Health State Utility Assessment for Breast Cancer

Vivianne Shih, PharmD, BCOP, BCPS[1], Alexandre Chan, PharmD, MPH, BCPS, BCOP[1,2], Feng Xie, PhD[3,4], Yu Ko, PhD[2,*]

[1]Department of Pharmacy, National Cancer Centre Singapore, Singapore; [2]Faculty of Science, Department of Pharmacy, National University of Singapore, Singapore; [3]Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, ON, Canada; [4]Programs for Assessment of Technology in Health Research Institute, Hamilton, ON, Canada

A B S T R A C T

Objectives: 1) To develop both English and Chinese versions of the descriptions of health states describing different stages of breast cancer and different adverse effects related to tamoxifen and aromatase inhibitors for breast cancer and 2) to elicit individuals' preferences for these health states from a group of oncology nurses. **Methods:** Twenty hypothetical health states and their descriptions were developed on the basis of literature review and oncology expert panel reviews. Health state utilities were obtained from 20 oncology nurses by using the visual analogue scale and standard gamble methods. After recalibration, the adjusted utility scores were on a scale of 0 (dead) and 1 (perfect health). **Results:** The health states developed represented different disease stages and the presence and type of treatment side effects in breast cancer. For each health state, various general health-related quality-of-life domains, such as pain/discomfort and ability to work, were included in the descriptions, along with a state-specific description. The mean utility score of respondents' "current health" was greater than 0.9, while mean adjusted visual analogue scale–derived utility scores ranged from 0.256 to 0.860 and median adjusted standard gamble–derived utility scores ranged from 0.284 to 0.673. Among the side effects evaluated in the "no recurrence" health state, ischemic cerebrovascular events, pulmonary embolism, and spine fracture had the greatest utility detriment. **Conclusions:** The study results indicate the value that individuals place on the avoidance of disease progression and the side effects of hormonal therapies in breast cancer. The health state descriptions developed can be used in future research to obtain society's utilities for use in a cost-utility analysis.

Keywords: breast cancer, standard gamble, utility, VAS.

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Introduction

Breast cancer is one of the world's leading malignancies, and billions of dollars are spent each year on its treatment [1–3]. Approximately two-third of all breast cancer patients are diagnosed with hormone receptor (HR) positive breast cancer [4]. Hence, endocrine therapy, along with other treatment strategies such as surgery and chemotherapy, is one of the main treatment modalities used in patients with early stage HR positive breast cancer. For the past few decades, tamoxifen has been advocated as the gold standard of hormone treatment. More recently, for postmenopausal HR positive breast cancer patients, third-generation aromatase inhibitors such as anastrozole can serve as an alternative treatment option. In choosing the most appropriate therapy for postmenopausal HR positive breast cancer, in addition to effectiveness, factors such as the cost and adverse effect profile of hormonal agents and patients' health-related quality of life (HRQOL) are important and need to be carefully considered.

One way to incorporate these multiple factors into an economic evaluation is through cost-utility analysis, which compares the cost per quality-adjusted life-year between different treatment strategies. As an essential component of cost-utility analysis, utility scores can be obtained by eliciting individual preferences for health states or outcomes by using direct valuation methods such as the standard gamble (SG), time trade-off, or visual analogue scale (VAS). Utilities can also be obtained indirectly by mapping the scores from a disease-specific HRQOL measure, which are more sensitive than generic ones but do not have utility scoring systems, onto a preference-based generic measure such as the EuroQol five-dimensional questionnaire. Currently, utility data that reflect the preferences of the community for breast cancer–related health states are not available in Singapore.

Because there is no appropriate disease-specific HRQOL measure that can be used for all the health states assessed and because Singapore-specific population-based values for the EuroQol five-dimensional questionnaire are not available, the direct valuation approach was adopted in this study. We aimed to develop both English and Chinese versions of the descriptions of health states describing different stages of breast cancer (no recurrence, local recurrence, distant recurrence) and of different adverse effects related to hormonal therapies for breast cancer, specifically tamoxifen and aromatase inhibitors. In addition, the preferences for each of these health states were elicited from a group of oncology nurses.

Methods

Development of health states

To facilitate the development of the first draft of the health states, a targeted literature review was conducted to identify the adverse effect profiles of hormonal therapies and their impact on various HRQOL aspects. Validation of the health state descriptions was conducted by a group of experts comprising breast oncologists and experienced oncology nurses.

Literature review

After the literature review, the following adverse effects resulting from adjuvant hormone therapy were identified and included for evaluation: fractures, vaginal bleeding, venous thromboembolism, cataracts, ischemic cerebrovascular events, musculoskeletal disorders, hot flushes, and endometrial cancer, which are all significant adverse effects of anastrozole and tamoxifen reported in the Arimidex, Tamoxifen, Alone or in Combination trial [5,6]. Validated HRQOL instruments, namely, the European Organisation for Research and Treatment of Cancer breast cancer-specific and the Functional Assessment of Cancer Therapy-Breast quality-of-life questionnaire were used as references [7,8] in description development. Efforts were made to ensure that both the pertinent characteristics and the degree of detriment that patients may experience during their course of cancer therapy were accurately incorporated into the respective health state descriptions.

Health state description validation

The drafted health state descriptions underwent content validation by an expert panel, which consisted of three breast cancer oncologists and four oncology nurses who had at least 2 years of experience in oncology. The health state descriptions were reviewed and modified to ensure their accuracy with regard to symptoms, patients' feelings, and the level of detriment in each HRQOL aspect included.

No major amendments were required, and it was generally agreed that the drafted health state descriptions were comprehensive. Feedback from oncologists was minor and led to minor modifications of some descriptions for clarity. An additional domain on sleep was suggested by the nurses, and upon further literature review, this domain was added to the final health state descriptions. A second round of validation with the same expert panel was conducted, and then the health state descriptions were finalized.

Development of the Chinese version of the health state descriptions

A Chinese version of the health state descriptions was developed through forward and backward translation. The forward translation was done by the study investigators (all were bilingual and two had research experience in translation), and back translation was performed by a bilingual PhD pharmacy student who did not see the original English version. After the back translation, the original and back-translated health state descriptions were compared, discrepancies were identified, and the Chinese translated version was modified accordingly. Several iterations of the process occurred before no difference was considered major by the study investigators.

Health state utility measurement

Participants

A pilot study was conducted with two pharmacy PhD students and one research assistant to identify any potential problems or further clarification needed in interview instruments and procedures. No issues arose from the pilot study; therefore, no revision was made.

The main study was conducted at the National Cancer Centre Singapore, the largest ambulatory cancer center in Singapore that treats approximately 70% of all cancer patients. This study was approved by the Singhealth Centralized Institutional Review Board. Face-to-face interviews of oncology nurses were conducted by a trained research assistant in November 2010. Inclusion criteria for participants were 1) 21 years of age or older, 2) able to comprehend either English or Mandarin, and 3) a minimum of 2 years of experience in oncology. All respondents received a nominal fee of S $50 as compensation for study participation.

Utility measurement procedures

In the interview, respondents were first required to complete a sociodemographic questionnaire and were then instructed in the VAS and SG procedures [9] to measure their preference for the "dead" state, current health, and each of the 20 hypothetical health states of breast cancer.

The descriptions for each health state were presented to the respondents on a laminated card. The cards were labeled with a letter of the alphabet on the back and no headings were provided to denote what the health states were. Respondents were asked to read and comprehend all the health state cards. The trained interviewer explained to the respondents about the different colored text on the cards and their respective meanings. Text in dark purple presented aspects of health that were specific to that particular health state. In contrast, text in orange and black presented the common aspects of health in most health states, but the level of detriment in these aspects could differ among different health states. After explanation, the respondents were asked to rank the health states provided in the descending order according to their preferences along with a VAS (i.e., feeling thermometer) anchored by the health state they considered the worst at the bottom (0 point) and perfect health at the top (100 points). Respondents were then asked to give all the other health states a value between 0 and 100. If respondents were unable to differentiate between two health states, that is, if they felt that two health states were similar, the two could be given the same value.

With the SG, to aid in understanding, respondents were shown a color schematic diagram on a computer screen. For each health state under evaluation, the respondents were asked to choose between three options [10]: 1) living in that particular health state with certainty for the rest of their lives, 2) having a 50-50 chance of living in perfect health or in the worst health state (HSw), and 3) determining that the first two choices were equal. Once the respondent had made an initial decision, the chance probability (p) was varied systematically in increments of 5% until the respondent switched between the first two options or selected option 3. The same SG procedure was performed to obtain the utility score for the "dead" state except that if the respondents considered being dead worst than HSw, they were asked to choose between living in HSw or accepting a gamble between perfect health and being dead instead. A probability wheel was used as a visual aid to help the respondents more easily understand the probabilities presented [11].

Statistical analysis

Demographic data were summarized with means and SDs for continuous variables and percentages for categorical variables. In the VAS, if "dead" was placed at the 0 of the scale, the utility score for each of the other health states was the scale value of its placement. If being dead was considered better than HSw and placed at some point between 0 (HSw) and 1 (perfect health), scale recalibration was needed. The adjusted score was equal to