

ORIGINAL ARTICLE

## Challenges in the development of strategies for housing adaptation evaluations

AGNETA FÄNGE & SUSANNE IWARSSON

*Department of Health Sciences, Lund University, Sweden*

### Abstract

Founded on recent empirical experiences and results from a Housing Adaptation Project accomplished in a Swedish municipality, this paper aims to elucidate and problematize challenges inherent in the process of developing research-based strategies for housing adaptation (HA) evaluations feasible for municipality contexts. In this paper, theory and conceptual definitions of client-level outcomes related to Swedish HA legislation—i.e. accessibility, usability, and activity—are presented. In order to lay the ground for the presentation and discussion on challenges, the Housing Adaptation Project is described with regard to design sampling and data collection, client-level outcomes and assessment instruments used, as well as longitudinal results. The challenges faced during the project were related to the assessment of outcomes, the logistic flow of the data-collection process, client availability for follow-up assessments as well as interpretation of changes in accessibility. Some challenges were due to the organizational HA framework in the municipalities, while others were related to the methodology used for outcomes assessment. Based on our experiences with this project, a set of evaluation recommendations for practice and research is provided.

**Key words:** *Assessment, home modification, occupational therapy, outcomes, research-based*

### Introduction

According to current Swedish building legislation (1), all housing should be accessible and usable for all citizens. When client-specific accessibility and usability requirements are not fulfilled despite this legislative requirement, they are often addressed by means of housing adaptations (HA) (2). This intervention aims at reducing the demands of the physical environment in the home and its close surroundings, in order to enhance activity and participation and to promote independence (2–5). In Sweden, the municipalities administer and finance HA, and the full costs can be granted based on certification by a healthcare professional, in most cases by an occupational therapist (OT). The client is the formal applicant and receiver of the HA grant and the municipality officials administer all applications. In 2004, the total number of HA in Sweden was 63 300, at a cost of SKr 835 million. Around 75% of the persons receiving HA grants were above 65 years of age (6).

Evaluation of different interventions is part of everyday practice in occupational therapy, and necessary as a basis for evidence-based practice (7). Evaluation is the systematic assessment of the relevance, efficiency, effectiveness, quality, and value of an intervention (8), while an evaluation strategy is the framework for an evaluation, aiming at providing theoretical and methodological guidance for the process (9). Evaluations can target client, professional, administrative, and/or political levels (10), thus referring to structures, processes, and outcomes, where outcomes denote the results or effects of the intervention (10).

In spite of the fact that HA is a common intervention within OT practice in the municipalities (3–5,11), in current practice evaluations of HA are often done ad hoc on the basis of the experience of the individual OT. Follow-up visits are often restricted to large-scale and complex adaptations, and the use of systematic procedures (3,5,12) is scarce. On the national level, evaluations of HA have

so far focused on economic and legal aspects of the intervention, with no intention to evaluate outcomes of HA on the client-level (6). In fact, there is a lack of research-based strategies useful for evaluation of HA in municipality contexts (3,5).

As argued in current Cochrane reports (13,14), the scientific evidence of the effects of HA is limited. However, studies among older people indicate preventive effects of HA on health in terms of a slower rate of functional decline (15), reduced fear of falling (16,17), reduced pain and depression (17), improved satisfaction and performance of daily activities (ADL) (11,18), as well as reduced costs for healthcare and social services (15). It should, however, be noted that in the majority of HA evaluations published no theory-based definitions of core concepts and outcomes have been presented.

#### *Theory relevant for evaluations of housing adaptations*

When it comes to theory supporting evaluations of HA, given the objectives of the intervention (2), the evident theoretical approach is the relationships between the person (P), the environment (E), described as P–E interaction, and the activities (A) included in the personal repertoire. When it comes to models describing P–E interactions, the most often referred to is Lawton's ecological model (19,20), describing the person as a set of competences and the environment in terms of its demands. When including the activity component (A), theoretical approaches targeting person–environment–activity (P–E–A) transactions can guide the research process (21–23), and such models have been developed within occupational therapy (23).

#### *Core concepts and potential client-level outcomes*

An important aspect of the outcomes chosen for an evaluation is that they should be valid in respect of the objectives of the intervention (9). That is, based on current legislation (1,2) and relevant theory (21–23), for outcomes of HA accessibility, usability and activity should be defined and further operationalized.

First, accessibility is a relative concept, representing the relationship between functional capacity (personal component), and physical environmental demands (environmental component) (24). The personal component (P) is based on objective information on a person's functional limitations and dependence on mobility devices, while the environmental component (E) refers to compliance with official norms and standards for environmental design (25). Second, usability is the subjectively

perceived aspect of the constraining or supportive impact of the environment on activity performance (3,5,24), thus involving P–E–A transactions (3,5). Third, activity is a set of tasks or actions that are carried out by an individual in his or her current environment (26). Activities make up the routine of everyday life, while activity performance denotes what an individual actually does in his or her environment (27), thus being the result of P–E–A transactions.

A first necessary step in order to evidence-base the effects of HA is to develop research-based evaluation strategies providing sufficient theoretical, conceptual, and methodological guidance. Given the complexity of the intervention, this, however, poses considerable challenges. Founded on recent empirical experiences and results from the Housing Adaptation Project accomplished in a Swedish municipality (3,5,28), this paper aims to elucidate and problematize challenges inherent in the process of developing research-based strategies for HA evaluations feasible for a municipality context. It is hoped that other researchers involved in studies focusing on evaluation of different kinds of interventions among clients living in their own homes can benefit from our experiences and solutions. In order to lay the ground for forthcoming presentations of some of the challenges in this kind of process the overarching aim and design of the Housing Adaptation Project are first presented, followed by a description of the project municipality, data collection, and sampling procedures, as well as client-level outcomes and assessments. Given the explicit focus of this paper on presenting the challenges inherent in the project, the presentation of the longitudinal results is restricted to a brief summary, while more detailed descriptions and discussions of the results are given elsewhere (3,5).

## **The housing adaptation project**

### *Overarching aim and project design*

The basis for this paper is a longitudinal project, the Housing Adaptation Project, accomplished in a south Swedish municipality during 1999–2001 (3,5,28). The overarching aim of the project was to develop research-based strategies for HA evaluations, feasible for use in municipality contexts. Accordingly, the project was designed with the explicit aim of reflecting the ordinary HA case management process in the municipality as much as possible.

The project was approved by the Ethics Committee, Lund University, Sweden.

### Project municipality

The municipality was purposefully selected based on active interest and motivation for involvement in the project among politicians, officials, and OTs in the municipality.

In January 1999 the municipality had around 74 000 inhabitants, living in urban as well as more sparsely populated areas. The demographic characteristics were similar to those of other municipalities in the region, and a wide variety of housing standards and conditions were represented. Annually, around 770 HA were granted in the municipality, the vast majority of them to clients staying in different healthcare facilities at the time of application. The HA case management process in the municipality follows the national legal framework for HA (2).

In the municipality, prior to project start evaluations of HA were restricted to the examination of applications and invoices, and accomplished by the municipality officials. No systematic strategies were used.

### Data collection and sampling

Data were collected on three occasions, with the first ( $T_1$ ) up to one month prior to HA start, the second ( $T_2$ ) between two and three months after HA completion, and the third ( $T_3$ ) after another six months. In cases where the HA had not started one month after  $T_1$ , a new  $T_1$  assessment should be

conducted. All data were collected by the municipality OTs ( $n = 14$ ) at home visits as part of the ordinary HA case management process. A local project coordinator (an OT holding the position of municipality official responsible for HA case management) coordinated the data collection. For an overview of the data-collection process, see Figure 1. Due to individual circumstances in each case, for example the diversity in the kinds of adaptations granted, the time span between  $T_1$  and  $T_2$  varied considerably (71–238 days).

Prior to project start, in order to obtain valid and reliable data all OTs underwent four days of project-specific training in data collection and administration procedures. In addition, 10 study-specific seminars with all OTs were held regularly throughout the project, led by the project leader (first author).

In order to obtain a mixed, realistic sample of clients living in ordinary housing, persons above 18 years of age considered for HA grants assessed by municipality OTs were enrolled consecutively. Excluded were terminally ill clients, clients who spent most of the day in bed/chair, and clients with communication problems. A total of 158 clients fulfilled the inclusion criteria, and of these 131 clients (88 women and 43 men, aged 24–93 years) agreed to participate at  $T_1$ . No significant differences between participants and non-participants were found with regard to age, gender, and level of ADL dependence. At  $T_2$ , 104 clients participated, and at

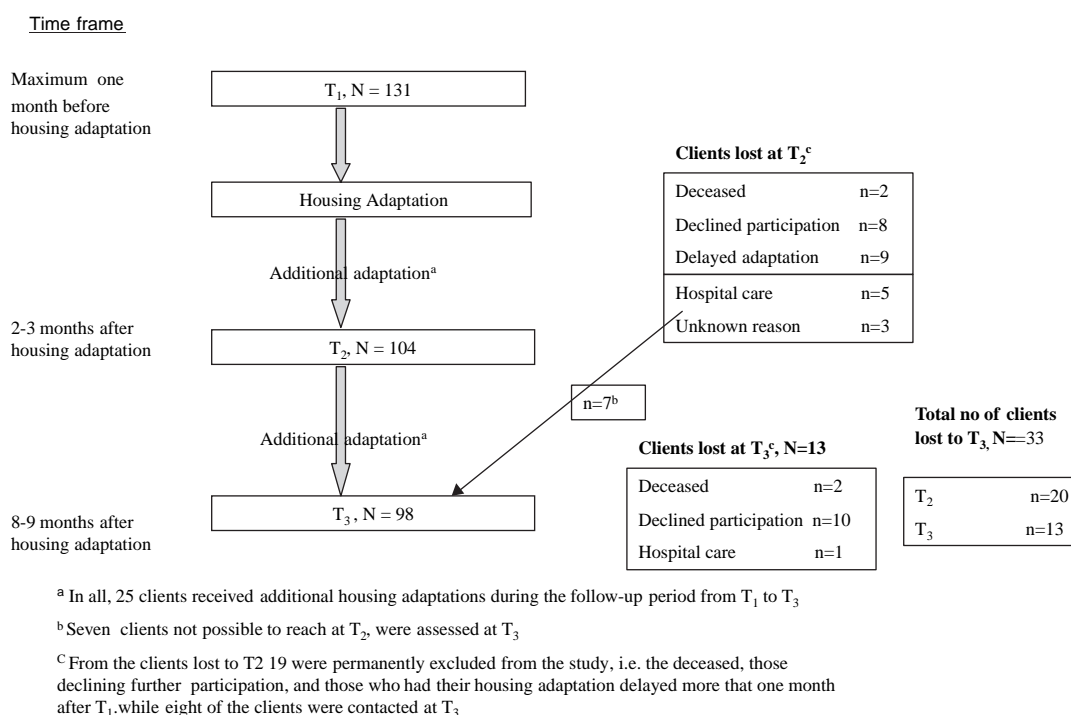


Figure 1. Overview of data-collection process and sample flow from  $T_1$  to  $T_3$ .

T<sub>3</sub> 98 clients. Compared with the 98 participants at T<sub>3</sub>, there were statistically significantly more men in the sample lost to T<sub>3</sub> (chi-squared test;  $p=0.033$ ), and the degree of ADL dependence was higher (Mann–Whitney U-test;  $p=0.0313$ ), see Figure 1.

#### *Client-level outcomes and assessments*

*Accessibility.* Accessibility was assessed by means of the Housing Enabler (29,30). It is an objective, valid, and reliable instrument for assessing and analysing accessibility problems in housing (P–E interaction), as well as the personal (P) and environmental (E) components of accessibility. The instrument is administered in three steps, utilizing a combination of interview and observation: The first step is an assessment of the presence of functional limitations (13 items) and dependence on mobility devices (2 items) in the individual (personal component). The second step comprises an assessment of physical environmental barriers (environmental component) in the home and the immediate outdoor environment (188 items) as present or absent. Around 70% of the barriers are defined and assessed based on norms and official guidelines, while the remaining barriers are defined and assessed based on professional judgement and expertise. Based on the assessments accomplished in the first two steps, the magnitude of problems caused by a particular combination of functional limitations/dependence on mobility devices and environmental barriers, i.e. the degree of accessibility problems in the home, can be calculated. A computerized tool for efficient data collection and analysis is available (31) (a demo version is also available at <http://www.enabler.nu>).

*Usability.* The self-administered Usability in My Home (UIMH) (32,33) was used to assess usability. It is a valid (32,33) and reliable instrument (32) that captures subjective evaluations of the home. The instrument comprises 23 items, of which 16 items are to be rated on a seven-step scale, with 1 indicating the most negative and 7 indicating the most positive response alternative. Examples of both items and rating scale are: “In terms of how you normally manage your washing up . . ., to what extent is the home environment suitably designed?” (1 = not suitable at all; 7 = very suitable), “How usable do you feel that your housing environment is in general?” (1 = not at all usable; 7 = very usable). The 16 items to be rated can be structured into three different aspects: Activity aspects (4 items), Personal and social aspects (6 items), and Physical environmental aspects (6 items) (33). In this respect, the three aspects reflect the P–E–A components inherent in usability. Data are analysed based on sum

scores for each aspect separately. Another seven questions are open-ended: six for definition of the type of usability problems experienced in different sections of the housing environment, and one for expression of any additional opinions (32).

*Activity.* In the Housing Adaptation Project activity was defined as activity performance in the home, that is, what an individual does in his or her home environment (27). Furthermore, activity was reflected in and assessed as part of the usability assessment outlined previously (32,33). Activity performance was further operationalized as ADL dependence, and assessed by means of the ADL Staircase (34,35), revised version (36). The ADL Staircase is an extension of Katz’s ADL Index (37), comprising five P-ADL items (feeding, transfer, going to the toilet, dressing, bathing) and four I-ADL items (cooking, transportation, shopping, cleaning), valid and reliable for use in the clients’ own homes (34,35). The assessment is recorded on a three-grade scale, dependent/partly dependent/independent, with dependence denoting dependence on other persons. For statistical analyses, the use of ADL ranks (38,39) is recommended.

#### *Statistical analyses and longitudinal results of the Housing Adaptation Project*

In all analyses, changes from T<sub>1</sub> to T<sub>3</sub> as well as separate pair-wise analyses from T<sub>1</sub> to T<sub>2</sub> and from T<sub>2</sub> to T<sub>3</sub> were conducted by means of a Sign test (accessibility, usability, ADL dependence, number of environmental barriers, as well as functional limitations and dependence on mobility devices), and McNemar’s test (single environmental barriers, functional limitations, and dependence on mobility devices items) (3,5,39).

With regard to the longitudinal results, both improvements and declines were indicated in all outcomes targeted. However, the pattern of improvements and declines was complex, with some changes occurring early after the HA, that is between T<sub>1</sub> and T<sub>2</sub>, while others occurred between T<sub>2</sub> and T<sub>3</sub>. An overview of the results from T<sub>1</sub> to T<sub>3</sub> is presented in Figure 2. In more detail, between T<sub>1</sub> and T<sub>2</sub> housing accessibility improved and the number of functional limitations and dependence on mobility devices increased, while the number of environmental barriers declined throughout the whole process (5). In overall ADL dependence no significant changes were found at any time in the HA process. However, between T<sub>2</sub> and T<sub>3</sub> dependence declined in the single item Bathing ( $p=0.020$ ) (3). Finally, when it comes to usability, improvements in

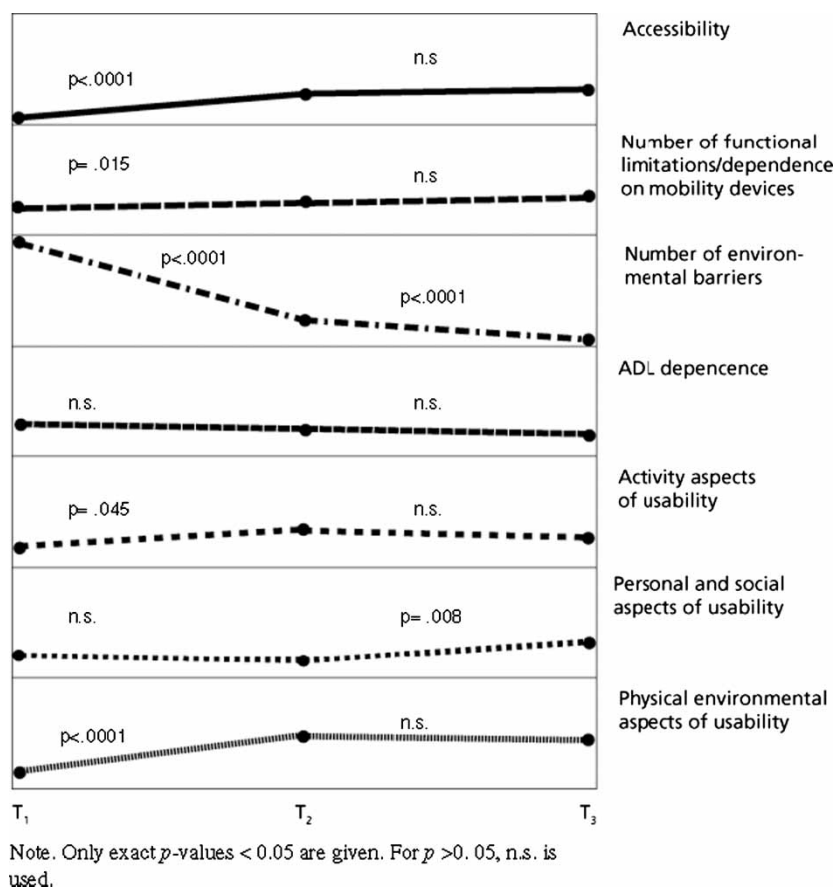


Figure 2. Graphical illustration of longitudinal changes in outcomes investigated in the Housing Adaptation Project.

activity aspects and physical environmental aspects were restricted to the time between  $T_1$  and  $T_2$ , while changes in personal and social aspects of usability occurred between  $T_2$  and  $T_3$  (3,5).

### Challenges in the development of housing adaptation evaluation strategies

In the Housing Adaptation Project a number of challenges were faced. These were related to assessment of client-level outcomes, the logistic flow of the data-collection process, client availability for follow-up assessment, and interpretation of changes in accessibility. Some of the challenges presented are more general in character and might be faced in any evaluation project, while others are specific to evaluation studies targeting HA in a Swedish municipality context.

#### *Challenges in the assessment of client-level outcomes*

For reliable data collection, data collectors must be trained in instrument administration and introduced to assessment goals and study objectives (40). Both the ADL Staircase and the UIMH instrument are easy to administer and use, and often the OTs were

able to collect valid and reliable data for the project after one introductory session.

On the other hand, when it comes to the Housing Enabler instrument, due to its construction substantial data-collector training is imperative for valid and reliable assessments (29). In relation to this, a major challenge faced in the Housing Adaptation Project concerned the accessibility assessments. More specifically, during the data-collection period, for different reasons and at different times there were changes in the data-collector team compositions, which posed challenges for the establishment of continuing training procedures. When needed, throughout the whole project training courses were held by the project leader (first author), and more experienced OTs served as supervisors for their new colleagues. In spite of this, newly employed colleagues were sometimes responsible for all OT services within a geographical area without having any training in Housing Enabler assessments. In order to assure that valid and reliable accessibility data were collected some of the trained OTs had to collect data for the project during a shorter time period. Such extra tasks added to the total workload among the trained OTs, and obviously were considered very stressful.

*Challenges related to the logistic flow of the data collection process*

One of the major challenges faced was related to the difficulty in obtaining the information necessary to guarantee that the time span between assessments was correct in each case. That is, information on start and completion of the HA was crucial to allow for  $T_1$ ,  $T_2$ , and  $T_3$  assessments to be conducted in due time.

The first challenge regarded  $T_1$  assessments, and the fact that they should not be conducted more than one month prior to HA start. Prior to project start, the impression of the municipality officials was that all HA had started within a month from needs assessment and application. However, during the project we discovered that for various reasons this was not the case for all. The reasons were due for example to delays in the delivery of necessary assistive technology, e.g. automatic door-openers, or to specific client needs coming up during the process. In such cases, according to plan a second  $T_1$  assessment should be conducted. However, in some cases the clients were not available for a second assessment, while in other cases the project coordinator or responsible OT was not informed of the delay, and accordingly could not conduct a second  $T_1$  assessment. In all, nine clients dropped out of the project for this kind of reason (see also Figure 1).

Next, with regard to the time for HA completion, similar problems were discovered. The time for  $T_2$  assessment was decided on in a telephone call from the local project coordinator to the client, at the same time making sure that the HA was completed and at what point in time. At the home visits for  $T_2$ , however, in some cases it was discovered that not all HA were completed according to plan. In some cases no information was available from the client, the OT, or the municipality officials on the reasons why the adaptations had not been completed, or on the time plan for completion. With regard to the clients, the majority of them were not able to give detailed information on dates for start and completion of the HA. Moreover, the clients were seldom informed about the reasons for delays, and they were sometimes not able to give information as to whether they had any special agreements with the carpenters in this respect. For some clients relatives or social services staff had more information, but this was not the case for all. With regard to the OTs or municipality officials, most of the time they did not have that kind of detailed information concerning ongoing HA cases. The challenges inherent in this may also be explained by the fact that for some of the clients living in multi-dwelling blocks, other renovation projects initiated by the house owner were

ongoing in parallel to the HA process. This most probably made it difficult for the clients to identify the adaptations made specifically within the HA process from other environmental changes, and accordingly to give information on HA start and completion.

During the project process the local project leader developed different strategies for obtaining necessary information on the HA case management process for each individual. For example, the OTs were asked to follow their cases in more detail, and to report start and completion dates to the local project coordinator, while the clients were asked to write down the dates for HA start and completion. Contacts were also made with the carpenters involved in order to obtain a detailed time plan for the HA. These strategies were introduced on a client-specific basis, at very high cost in terms of time and effort, in particular for the local project coordinator and the project leader. Even so, some clients dropped out due to the fact that it was not possible to define the points in time for HA start and completion (see also Figure 1).

*Challenges related to client availability for follow-up assessment*

Another challenge faced concerned the possibility of getting in contact with the clients in due time for the follow-up assessment ( $T_2$  and  $T_3$ ). In the project, many of the clients were older and frail and they often became in need of medical care and/or long-term rehabilitation. In addition, during the summer some clients also spent their holiday away from home, and thus it was not always possible to reach them for home visits at  $T_2$  and  $T_3$ . In addition, four participants died after  $T_1$ . In order to reach as many clients as possible the OTs tried to obtain updated client information from different sources, e.g. healthcare and social services staff. However, some clients were impossible to reach and thus dropped out of the project (see also Figure 1).

*Challenges related to the interpretation of changes in accessibility*

When it comes to accessibility, as well as the personal and environmental components of accessibility, the interpretation of the longitudinal changes turned out to be a challenge.

As expected, a decline in the prevalence of environmental barriers was identified between  $T_1$  and  $T_2$ . More surprisingly, a significant decline was also identified between  $T_2$  and  $T_3$ . Given the fact that 25% of the participants were granted another HA before  $T_3$ , this must have contributed to the

results. However, when it comes to accessibility, in spite of the fact that the prevalence of functional limitations and dependence on mobility devices improved between  $T_1$  and  $T_2$ , the magnitude of accessibility problems declined during the same time period. This indicates that the adaptations made during the first phase of the HA process were tailored to each individual's functional limitations and mobility devices dependence, while this seems not to be the fact when it comes to the adaptations made in the time between  $T_2$  and  $T_3$ .

As expected from the beginning of the project, in parallel with the HA process general indoor and outdoor housing renovations or reconstructions were initiated by the house owner, or the municipality. These interventions were not specifically designed for the individual client but obviously contributed to a reduction of environmental barriers. However, the magnitude of the renovation projects was considerably larger than could have been foreseen. Moreover, client-specific recommendations for environmental interventions not eligible for an HA grant, e.g. removal of carpets, were often given by the OTs, thus promoting proactive adaptations. Even if the environmental interventions outside the scope of HA contributed to the reduction of environmental barriers and improved accessibility, they constitute a considerable challenge throughout the evaluation process. Within the Housing Adaptation Project strategies to collect data around major renovation projects were developed, for example by establishing close contact with landlords etc.; however, in this regard systematic analyses could never be conducted.

## Discussion

Based on the longitudinal Housing Adaptation Project aiming at developing strategies for HA evaluations, this paper reports on some of the major challenges faced during the project process. Challenges related to assessment of client-level outcomes were elucidated, followed by descriptions of challenges related to the logistics in the data-collection process, to client availability for follow-ups, and to the interpretation of changes in accessibility. In relation to this, strategies used to overcome the problems faced along the project process have also been presented.

Traditionally, scientific publications report different study limitations and methodological challenges rather restrictively and therefore this kind of experience is rarely available in the scientific literature. In addition, evaluations of HA are in general restricted to demographic and financial follow-ups accomplished by the authorities (6), combined with

examination of invoices in each municipality. However, such evaluations do not determine the challenges identified in the Housing Adaptation Project. Even if some of the challenges faced were municipality specific and specific to HA, we consider it important to inform practitioners and researchers about them. In this respect this paper is a contribution to the methodological literature in the research field.

A particular challenge faced was related to accessibility assessments, and the use of the Housing Enabler instrument (29). To be able to accomplish valid and reliable Housing Enabler assessments, systematic rater training is necessary prior to assessment. As seen in our project, this poses significant challenges since training options need to be available on a regular but flexible basis for newly appointed OTs. More importantly, however, given the fact that the environmental component of the Housing Enabler is based on norms and guidelines for building design, while at the same time the objective of a HA is to reduce the demands from the environment for a particular client irrespective of norms and guidelines, its validity as an outcome assessment in HA evaluations can be questioned. Instead, based on our experiences from this and parallel projects (22), the primary advantage of using the Housing Enabler is that it structures the data collection underlying the planning of the intervention. Since data collection prior to HA in current practice is most commonly unsystematic (4,12), this advantage should not be underestimated.

When it comes to the two remaining outcomes defined and assessed for the Housing Adaptation Project, that is, usability and activity, they are important items to discuss. First, usability was assessed by means of the UIMH instrument, thus directly targeting a core outcome of an HA. As illustrated by the longitudinal results, the instrument seems to be responsive to changes over time in an HA process, and also, as verified by the OTs collecting data for the project, another important feature for practice use is that the instrument is rapid and easy to administer. Accordingly, it is suitable for HA evaluations. Next, activity was reflected in two different ways: in the usability assessment and in ADL dependence. When it comes to ADL dependence, the ADL Staircase (34,35), revised version (36) is one of the few instruments that are valid and reliable for use in municipality practice, thus being suitable for HA evaluations. However, since the measurement level in the ADL Staircase is as strict and relatively insensitive as dependence/independence, the instrument might not be sensitive enough to detect subtle changes following HA, as also indicated by the longitudinal results (see Figure 2).

In usability assessments, positive effects on activity performance, such as adaptations that are facilitating for caregivers (18) or reduced efforts needed for activity performance, are discovered. Such effects are not necessarily detected as changes in ADL dependence, indicating that the UIMH instrument (32,33) and the ADL Staircase (34,35), revised version (36) would be an effective combination of instruments for evaluation of activity in relation to HA. Given this, this paper also provides OTs working in the municipalities with a methodology that has proved useful for conducting evaluations of HA.

Other challenges important to comment on are those related to the logistic flow of the data-collection process and the considerable difficulty of obtaining information on the start and completion of HA. Prior to project start, the possibility of obtaining detailed information on the dates for HA start and completion was discussed thoroughly with OTs and municipality officials involved in HA case management. No one could foresee any problems but during the project process the difficulty of obtaining such information turned out to be a major problem. Since these affected the project monitoring process, and also contributed to dropouts, for future evaluations of HA strategies aiming to minimize such problems need to be developed prior to project start.

Taking the client perspective, it was obvious from the problems experienced in our project that many of the clients did not have any or had very little information on the different steps in their own HA process. Many different actors are involved in each individual HA process, such as OTs, municipality officials, carpenters, etc., thus probably leading to confusion over whom to contact when problems occur. Also, given the fact that other renovation projects were ongoing in parallel with the individual HA process it is understandable that the clients could not differentiate the HA process from, for example, an ordinary renovation. Most important, however, since an HA often is only one intervention among others in a complex healthcare and rehabilitation process, a delayed HA might have implications for other intervention decisions, for example prescription of technical devices. Consequently, for efficient case management there is a need for the OTs to obtain detailed information on the progression of the HA process for each individual. Otherwise, there is a considerable risk that the lack of information might lead to overall quality deficiencies both in the healthcare and social services delivery process within the municipalities (41) and with regard to the specific HA process (42).

To a large extent the problems described are due to the legal process around HA case management

and the fact that no one is responsible for following the entire HA case management process. As recently pointed out by Swedish user organizations (12), given the construction of the legal framework and the number of actors involved in an HA process, the possibilities for clients to be actively involved in the HA process might be considerably restricted, and the risks of not receiving HA suitable to needs are substantial. In this respect, one can seriously question whether the HA process is monitored with the needs and conditions of the client in focus, that is, whether the HA process is client-centred (27).

When it comes to client availability for follow-up assessments and the dropout rate in the Housing Adaptation Project these are worth commenting on. Participation in longitudinal studies is time consuming and demanding for clients, and even if such experiences were rarely voiced among our clients, given the fact that the majority of HA clients are frail and older (6) the risk of dropout over time is considerable (43). However, it is worth noting that the dropout rate in the Housing Adaptation Project was relatively low compared with what can be expected in this target group [see e.g. 43]. Most probably, this is thanks to the active involvement of the clients' ordinary OTs and their considerable efforts in making follow-up assessments possible. Moreover, the value of engaging a local project coordinator with long experience of HA case management and a personal contact network in the municipality cannot be overestimated.

To sum up the challenges elucidated and problematized in this paper, it is obvious that some of them are consequences of the organizational frameworks around HA in the municipalities, while some challenges are related to the outcomes and the choice of assessment instruments valid for the outcomes of HA. Moreover, the fact that the physical housing environments assessed for the project changed for a variety of other reasons than as a result of the HA constitutes a real challenge. On a general level, the challenges met in the Housing Adaptation Project illustrate that the HA process is very complex with different actors involved, and thus is difficult to monitor for clients (6,12). Accordingly, it is obvious that large benefits could be made by developing the organizational framework for HA case management in the municipalities towards being more client-centred. In this respect, assigning an HA case manager to each client could be one solution. Moreover, from an overall HA evaluation perspective it is obvious that, due to the complexity of the HA process and the magnitude of other interventions and adaptations targeting the client in his or her environment, it is difficult to interpret the outcomes.



It should be kept in mind that the Housing Adaptation Project constituted the first steps towards developing and testing research-based strategies for scientific evaluations of HA, and thus restricted its methodology to client-level outcomes. In the project the HA itself had to be considered as a “black box”, with for example the type of intervention and time for completion only descriptively investigated. For future development of research-based HA evaluation strategies thorough investigation of the intervention itself in terms of, for example, types and costs of adaptation granted, other parallel healthcare, and social services interventions is crucial. In this respect, the challenges described in this paper provide important background information.

To conclude, the challenges faced within the Housing Adaptation Project illustrate that conducting research in complex municipality contexts is a major challenge for all actors involved. Based on the fact that the project was designed to reflect the ordinary HA process, and was accomplished in close collaboration with the municipality, the challenges faced reflected current practice around HA. Accordingly, they might be faced in any HA evaluation accomplished, at least in Sweden. Moreover, the outcomes chosen and the methodology used seem valid and reliable for evaluations of HA. Based on this, we now are in a position to be able to give some recommendations regarding the evaluation of HA on the client level:

1. Usability and activity are adequate target outcomes, based on the legislative framework around HA.
2. The UIMH instrument is recommended for collecting data on usability, and the ADL Staircase is recommended for collecting data on ADL dependence.
3. It is recommended to use the Housing Enabler instrument in order to structure the data-collection process.
4. Active involvement of OTs and municipality officials exercising public authority in HA grant decisions and case management, as well as establishing contacts with carpenters, landlords, and house owners, is crucial for successful monitoring of the evaluation process.
5. Prior to evaluation start, detailed strategies to obtain the necessary information on renovation projects affecting the physical housing environment of the clients and information related to the progression of each client's HA process should be established.

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