

# Stress Intervention Online

## - Designing for Self-help through Multiple Help

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**Abstract**— E-health has undergone many changes during the years. One is the development of web-based self-help services for patients and citizens with health concerns. This paper presents design ideas for a stress management web-based system that takes the development of self-help services further. The aim of the system is to help people with mild to intermediate levels of stress problems change patterns of behavior and take control of their stressful life situations. The system includes not only self-help through individual work with stress-related issues, but it also complements the individual efforts with help from peers and medical professionals. The system then becomes a platform for combining multiple help online. The system design ideas have resulted from research studies and practical experiences of stress management and web-based self-help systems. The paper also presents a couple of scenarios to illustrate in what ways the system usage can be characterized by multiple help online and a holistic approach to stress intervention.

**Keywords**— stress intervention; web-based; self-help; multiple help; communication.

### I. INTRODUCTION

E-health systems have evolved in many different health areas. Both patients with physical and mental conditions and citizens with health concerns, such as unhealthy lifestyles, use the Internet to search for information and seek help from medical professionals and peers. One area is self-help for people who experience unhealthy levels of stress and high stress responses.

Studies have shown that many people in working life are on sick leaves due to high levels of stress [1]-[2]. In Sweden, stress related dysfunctions have become the second most common reason behind sickness absence [3]-[5]. By changing unhealthy lifestyles, people can reduce the risk of getting severe illnesses. Preventive healthcare and early interventions are therefore recognized as important in order to help groups of people from becoming patients of the healthcare system and from being forced to sick leaves and long-term sickness absence.

Stress research has since a long time been oriented toward studies involving the physiological response (= the body's reaction) to stress and the cognitive processes that influence the perception of stress. However, the social perspective of the stress response has established that people with similar life

conditions are not necessarily affected in the same way, which indicates that stress is caused, at least in part, by a person's mind or way of thinking. To change a certain way of thinking and to tackle an unhealthy behaviour includes promotive and preventive interventions and an ongoing support [6]-[7]. This is where the Internet and web-based systems can play an important role through available information of different kinds and continuous communication with others. Intervention systems need flexibility that allows people to find their own ways through the system.

The use of self-management intervention systems on the Internet today is characterized by information management, interactivity and communication. However, the use of the different online health services for information and communication with experts and peers has not yet reached the level of integration and holistic thinking. The paper addresses this gap. The paper introduces the design of a new type of web-based stress intervention system that considers integration, flexibility and individual differences. It includes different ways to approach stress, both from a stressor perspective (triggers) and a response perspective (stress reactions). However, the main focus is on the individual intervention. It also includes different sources of help, from research findings to real life stories, communication with peers and practical tools and counseling.

The following sections are organized as follows. To start with, background knowledge and understanding of stress, stress interventions and internet self-help services will be presented. Thereafter, we will introduce our design for a new web-based stress intervention system based on a holistic approach using multiple help online.

### II. RELATED RESEARCH AND KNOWLEDGE

#### A. Stress

According to the bio-psychosocial model of stress, it is stated that biological, psychological and social factors are linked in the progress of promoting health or causing disease [8]. In this model the mind and the body are well connected and interdependent, which means that biological, psychological, and social issues operate together to affect the health status. The model is somewhat more comprehensive and

could be considered a development of Selye's original model [9]. The stress response is elicited by a many different psychosocial stimuli which can threaten the homeostasis, which is the ability to maintain internal equilibrium by adjusting its physiological processes. Stress is experienced negatively when this imbalance occurs between the individual's perceived demands and the ability to respond to these demands. In today's life the psychosocial stressors are the most common. To let a thought or an event be appraised as a stressor, there is a perceived mismatch between the demands and the individual's resources to cope with it [10].

### B. Stress Intervention

In stress intervention empowerment is a central concept. The strategies can be concluded as the processes leading to increased stress management and better health in different populations and groups of people. Empowerment helps people to increase control and manage their lives according to their needs and preferences. The key question is how to build on and reinforce authentic participation ensuring autonomy, feelings of value and sense of mastery in decision-making. Learning and problem solving abilities are important assets for any organization or work site wishing to reach its full potential, and empowerment within the individual stimulates job satisfaction. The educational approach to stress management is concerned to enabling people to make informed choices, set limits, and increase coping ability. The preventive and promotive approach are aimed to achieve behavior changes: Internal locus of control is a key factor in efforts to create empowered environments and empowered individuals able to meet stressors at work and in private life [11]-[12].

### C. Self-help and Different Actors Online

There are different types of self-help services on the Internet today for people with lifestyle issues such as stressful lives. One is the Ask-the-Expert that lets users post questions directly to the system to be answered by an expert, and the users can also choose to browse the system for stored questions and answers [13]. This function in the e-health area is believed to offer value to people who need to gain new health knowledge and guidance [14]. The users can get health recommendations and advice from a medical expert [15], and this health service is also recognized to offer a new type of continuous relationships with medical experts [16].

Another self-help service on the Internet is the community forum systems for peers. These community forums on health issues have become popular lately and are used regularly by patients and citizens with different physical and mental conditions [17]. These systems let people share experiences and offer each other advice on how to cope with different health concerns [18]-[19]. Research gives that patients online tend to be well informed today, and that they act both as producers and consumers of health information [20]. This blur between being a producer and a consumer of health information and services is also named 'prosumption' and the user a 'prosumer' (e.g., [21]-[22]).

When the web-based communities on lifestyle problems for peers have been compared to the Ask-the-Expert systems, the two types of systems were shown to offer the users complementary contents and knowledge [23]-[24]. Advice and information given in the two types of systems were seen to be of different characteristics, allowing people with lifestyle problems to get diverse and complementary views of their problems. While answers from health experts were characterized by detailed descriptions of health subjects, the peer conversations emphasized personal experiences and more practically oriented advice. By linking the different answers – the ones from health experts and the ones from peers in community conversations – the users are assumed to benefit more [23]. This leads us to believe that a combination of different types of health services and actors in the stress management area would help people with mild to intermediate levels of stress problems change patterns of behavior and take control of their stressful lives. To integrate knowledge and experiences of medical professionals and peers is believed to make an advantage.

Many people who suffer from stress related disorders prefer to get interventions through the Internet, and studies have also shown positive effects on health outcomes. However, there are probably high rates of drop-outs [25]-[26]. There is also little known about the participants' use of the web-based stress intervention programs, what the communication patterns are like, and what support the participants take advantage of. How to make use of technological possibilities and human resources in this field needs to be further explored.

## III. DESIGNING A STRESS INTERVENTION SYSTEM

### A. Multiple Help Online – Five Types of Help

The system for stress intervention online that we propose is designed as to form a whole of different help services and actors who contribute together. The system consists of five types of help: Ask-the-Expert, Counseling room, Community forum, Exercise programs and Stories told & research results. Below, the basic characteristics of each of these five are described.

#### 1) Ask-the-Expert

Ask-the-Expert is where the user can ask medical professionals for help and advice on different stress related concerns. This help can be used both for direct questions and also for browsing for previously popped questions and their answers. This part of the system is based on communication between one user and a medical expert as well as on storage of these interactions.

#### 2) Counseling Room

The counseling room is a chat area in which users and medical professionals can meet in smaller group sessions. The counseling room is based on synchronous communication among the participants. Different predefined topics related to stress management can be addressed during these sessions. Cognitive behavioral therapy for stress management addresses

topics such as excessive job involvement, low self-esteem, lack of recuperation, work-family imbalance, job mobility and competence matching.

### 3) *Community Forum*

Communication between peers is also important for keeping up with ongoing stress interventions. Community forum lets the users have conversations together on current topics in their daily lives, related to sleep, work situation or balance between work and family, for example. The forum is based on asynchronous communication, and communication can therefore take place whenever the users have the need for it. The web communication with peers can help people get new insights and encouragement to develop new habits.

### 4) *Exercise Programs*

The fourth function of the system is exercise programs. Depending on the stress issue, there are different available exercises that the users can do on their own. Reflection exercises on work or study situation, relaxation techniques and abdominal breathing exercises to ease physical tensions are examples. The exercises are presented in textual form, audio and video, depending on the purpose of the exercise.

### 5) *Stories Told & Research Results*

The last function of the system is about giving the users access to stress-related research results and stories told by others who are, or have been, in similar situations. This part of the system is mainly based on storage of textual information. By letting the users read about other people's stories together with comments from medical professionals, the users can learn to see their own situations clearer. It also helps to reduce stigmatization.

## B. *Stress Intervention Areas*

There are different areas that need to be addressed in order to ease the stress levels of the users. The system's multiple help is therefore structured in accordance with four main stress intervention areas: sleep, work/studies, balance in life and physical wellbeing. Figure 1 shows a design of this structure. The stress intervention areas are introduced in the following sub sections.

### 1) *Sleep*

It has been concluded that stress is strongly linked to disturbed sleep, insomnia and impaired awakening. The inability to relax and to let work issues act as stressors is probably an important link in the relation between stress and sleep. The quality of sleep has thus shown to be of great importance for the onset of stress-related dysfunctions as well as the recovery. It is therefore an impending risk that a person with high levels of stress ends up in a negative loop of increased sleeping disturbances and high level of stress. Assessments of sleeping quality and insomnia and exposure to stress as well as the effects of interventions need to be further investigated.

### 2) *Work/Studies*

An overcommitment at work could entail increased risk to experience work issues as stressful [27]-[28]. Exposure to stressful job conditions such as heavy workload, infrequent rest breaks, long work hours, shift work, and interpersonal relationships, can certainly have a direct influence on workers' health. Overcommitted co-workers often suffer from inappropriate perceptions of demands and fail in their coping ability. Also, perfectionists have been described as people who are highly responsive to stress, and they tend to generate extensive stress for themselves [29]. Concern over mistakes and automatic thoughts of perfectionism are examples of things that can increase the level of stress.

Both work and studies nowadays include a great amount of flexibility and ability to stay connected independently of time and space. In general, this is a positive development since it allows for distance work and studies. But at the same time it increases the risk of having more people ending up in active work and study lives without boundaries. To be able to negotiate about expectations regarding availability, and to set limits, are important for a healthy work and study life [30].

### 3) *Balance in Life*

Stressors related to occupational work such as a frustrating work situation or a work-family imbalance are often major causes of strain, and mental ill-health, as well as psychosomatic conditions [4], [31]. Especially job strain with exposure to

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## A System for Multiple Help Online

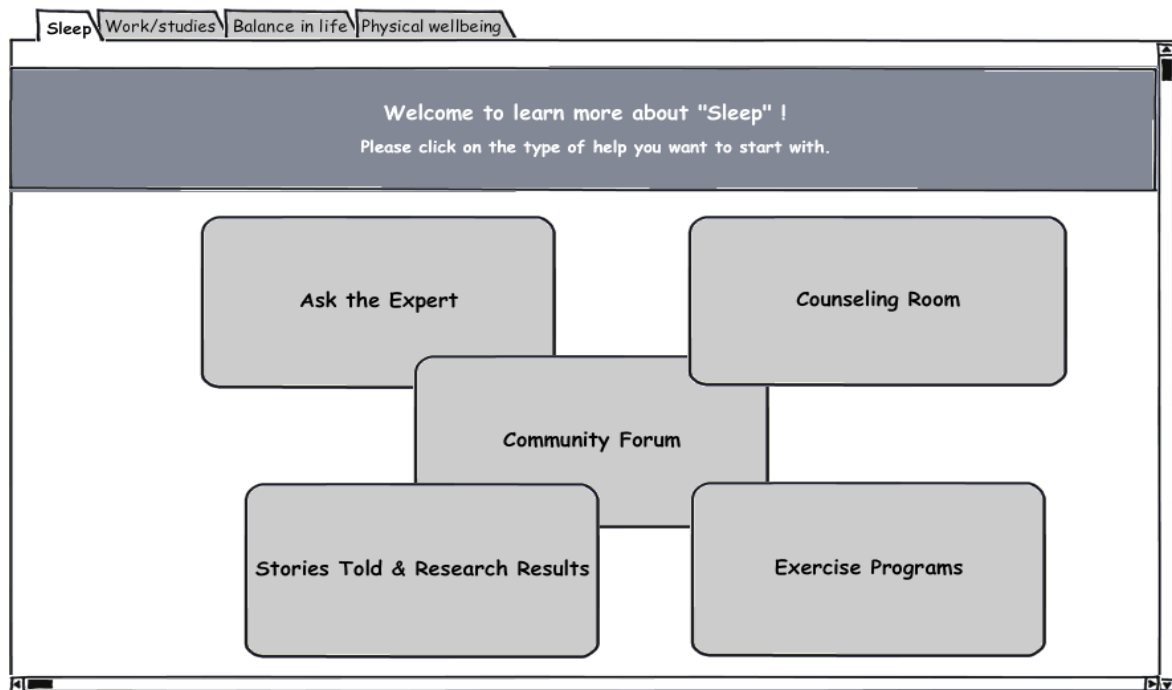


Figure 1. Mockup design of the stress intervention system showing the multiple help functions and stress intervention areas.

stressful job conditions could certainly be a health hazard to those who have additional strain from family life. Perceptual distortion can prevent people from accurately assess cost-gain relations and to set limits [27].

#### 4) Physical Wellbeing

Responses to stress are often manifested in body tension. Regarding individual interventions in the area of dysfunction due to negative stress exposure, progressive muscle relaxation was originally designed by Jacobson to guide people through successive tensing and relaxation of the body muscle groups from toe to head to achieve overall body relaxation [32]. This process is easy to learn and teach, safe, non-threatening and non-competitive. Since then it has been concluded that the effectiveness of the interventions varied according to the health-outcome measure used. Cognitive-behavioural skills were more effective for psychological outcomes, whereas muscle relaxation techniques were more effective for physiological outcomes. Using a combination of techniques; muscle relaxation and cognitive-behavioural skills seemed to be more effective across outcome measures than using a single technique. Deep, diaphragmatic breathing is known to counteract the fight or flight response symptoms that are often associated with anxiety and negative reactions on stress exposure. Also meditation can be used to counteract stressful situations, as it is a technique to develop concentration and awareness to produce a calming effect. Here diaphragmatic breathing is central to any meditation practice. It has been found that there could be a lowering of blood pressure during

deep breathing, which is interesting to consider in stress management [32]-[35].

#### C. A Holistic Design with Multiple Help Integration

The stress intervention system proposed in this paper applies the concept of multiple help online for different stress intervention area. From this follows that peer conversations, questions to as well as answers from medical experts, counseling sessions, research results, life stories and exercises are available in each of the stress intervention areas.

The different stress intervention areas aim at letting the user choose his or her way into the system based on what is believed to be the most urgent stress-related concern. At the same time, it is important to offer easy ways to navigate between the different intervention areas. The technical system can assist in this through links and navigation menus, but also medical professionals, as well as the peers, can support this by referring to other intervention areas. In a conversation on sleep, for example, there could be references to related conversations on work issues within the work/studies intervention area.

The same idea is applied on the five types of help in the multiple help concept. The different types of help are linked together so that the users can navigate easy between them, but also the medical experts can encourage the users to take advantage of other help types for complementary support and knowledge. In the Ask-the-Expert answers, there can be references to relevant peer conversations that the user could join, for example. This can be implemented manually to start with, by having the medical expert suggesting peer

conversations in his or her answer. In a future setting, it is also possible to implement automatic matching techniques in order to generate links to similar stress-related topics in different parts of the system.

#### IV. SCENARIOS

Below, there are two short examples of scenarios aiming to illustrate in what ways the web-based stress intervention system can be used to let the different stress areas, information sources, tools and actors work together.

##### A. Scenario 1: Chain of Complementary Support

Eve, 52 years, is a middle manager in a company. She is ambitious and has always felt that people around her have high demands on her. Today, her employees and family take almost all her time, which has led to a stressful life situation with too little sleep and unhealthy food and exercise habits.

Eve enters the stress intervention system by visiting the stress intervention area “balance in life” and its community forum for peers. She finds a conversation that is ongoing, on a theme close to her own situation. She reads the conversation for a while, and then adds a posting telling the others that she finds it difficult to make room for herself and her needs. The conversation continues with the problem of saying no and to delegate responsibilities. One peer recommends Eve and the others to sign up for an online counseling session on how to set limits. Eve signs up, and later she joins the counseling session together with a handful of peers, moderated by a medical professional. During the session, the medical professional refers to an exercise on how to practice limit settings present in the help function “exercise programs”.

##### B. Scenario 2: Complementary Stress Intervention Areas

Johan is a 37-year old man who works with systems analysis at a big IT-company. He works very long hours in front of his computer. His back has started to hurt, and his body is stiff and his eyes dry. Recently, his sleep has been affected as well. He finds it difficult to fall asleep and he often wakes up at night.

The first thing Johan does when entering the stress intervention system is to open the intervention area called “sleep”. He starts to search for similar stories from others, and he also posts a question to the Ask-the-Expert service to find out about what he can do to ease his sleeping problems. The medical expert who answers the question from Johan presents some practical advice on how to relax before going to bed. But, since Johan has several concerns, the expert also recommends exercises that Johan can do at work, both to increase the variety of physical work activities when using the computer and to reduce strain on the eyes. These exercises are found in the stress intervention area called “work/studies”. The medical expert also recommends Johan to visit the stress intervention area called “balance in life”, to read about research results and to join conversations with peers on how to make room for other activities besides work.

#### V. CONCLUSIONS AND FUTURE WORK

This paper has outlined some basic foundation of a new and holistic web-based system for stress intervention. The novelty of the system lies in the holistic approach considering both different aspects of stress and stress intervention and also different supportive roles and functions. Not only have attention been drawn to self-help through information access and exercises, but also to the necessity of having support and guidance from peers and medical professionals to ease the individual struggle for sustainable new habits and improved health. To make the system holistic, web links between the different intervention areas and also between the different kinds of help are considered. Additionally, the medical professionals and other actors in the system can amplify the holistic view of the system by making references to different system parts. This will let the user navigate more easily between the different parts of the system and to use different kinds of help in combination.

Next step is to have the system design implemented, and then evaluated by a pilot test group. Research studies will also be conducted on the system usage and online communication patterns.

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