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ICT and the future of health care: aspects of health promotion

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ABSTRACT

Purpose: Increasingly, Information and Communication Technology (ICT) applications enter the daily lives of consumers. Availability of various multimedia interfaces offers the opportunity to develop and adjust ICT solutions to all aspects of society including health care. To address the challenges of the ongoing adaptive progress of ICT, decision makers profit from estimates of expectable merits and risks of future technological developments. The aim of the present study was to assess the prevailing opinions and expectations among Austrian stakeholders regarding ICT-assisted health promotion.

Methods: In total, 73 experts (74% males) engaged in the Austrian health care sector participated in a biphasic online Delphi survey. Panellists were assigned to three groups representing medical professionals, patient advocates, and administrative personnel. In a scenario-based questionnaire, experts evaluated potential advantages and barriers as well as degree of innovation, desirability, and estimated date of implementation of six future ICT scenarios. Scenario-specific and consolidated overall opinions were ranked. Inter-group differences were assessed using ANOVA.

Results: Panellists expected the future ICT-supported health promotion strategies to especially improve the factors living standard (56%), quality of health care (53%), and patient's knowledge (44%). Nevertheless, monetary aspects (57%), acceptance by patient advocates (45%), and data security and privacy (27%) were considered as the three most substantial hampering factors for ICT applications. Although overall mean desirability of the scenarios was quite high (80%) amongst panellists, it was considerably lower in medical professionals compared to patient advocates and administrative personnel ($p = 0.006$). This observation suggests a more precautious attitude of this specific interest group regarding technological innovations.

Conclusions: The present Delphi survey identified issues relevant for successful implementation of ICT-based health care solutions, providing a compilation of several areas that might require further research. In the light of ageing societies facing the perceived threat of permanent online surveillance, different requirements and expectations of end users

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should be accounted for by various stakeholders. Thus, close collaboration could facilitate the harmonization process on hot health topics among interest groups.

1. Introduction

Increasing numbers of patients suffering from chronic medical conditions like cardio-respiratory diseases and diabetes mellitus are overwhelming modern health care services with high annual expenses [1]. Addressing these increasing financial challenges, Information and Communication Technologies (ICT) allow for cost-effective disease management as well as patient's empowerment and health promotion [2]. Together with wireless technologies, especially long-term medical care requirements could be addressed at significant lower expenditures in ambulatory settings or patients' homes by ICT applications [3]. Implementation of ICT-supported preventive measures might be expensive, but possess a high cost-saving potential in the long run [4].

During the last century and similar to trends observed in other developed countries, the shape of the Austrian population age pyramid changed and became top heavy, i.e., the proportion of children and young people was reduced in favour of the older generation [5]. To address this shift in population structure, new Public Health strategies for promoting pro-active ageing could be of great societal value [6,7]. In all fields of society, especially in the health and geriatric care sector, ICT-enabled innovations designed for consumers with special needs offer a huge opportunity to face the challenges of ageing societies [8–10]. As a first step, ICT-based assistance in everyday life provides the key to consumer's independency and self care [9]. Further, as suggested by Guillen et al. [11], personalization, mobility, and adaptation of ICT applications could enhance the success of national health promotion and disease prevention programs. To maximize respective Public Health efforts, design and usability of web-based health portals are constantly improved nowadays [12]. Availability of these interactive consumer-orientated online services could exert positive influence on health outcomes including reduction of duplicative testing, hospital (re)admission, and mortality rates due to increase of patients' knowledge and compliance [13,14].

Anticipation of future ICT developments greatly enhances effective communication between end users and decision makers in scientific, industrial, and clinical settings [15]. So far, empirical research on prevailing opinions regarding ICT use of health care professionals is lacking for Austrian conditions. To close this knowledge gap, the Delphi method serves as a useful research method [16]. Thus, we invited a panel of Austrian experts representing the three interest groups medical professionals (hospital-based doctors as well as community-based general practitioners), patient advocates, and administrative personnel. During a two-round online Delphi process, panellists determined aspects and classified factors for six conceivable ICT scenarios. The present study aimed at identifying expected benefits and perceived challenges of prospect demands in the specific area of ICT-supported health promotion as well as primary and secondary disease prevention in Austria. As panel members were assigned to a specific stakeholder group based on their professional background, a further study objective was to analyze potential inter-group differences of scenario-based expert opinions.

2. Methods

2.1. *Identification of future ICT scenarios*

The current analysis was part of a larger research project that gathered opinions and expectation of future ICT-assisted health-related aspects by constitutively investigating results of a two-round online Delphi survey. In the study's initial design and conception phase, we identified three major research fields of interest covering ICT-based health promotion, doctor–patient communication, and pervasive health. The two latter topics are elaborated on in consecutive, though separate scientific articles. Adapted from our previously published paper evaluating the impact of technological applications on doctor–patient communication [17], the current study merely focuses on the expected impact of prospect scenarios on ICT-supported health promotion. Accordingly, we defined the following six hypothetical scenarios based on respective international, peer-reviewed literature.

- Scenario 1 – Compliance: "Personalized information and communication technologies remind patients of punctual intake of prescribed medicine, resulting in higher compliance and thus better therapeutic outcome." [18–21].
- Scenario 2 – Education: "Scientific, interactive multimedia is broadly accepted and intensively used for Public Health education and preventive medicine." [22,23].
- Scenario 3 – Cancer risk: "Target-group specific information and communication technology-assisted preventive medicine is widely used to reduce the individual's cancer risk." [24–26].
- Scenario 4 – Insurance rates: "Funding of health insurances is deregulated, and insurance rates depend on individual information and communication technology-tracked lifestyle choices." [27,28].
- Scenario 5 – Activities: "Target-group specific tourist and recreational activities for consumers with similar socioeconomic and medical conditions are a common information and communication technology-based health promotion effort." [11,29].
- Scenario 6 – Prevention: "Web-based communication tools assist handicapped or elderly people by providing educative information for primary and secondary health prevention." [11,30].