

Exploring User Perspectives on a Digital Preconception Care Risk Assessment Tool

Marloes DERKSEN^{a,b}, Corine OLDHOFF-NUIJSINK^{a,b}, Elsbeth VAN VLIET-LACHOTZKI^c, Eric STEEGERS^c, Silva HARMSSEN^d, Lidewij HENNEMAN^e, Mirjam FRANSEN^{b,d}

^a Amsterdam UMC, location University of Amsterdam, Department of Medical Informatics, eHealth Living & Learning Lab Amsterdam, Meibergdreef 9, Amsterdam, The Netherlands

^b Amsterdam Public Health research institute, Digital Health, Amsterdam, The Netherlands

^c Erasmus MC, Department of Obstetrics and Gynaecology, Wytemaweg 80, Rotterdam, The Netherlands

^d Amsterdam UMC, location Vrije Universiteit, Department of Public and Occupational Health, Van Boechorstraat 7, The Netherlands

^e Amsterdam UMC, location Vrije Universiteit, Department of Human Genetics, Boelelaan 1117, Amsterdam, The Netherlands

ORCID ID: Marloes Derksen <https://orcid.org/0000-0003-0372-7021>

Abstract. Preconception care is considered essential for raising early awareness of health risks among women planning pregnancy, optimizing lifestyle factors, preventing potential perinatal complications, and supporting informed decision-making to improve both maternal and child health outcomes. The target group for preconception care is diverse, including women and men with varying backgrounds and health literacy levels. The digital tool ZwangerWijzer (Preparing for Pregnancy) has been validated and is designed to identify preconception risk factors while providing tailored information on topics such as lifestyle, chronic conditions, and hereditary diseases. This study evaluated the usability of ZwangerWijzer, employing the Think-Aloud method and semi-structured interviews with women (n=13). Results showed that users generally perceived the tool as intuitive, well-organized, and user-friendly. Users also identified room for improvement in content clarity, visual design, and the provision of interactive feedback. Recommendations are provided for further development to enhance accessibility and inclusivity in digital preconception care.

Keywords. eHealth, Preconception Care, Usability

1. Introduction

Preconception care comprises interventions aimed at identifying and modifying biomedical, behavioral, and social risk factors before conception, to optimize maternal and child health outcomes [1–2]. In the Netherlands, daily 500–550 women become pregnant [3]. Despite clear evidence linking preconception health to pregnancy outcomes, awareness and uptake of preconception care remain low [4]. Digital health tools offer scalable, accessible solutions for health education, but their effectiveness depends on usability and user acceptance [5–7]. The Technology Acceptance Model highlights perceived usefulness and ease of use as key determinants for technology adoption [8]. Usability, as defined by ISO 9241-11, is “the extent to which a system can be used by specified users to achieve specified goals with effectiveness, efficiency, and

satisfaction in a specified context of use” [9]. For preconception care, the target group is diverse, including women and men with varying backgrounds and health literacy levels [2]. Women with limited health literacy tend not to know about preconception care or its availability, yet they show clear interest in the topic [10]. Digital tools must therefore be understandable, accessible, and usable to promote and maintain a healthy pregnancy [11-12]. ZwangerWijzer (Preparing for Pregnancy) is an interactive, validated digital risk assessment tool that helps people with a desire to have children identify risk factors through a questionnaire related to lifestyle, heredity, work, illness, medication and vaccination, previous pregnancies, and feelings and experiences [12-13]. After completing the questionnaire, users receive personalized advice to discuss with healthcare professionals. This study aims to evaluate the usability of ZwangerWijzer for women of reproductive age with a desire to have children, identifying user experiences, usability problems, and areas for improvement.

2. Methods

2.1. Study Design

A usability evaluation study was conducted, combining the concurrent Think-Aloud (TA) method and semi-structured interviews to assess user experience with ZwangerWijzer. The study was reviewed by the Medical Ethics Review Committee (METC number: 2025.0303) and deemed outside the scope of the Medical Research Involving Human Subjects Act (WMO). All participants provided informed consent.

2.2. Participants and Recruitment

Participants were women aged 18 and older who were nulliparous, had a desire to have children within three years, were proficient in Dutch, and had no prior experience with ZwangerWijzer. Due to limited response, the inclusion criteria were broadened to include women with a less concrete desire to have children ($n = 3$) and multiparous women ($n = 2$). Recruitment targeted women from diverse socioeconomic backgrounds in the Amsterdam region, using both active and passive distribution of flyers, posters, and online advertisements. Participants received a €20 gift card in recognition of their time.

2.3. Data Collection and analysis

Sessions were conducted via Microsoft Teams, with screen sharing and audio and video recording. Each session lasted 45–60 minutes. Participants completed three out of six modules of ZwangerWijzer using the concurrent TA method, followed by a semi-structured retrospective interview. Each module was assessed at least by three participants. Health literacy was assessed using the Newest Vital Sign [14]. Interview transcripts and TA comments were analyzed thematically using MAXQDA, guided by the ISO 9241-11 usability dimensions: effectiveness, efficiency, and satisfaction [15]. Usability problems were further classified using Nielsen’s ten usability heuristics and severity rating [16].

3. Results

Thirteen women participated, with a mean age of 30 years (range 24–38). Most participants had a high educational level ($n = 9$) and high health literacy ($n = 10$). The TA identified 41 usability issues, most of which were rated as minor or cosmetic severity in nature. The most frequently noted heuristics involved help and documentation and match between system and the real world, highlighting areas for further refinement. Overall, our findings suggest that the tool is generally user-friendly, supported by the retrospective interviews, and discussed in more detail below.

3.1. Effectiveness

Participants were generally positive about the purpose of the website and appreciated its overall intent. Some questions could be refined for clarity, particularly those without explicit timeframes or context (e.g., 'occasionally' or 'ever'), to reduce uncertainty and enhance response consistency. Tailoring questions to individual circumstances (e.g., employment status) could further improve comprehension. Introducing intermediate answer options (e.g., 'sometimes') may allow for more nuanced responses. Making pop-up texts more concise and tailored to users' situations could improve readability and the perceived relevance of the information.

3.2. Efficiency

Navigation was generally intuitive, with clear buttons and the option to revisit previous answers. A few participants noted opportunities for improvement, as some participants did not manage to scroll through pop-ups, providing more consistent feedback for incomplete answers rather than referring just referring to just the module, and clarifying error messages (e.g., when a mandatory question was missed). Addressing these points could further enhance the smooth and efficient completion of the questionnaire.

3.3. Audiovisual Support and Aesthetics

Participants appreciated the inclusion of an introductory video and the clear, structured design of the questionnaire. However, the video was rarely viewed, likely because it was not prominently positioned and did not display its duration. Increasing its visibility and adding a time indicator could encourage more users to watch it. While some participants perceived the homepage design as somewhat outdated, which affected initial trust in the tool, the questionnaire itself was consistently described as well-organized and visually clear.

4. Discussion

Users generally found the tool intuitive and well-organized. While the tool was generally considered user-friendly, several usability issues were identified. Participants indicated that certain questions would be clearer and easier to answer if additional context or

response options were provided, a key factor in technology acceptance [17]. An earlier study showed that excessive or poorly structured information can overwhelm users, especially those with lower health literacy [18]. Our findings align with existing literature, showing that visual design and clear navigation enhance trust and accessibility, particularly for vulnerable groups [19]. The sample included women with diverse backgrounds, yet most had moderate to high education and health literacy, limiting generalizability to lower-literacy populations. Moreover, participants evaluated only parts of the tool during an online session, which may have affected the results of this study.

5. Conclusions

ZwangerWijzer is generally perceived as user-friendly, with clear navigation and structure. Usability could be further enhanced by clarifying question wording, offering more nuanced answer options, and shortening and modularizing explanatory texts. To maximize the tool's impact and inclusivity, future research should focus on iterating the tool and actively involving women with lower health literacy in usability evaluations, as this group remained underrepresented in the current study.

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