# The use of umbrellas, hiking poles and walking sticks to aid walking in Hong Kong

Tulio P.S. Maximo[1,2], Newman Lau [1]

[1] *The Hong Kong Polytechnic University,* [2] *Asian Lifestyle Design Lab*

## INTRODUCTION

Walking aids are among the most used types of assistive technology (AT) and are included in the World Health Organization (WHO) Priority Assistive Products List [1]. As our physical capabilities decrease with age, stick-shaped devices like canes and hiking poles can help people maintain or improve balance and reduce weight bearing on one or both legs [2]. Besides, it can alleviate pain from injury or clinical pathology, compensate for weakness or impaired motor control of the leg [2]. Beyond the clinical benefits, the use of walking aids can increase older adults' confidence and feelings of safety, which, in turn, can raise their levels of activity and independence [3]. The use of a cane and similar stick-shaped devices is the entrance for many people to the world of ATs, often accompanied by the inherent stigma of aging and disability.

In comparison, eyeglasses have been transformed from medical necessity to fashion accessories [4]. The eyewear revolution has come about through embracing the design culture of the fashion industry [4]. Beyond aesthetic values, design can contribute to a better understanding of human behavior and contribute with solutions to complex problems such as matching person and technology, training for AT use, and support habit formation for effective interventions.

People often purchase walking aids directly, without support for an informed decision and training to use and maintain the device [5,6], which in turn may lead to misuse or discontinuance of the device [5,7,8]. The misuse of walking aids may cause discomfort and pain, contribute to the development of pathologies on the upper-extremity joints, and lead to improper posture, which could lead to additional risk of falls [2,5]. In Hong Kong, the Consumer Council found over 55% of the sample of 30 walking sticks and 90% of a sample of ten 'cane umbrellas' failed at least one of the safety tests, and 100% of 'cane umbrellas' sample without instruction manual [9]. There is a need to empower the user to be capable of responsible choices when they purchase ATs directly [5,6,10].

This research aimed to investigate people's perception of disability and stigmas associated with the use of walking aids in Hong Kong. It raised the hypothesis that people prefer to use devices less associated with aging and disability to support walking, such as umbrellas and hiking poles, to reduce the stigma of disabilities. The study aims to understand the Hong Kong population's needs using walking sticks and similar stick-shaped devices to provide insights on the design and service provision of devices obtained directly by end-users.

## METHODS

### Design

The study adopted a design ethnography approach, including structured observations on the field and semi-structured interviews. The structured observations aimed to understand the patterns of use and how people act with the walking aid in a natural context without any interference. The semi-structured interviews aimed at understanding the stigmas and feelings associated with walking aids use, including the use of devices not designed to aid walking, like standard umbrellas. The interviews also aimed at understanding the barriers to acquisition, training for use, and design requirements of stick-shaped devices used to aid walking in Hong Kong. There was no contact with or connection between the people observed and the interview participants. The study was approved by the Departmental Research Committee of The Hong Kong Polytechnic University, reference number HSEARS20190417003. This article will focus on reporting the results of the observation and the preliminary interview findings.

### Structured Observations

The structured observations were conducted using the AEIOU observation framework. AEIOU stands for Activities, Environments, Interactions, Objects, and Users [11]. The framework was employed to guide data collection and categorize collected data. The research team acted as a complete observer of the activities without revealing its identity, making notes, and photographing public areas for detailed analyses under the AEIOU acronym themes. A sample of 391 people was observed in their natural environment. The criteria included adults living in Hong Kong and using any of the following stick-shaped devices to support walking: adjustable canes,

folding canes, canes with fixed height, crafted wood sticks, quadripod sticks, hiking poles, umbrella canes with ferrules, and standard umbrellas without ferrules. White cane and crutches were excluded from the study. Eighty-three cases were excluded during analyses for not meeting the stipulated criteria, totaling 308 cases analyzed. People were observed in various regions and places, including streets, parks, playgrounds, malls, underground stations, and other public areas.

**Semi Structure Interviews**

Participants for the semi-structured interviews were selected with the same including criteria of the structured observations. Participants were invited using a network of academic and civil society institutions in Hong Kong, including The Institute of Active Ageing and The Hong Kong Society for Rehabilitation. Participants were offered a shopping voucher as an incentive for participation. A total of 24 participants were interviewed, being 16 females and eight males. More male participants are being sought as the results of the observations pointed to significant gender differences in walking aid use. The aim is to interview a similar gender proportion revealed from observations even though data saturation seems to be reached as little new information has been generated after the 20th interview. The interview contained questions related to lifestyle and device use (e.g., activities performed with the device, the context of use, frequency of use), pre-existing health conditions (e.g., the reason for device use, pain scale, pain location), AT service provision (e.g., device prescription, acquisition, training). It also contained questions related to feelings (e.g., perception of disability, positive and negative emotions associated with the device use) and design requirements (e.g., previous issues, preferred features, expected features).

The interviews were conducted face-to-face or through face-calls. In both interview modes, participants were given an information sheet and a consent form previous to participation. Face-to-face interview' participants read and signed the consent form while face-call participants read the consent form and had their agreement recorded. Interviews occurred in English or Cantonese, according to participants' preferences. All interviews were recorded and the audio transformed into a transcript. Interviews conducted in Cantonese were translated to English by a research team member speaking Cantonese as the first language and holding two master's degree in English studies.

**Analysis**

Data collected were analyzed using a theoretical thematic analysis approach and some grounded theory practices, such as memoing and concurrent data generation and collection [12]. The analyses started from a deductive approach – or theoretical thematic analysis – for which categories were defined prior to data collection. Observations categories utilized the AEIOU framework and the interview categories grounded on AT service delivery good practices [10] and human-centered-design good practices [11,13]. All categories created using the deductive approach had a description of the including criteria to guide the research team. As analyses progressed, the inductive approach was included, in which new themes were created strongly linked to collected data. A memo was created to keep track of the categories' changes, and cases analyzed earlier were revised for new themes. The research team held regular meetings to review the themes and cases. The Principal Investigator (leading author) revised all cases when data collection was concluded. All data collected, including reviewed articles, photos from observation, interview audio and transcripts, and the signed consent forms, were stored and analyzed using the Qualitative Data Analysis Software NVivo Plus 12. The access to NVivo files was restricted to the research team, who signed a non-disclosure agreement.

**RESULTS**

The observations revealed an approximate proportion between females (52%, n=159) and males (48%, n=149) using stick shaped devices to aid walking in Hong Kong. A similar proportion was observed between people using umbrellas (33%, n=100) and adjustable walking sticks (32%, n=98). Nonetheless, more females (n=58) were observed using adjustable walking sticks than males (n=40). As for the types of umbrellas observed, more males (n=38) were using standard umbrellas than females (n=10), and more females (n=33) were using cane umbrellas with ferrules than males (n=19). Hiking poles accounted for the third most observed type of stick-shaped walking aid device (n=19%, n=57), with 31 females and 26 males observed. Sticks with fixed height accounted for 10% of the observed cases (n=31). More males (n=15) were observed using a crafted wood stick with fixed height than females (n=3), while more females (n=10) were observed using off-the-shelf sticks with fixed height than males (n=3). A small proportion of people (5%, n=14) were observed using unconventional devices to aid walking, such


**Figure 1 Word cloud of adjectives related to walking aid use**

as a baby stroller, a piece of tube, or a wooden pole not fabricated to aid walking. Devices without a medical appeal, such as umbrellas, hiking poles and unconventional devices were observed in 56% of the sample (n=171).

Initial analyses of the interview data reveal a mostly positive attitude towards walking aids devices and associated perception of disability. When asked to rate how disabled they feel when using their walking aid devices, most interviewees responded that they do not feel disabled (46%, n=11) or feel slightly disabled (42%, n=10). Only three interviewees felt moderately disabled, and one felt very disabled. Interviewees were given eight positive adjectives and eight negative adjectives to represent how they feel when using the walking aid device. Figure 1 presents the word cloud of interviewees' responses, on which the size of the word increases with the number of mentions. The interviewees had an average of 2,17 stick-shaped walking aid devices, and 54% had more than one type. 62% of interviewees (n=15) mentioned that a healthcare professional prescribed the walking aid, while 38% (n=9) self-prescribed the device. The majority of interviewees (87%, n=21) purchased off-the-shelf devices themselves, from which only six received support from the seller.

## DISCUSSION

Previous studies on walking aids in Hong Kong include a broad range of devices such as walking frames, walking sticks, and crutches. Therefore, we could not compare the data with previous studies but identify similarities. Regarding the private purchase of AT devices, one survey conducted with rehabilitation professionals (n=443) and AT end-users (n=787) in Hong Kong revealed that 50% of the AT end-user respondent group has paid for their AT devices, from which 34% were walking aids. Walking aids were the second most prescribed AT devices by rehabilitation professionals, referred by 74.8% of respondents [6]. Nonetheless, walking aids were not listed within the groups of devices not obtained due to lack of financial support, as end-users claimed. Those results corroborate our findings that, despite 62% of the interview participants had their devices prescribed by a healthcare professional, 87% purchased the devices themselves. Accumulate knowledge from our studies and previous researches shows a strong indication that stick-shaped walking aid devices such as cane and hiking pole are often purchased in Hong Kong through a consumer model of AT service delivery on which the user decides on the devices and purchases them directly. However, such a model can only work if users are empowered to make informed and responsible choices and be accountable against the intended objectives [10]. The fact that a high percentage of people observed (33%) and interviewed (28%) use umbrellas to aid walking, and that 100% of 'cane umbrellas' tested by the Consumer Council in Hong Kong were found without instruction manual [9] pose its users at risk [2,5,7,8]. There is a clear need to raise awareness of the dangers of using umbrellas to aid walking and empower people to make informed decisions when purchasing walking aid devices themselves. Also, there is a need to support the walking aid and umbrella industry as well as its points of sales to provide more information on the device use, misuse, training, and maintenance.

## CONCLUSIONS

The study results indicate a preference within the Hong Kong population for using stick shaped devices without a medical appeal to aid walking, such as umbrellas and hiking poles. The study indicates that end-user often purchases such devices themselves without support from the seller. The feelings associated with the use of stick-shaped devices are mostly positive. There is a low perception of disability related to the device use, often linked to devices without medical appeals such as umbrellas and hiking poles. There is a clear need to raise awareness of the risks from using umbrellas to aid walking and empower the user to make informed decisions when purchasing walking aid devices themselves. In addition, there is a need to support the chain of supply of the walking aids, including umbrellas and hiking poles, to provide more information on the device use, misuse,

training, and maintenance. More interview data is being collected to better understand gender differences and associated stigmas to walking aid use in Hong Kong.

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