1970 - 2019. The University librarian's assistance was used to search for the articles. Articles were located using keywords: difficulty therapy; difficulty and therapy; difficulty and intervention; difficulty and treatment; difficulty and rehabilitation; barriers and treatment; barriers and intervention. These databases produced 294, 48, 261, 309, and 28 articles, respectively. Two reviewers independently vetted each abstract and full article to ensure the validity and suitability of each study for inclusion. Any disagreements among these reviewers were resolved through discussions. If a consensus was not reached, disputed articles were independently reviewed by a third party.

Publication Inclusion

Study Designs and Participants

In order to have a broad and inclusive approach to study designs were included. (1) Experimental methods including using randomized control trails (RCTs), as well as quasi-RCT designs; (2) self-report surveys, observational methods, pre-post interventions, secondary data analysis, case series, and cross sectional experiments were included in the search. Reviews, as well as pilot studies, were also considered for examination. Database searches were limited to articles written in English and continued until December 6, 2019. Studies that involved difficulty of healthcare services as a variable and the population in any age group were included for review.

Measures

Consistent with the focus of this review, the primary measure for study inclusion was task difficulty (e.g. easy, moderate, and difficult). Other measures related to task difficulty were also considered, such as treatment difficulty and difficulty with therapy (e.g. constraint induced movement, antiretroviral), difficulty with therapy compliance, and difficulty with healthcare services including inpatient, outpatient and community services. Additional outcome measures for inclusion consisted of difficulty and goal valence, goal attractiveness, and treatment satisfaction.

Quality Rating

The two reviewers assessed the quality of selected for this review by using Joanna Briggs Institute's critical appraisal tool. The tools for critical appraisal were selected based on the study design. A score of 6 was given to the quasi-experimental study and a score of 9 was given to the randomized controlled trials. Any disagreements for critical appraisal were resolved by a third-party consultation.

Results

Sample and Participants

There were 940 articles produced from our initial search. The review process resulted in the selection of 29 articles for inclusion. Hence, 911 articles were excluded for failure to meet criteria. Selected articles described research that utilized a host of different populations. These included studies with individuals who have chronic illnesses, such as HIV patients, diabetics, and haemophilia patients. Other studies used participants with mental disorders e. g, individuals with post-traumatic stress disorder, personality disorder, conduct disorder, and affect disorders. Additional participant characteristics included stroke patients, undergraduate students, children as young as six years of age, youths receiving mental health services, veterans, various professional (e.g. occupational therapists) and elderly community members.

Intervention Characteristics

Articles that were included in this review employed various intervention strategies, including those targeting behavioral intentions, effort and skill intensive training, emotion valence, motivation, CI therapy, pain, fatigue, motor function, treatment difficulty, range of motion, robotic assessments, clinical assessments, psychotherapy, and psychological functioning. Overall, there were 2 studies that conducted experimental analyses of task difficulty at research labs housed at various universities.

Perceived task difficulty and perceived ability

Kukla postulated that for a task with fixed difficulty, perceived difficulty is a function of perception of the individual's own ability. People who perceive their personal ability to be low with respect to the challenge would perceive the task to be more difficult than people who perceived their ability to be high with respect to that challenge [3]. For a task with high difficulty, participants' CV reactivity (i, e blood pressure, as a proxy for effort) was found to be greater for the participants who had high perceived ability compared to those who had low perceived ability. The study showed an interaction effect of perceived self-ability and task difficulty on efforts [4]. In an extension of this work, the role of natural ability in carrying out the tasks of three difficulty levels, i.e. easy, moderate and difficult, ability and task difficulty were found to have a significant interaction effect on the efforts. Participants with low self-perceived ability exhibited greater effort related CV reactivity for moderate difficulty task than for easy and extremely difficult conditions, whereas participants with high ability showed greater effort related CV reactivity as the challenge became more difficult.

These studies suggest that an individual with low self-perceived ability will regard a task as more demanding than an individual with high self-perceived ability. Individuals with low self-perceived ability will increase their effort as task difficulty increases from low to moderate; however, for task with high difficulty, little or no effort will be expended. Individuals with high self-perceived ability will expend effort in tasks of all difficulty levels from low to high. Therefore, perception of difficulty of a task and energy expenditure is a function of self-perceived ability.

Relationship of perception of difficulty to undergo therapies with attitude

With regards to associations between the perception of difficulty of a therapy and the attitude towards the treatment, a cross sectional study was conducted to see the factors associated with self-reported difficulty for taking Anti-Retroviral Therapy (ART) in an Australian sample of People Living with HIV infection (PLWH). Thirty nine percent of 1106 participants reported difficulty taking ART. Self-reported difficulty taking ART was found to be significantly associated with younger age, alcohol and party drug use, poor or fair self-reported health, diagnosis of a mental health condition, taking more than one ART dose per day, experiencing physical adverse events or health service discrimination, certain types of ART regimen and specific attitudes towards ART and HIV. Therefore, perception of difficulty of treatment was found to be associated with the attitudes towards the treatment. The implication is that any changes in attitude when a person undergoes the therapy may change their perception of difficulty of therapy [5].

Relationship of Perception of Difficulty to Undergo Therapies with emotions

Studies have also found the perception of difficulty of therapy to be associated with the emotions. Passyn and Sujana conducted a study

to examine the role of remembered and re-experienced emotions in motivating a person to perform difficult behaviors. The study included 134 undergraduate students. The study showed that under the conditions of felt regret, behavioral intentions to take the Cardio Pulmonary Resuscitation (CPR) training were higher when task was difficult and effortful than when the task was either perceived as easy ($p < 0.01$) or requiring skill ($p < 0.01$). Under the conditions of felt pride, behavioral intentions were no different when the task was perceived as easy vs effortful. When the task was perceived as skill based, behavioral intentions to take the CPR training were significantly higher in the easy and effortful task conditions ($p < 0.05$). The study indicates that emotional states may influence the perception of task difficulty, thereby affecting an individual's choices for performance of tasks with different difficulty level [6]. Another study conducted on 121 hemophilia patients to determine the factors associated with treatment adherence, treatment difficulties and treatment satisfaction found that negative affect showed a significant association with treatment difficulties ($p = 0.004$), and treatment satisfaction ($p = 0.02$). These studies indicate that negative affect is an important factor related to both perceived difficulties of treatment and treatment satisfaction. Therefore, it is important to consider patients' mood while studying their opinions about a treatment.

Relationship of Perception of Difficulty to Undergo Therapies with lack of information

Patients' information about a therapy [7] is found to be associated with their perception of difficulty of therapy. A prospective study on four hundred and six HIV patients to describe the degree of difficulty with ART found that poor understanding of the nature of treatment and its side effects remained a significant predictor for the perception of difficulty. Overall 51.4% ($n = 180$) of the patients found their treatment to be of medium to high difficulty on their first visit which was correlated with actual difficulties encountered including four or more adverse reactions caused due to ART, moderate to severe anxiety, HIV serotype status disclosure and CD4+T lymphocyte count $> 200/\text{mm}^3$. The perception of difficulty of the treatment dropped to 37.3% ($n = 78$) on third visit, and was found to be related with the pill burden (> 7 pills), use of other medications and low understanding of the nature of the treatment and its side effects showed an independent association with the difficulty of ART. The study indicates that at the first visit patients' perception of treatment difficulty was correlated with actual difficulties encountered. This was no longer true by the third visit. However, poor understanding of the nature of treatment and its side effects remained a significant predictor for the perception of difficulty perception on the third visit. Thus, lack of information about therapy can lead to unrealistic expectations and misconceptions, which may prevent the patients from utilizing treatment services. There is also a possibility that the patients may change their opinion about a therapy once they perform that therapy.

Another study was conducted by Page to determine the opinions of stroke patients and therapists about CIMT. Data were collected from 208 stroke patients by administering a self-report questionnaire to them. A similar questionnaire was administered to 85 physical and occupational therapists. Participants had CIMT described to them based on a published study. Participants were asked to respond to various statements concerning their opinions of the CIMT protocol and provide the rationale for their opinion [8]. Sixty eight percent of the patients reported that they would not participate in CI therapy and 65% expressed the view that they do not want to wear the restrictive device or mitt. Fifty four percent of the stroke patients reported that they would not like to participate in the therapy and most of them

expressed a low motivation to sit for 6 hour therapy sessions, and also expressed concerns about the restrictive device schedule. The therapists mentioned their concerns about adherence, safety and unavailability of resources to provide CIMT. This study does not provide any information about the educational materials about CIMT that were given to these participants. These participants did not have a proper information and any experience of this treatment.

Relationship of Difficulty of Therapies with the Treatment Outcomes

Many studies have examined the relationship between difficulty of therapy procedures and the therapy outcomes. These studies show perceived treatment difficulty related to the outcomes in a varied way. Eubanks, Wright and Williams conducted an experimental study to examine the cardiovascular effects (viewed as effort-related cardiovascular responses) of incentive value in men and women who had been confronted with difficult cognitive challenges. Participants were provided with a prize of \$100 or \$10 prize by attaining a 90% success rate on a computer memory task with low to high difficulty. There was an interaction effect of task difficulty and incentive value on heart rate. The study indicates that there is an increase in the participants' efforts to complete a high difficulty task and thereby achieve an outcome of high value [9].

Tamir tested the validation of the Patient Perceived Difficulty of Diabetes Treatment (PDDT) scale on 688 types 1 and type 2 diabetic patients. The PDDT scale is used for assessing the diabetes treatment characteristics. The participants also completed a self-reported questionnaire on overall perceived difficulty of diabetic treatment and diabetes Quality Of Life (QOL). The study showed that PDDT reflects the characteristics of diabetes treatment including adherence to self-monitoring of glucose schedule, frequency of self-monitoring of glucose, adherence to medication administration schedule, frequency of medication administration, multiple number of medications, synchronization between meals and medications, dependence on the medications, pain associated with treatment, diet restrictions, self-care, multiple healthcare providers and cost of treatment. A strong correlation was found between overall perceived difficulty in diabetic treatment and outcome of diabetes QOL ($r = 0.60$) [10].

Another study also found the perceived treatment difficulty to be related to the treatment outcome. The study was conducted on 313 adult dental patients to see the influence of perceived treatment difficulty on the treatment outcome and investment on orthodontic treatment. These individuals were treated by either specialists or general practitioners for their orthodontic care. Twenty-seven percent of the participants perceived their treatment as moderately difficult and 47 percent perceived their treatment as difficult. Higher perceived treatment difficulty was found to be related to lower treatment outcome success [11].

Colson conducted a survey on sixty nine adolescents and six-year-old kids with personality disorder conduct disorder, affective disorder and childhood & adolescent disorders. The study aimed to determine the relationships of treatment and therapeutic alliance difficulties with staff rating of patient qualities, family issues and treatment outcomes. The overall treatment difficulty was found to be directly associated with therapeutic alliance difficulty ($p < .001$). An inverse relationship was found between overall treatment difficulty and outcome of patients' progress in treatment ($p < 0.001$) and with family progress scores for the course of patients' hospital treatment ($p < 0.01$) [12].

A similar relationship was found in another study conducted by

Metzger. This pilot study was conducted to evaluate a patient-tailored and Adaptive Robot-Assisted Therapy (Uswatte-Aratchi) concept to optimally challenge patients throughout the therapy progress. The study involved six adult patients with first occurrence of stroke (for less than six weeks) and hemiparesis. Robotic assessments of both motor and sensory impairments of hand function were conducted prior to the study to adjust the exercise parameters and customize difficulty levels. An automated routine adapted task difficulty levels throughout the therapy sessions to maintain optimal motivation and challenge, and a patient performance around a target level of 70%. The study revealed a strong correlation ($p < 0.04$) between improvement in motor ability and number of difficulty levels progressed throughout the therapy [13]. In summary, the above studies indicate a relationship between perceived difficulty of treatment and treatment outcomes.

Discussion

Perceived task difficulty is one of the important factors that help an individual to decide whether a task should be attempted [14]. If an Individual perceives a task to be within their ability, they will attempt to perform that task, whereas, if the task is perceived to be of high difficulty, no attempts will be made to perform that task [4]. Research have shown that perceived self-ability can be improved by various strategies like motivational and skill based feedback [15] and problem solving strategies using a strategy like “if-then” plan [16]. Therefore, these strategies can improved patients’ self-perceived ability, which, in turn, would improve their motivational arousal to perform a task perceived to be of high difficulty level. Researches can be conducted to find out other strategies that can be used to improve individuals’ perceived ability so that they can undergo the treatments that are perceived to be difficult.

Perception is influenced by the knowledge and experience of the task [17]. Improper information or lack of information was one of the important factors related to the perception of difficulty of different treatments [7]. Many researches related to the perception of task difficulty do not take the participants’ information about that task into account, for example, a survey conducted by page involved the assessment of perception of difficulty of CIMT procedures [8]. This article does not provide any information about what education material about CIMT was provided to these participants. Presumably, participants in this study got information about this therapy from hearsay of the treatment and from some published articles in which there was no detailed information about CIMT. Moreover, these participants did not have any experience of receiving or delivering the CIMT. The lack of information would have influenced participants’ perception; hence, the findings of these researches are questionable. Therefore, researches related to studying perception of a therapy should highly emphasize the participants’ information and their experiences with that treatment, so that their perceptions are more accurate.

Goal importance is another important aspect to the task performance. Individuals put the effort to perform task only if they find the outcome to be worth it [2]. Therefore, in addition to the tasks and procedures involved in a treatment, the information about the gains in its outcome should also be an important aspect of the patient teaching before getting through a treatment. Studies have shown the value of an outcome influences the effort to perform that task, whereas none of the studies have examined how the information about gains in outcome of a treatment influences the participants’ perception of its task difficulty. Therefore, studies should be conducted to see how the importance of an outcome influences the perceived difficulty of a treatment.

Besides knowledge, perceptions are also influenced by individual’s

attitude. There is a gap in the literature to see the effect of the change in attitude on the perception of task difficulty of a treatment. Therefore, both information and attitude should be considered while studying the individuals’ opinions about any treatment. The implications are also for the studies that are focused on development of intervention. Strategies that change the individuals’ knowledge and attitude towards a treatment should also change their perception about that treatment. Examining the articles that involved the association of emotions, perceived task difficulty showed a consistent association with negative affect [6]. Future research should focus on the role of emotions on perception of task difficulty and actual performance during a treatment.

Self-efficacy is an important construct related to the performance of a task with different difficulty levels. As defined by Bandura, self-efficacy is the competence of an individual to perform a desired task or behavior,” and the confidence to overcome barriers to perform a task [18]. Self-efficacy is thought to be domain specific, pertaining to specific behaviors in a particular context, therefore, the patient’s self-efficacy to carry out the therapy successfully is of prime importance. So far, none of the studies have examined how the patients with different levels of self-efficacy respond to the tasks of different difficulty levels, and how the strategies that enhance self-efficacy influence the individuals’ performance on tasks with different difficulty levels.

Comparative studies can be conducted to see the difference in the perceptions caused due to interventions that change knowledge, attitude, self-efficacy and emotions. In addition, patients’ status related to these factors should be considered while they are asked to make a decision about any services. Correct and detailed information related to the treatments and services could be delivered to change their knowledge, attitude and self-efficacy to adhere with a treatment. Thereby, helping them to make the correct decisions in selecting the effective treatments and services.

Conclusion

In summary, patients’ self-perceived ability [4], information about a therapy [7], attitude towards a therapy [5], their emotional state [7] are linked with their perception of the difficulty of therapy. Patients’ experience of undergoing a therapy and education about the treatment may change their attitude and perception about that therapy. Thereby will help them to follow the treatments especially among individuals with chronic diseases living in community settings where the healthcare follow up services are not much available.

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