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ABSTRACT

Health locus of control (HLOC) may influence people's behavior regarding their health as well as their desires to be involved in the medical decision-making. Our study aimed to examine HLOC's relations with people's control preferences about the medical decision-making. A total of 153 people filled out the self-administered version of the Control Preference Scale and the Multidimensional Health Locus of Control Scale – form C. The most preferred role is the collaborative one. However, HLOC explained heterogeneity in people's control preferences: lower scores in external HLOC were related to a greater preference for the active and the collaborative role. From the personalized medicine perspective, an accurate evaluation of the patient's HLOC could help tailoring the decision-making process within the clinical context.

1. Introduction

Health locus of control (HLOC) is defined as 'a person's beliefs regarding where control over his/her health lies' (Wallston et al., 1994, p. 534) and has a central role in health care (Janowski et al., 2013). People with an internal HLOC believe that their behavior influences their health, while people who believe that their health is influenced by others (e.g. doctors or caregivers) or by fate or chance have an external HLOC (Wallston et al., 1994). HLOC can explain healthy and preventive behaviors and influence people's preferences about treatment decision-making (Hashimoto & Fukuhara, 2004). Patients who want more control (internal LOC) tend to seek more information. Patients with external LOC, conversely, delegate decisions to physicians or other 'powerful' people (Affleck et al., 1987; Hashimoto & Fukuhara, 2004).

Even though it is still a debated topic (Blumenthal-Barby et al., 2019), literature seems to indicate shared decision-making (SDM) as a useful practice when facing medical decisions (Coulter, 1997; Gorini & Pravettoni, 2011; Henselmans et al., 2015). The risk that the clinician would approach the SDM process as omniscient influencing patient's choice is balanced by

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the focus on keeping the patient informed and to proceed jointly toward the decision (Fridman et al., 2015; Henselmans et al., 2015) as the '[…] health team and patients work in partnership to make healthcare decisions' (Renzi et al., 2016, p. 135). Different instruments exist to measure SDM's application (Simon et al., 2007) and its effects on the care process and patients' clinical outcomes (i.e. less distress related to symptoms, depression and anxiety, more satisfaction with physicians and compliance) (Bailo et al., 2019; Fallowfield et al., 1990; Greenfield et al., 1985; Morris & Royle, 1988; Schulman, 1979).

However, individual differences in patients' preferred role in treatment decisions (i.e. control preference, CP) (Russo et al., 2019) are relevant to explain heterogeneity of CP. The relationship between the HLOC and CP in the medical care context is studied in the previous literature (Nomura et al., 2007; Schneider et al., 2006). However, to our knowledge, only a few studies considered HLOC in all its dimensions in general population.

This study is part of a broader research project to evaluate the role of individual and contextual factors in determining patient CP (for a detailed description, see Monzani et al. (2020)). The aim of this study is to evaluate the associations between HLOC and its dimensions, and patient CP when evaluating treatment alternatives. We considered the *internal, chance, doctor*, and *other people* dimensions to understand whether patients with higher *internal* HLOC or lower *doctor* HLOC would exhibit higher preference for the active role and lower preference for the passive roles than patients with lower *internal* LOC. We did not advance any specific hypothesis for *other people* HLOC and *chance* HLOC in shaping CP.

2. Methods

We recruited through social media and volunteers a convenience sample of 153 people composed of young adults and adults (mean age: 40.32; women: 60.1%). The study was conducted in compliance with the Declaration of Helsinki ethical standards. People enrolled filled out an online consent form and an assessment of sociodemographic variables, control preferences, and multidimensional HLOC on Qualtrics.

People responded to the image-revised self-administered version of the Control Preference Scale (CPS) (Degner et al., 1997; Solari et al., 2013). This scale was developed to evaluate CP by considering five illustrated vignettes with accompanying statements displaying the five different roles people may play in the medical decision-making: 'I prefer to make decision about which treatment I will receive' (A-active role), 'I prefer to make the final decision about my treatment after seriously considering my doctor's opinion' (B-active-collaborative role), 'I prefer that my doctor and I share responsibility for deciding which treatment is best for me' (C-collaborative role), 'I prefer that my doctor makes the final decision about which treatment will be used, but seriously considers my opinion' (D-passive-collaborative role), and 'I prefer to leave all decisions regarding treatment to my doctor' (E-passive role). Participants were asked to imagine of being sick and going to their doctors to discuss about their health status, pay attention to each CPS vignette, and state their CP. We administered the CPS presenting people with ten paired comparisons (paired comparison method) (i.e. AB, BC, CD, DE, AC, BD, CE, AD, AE). Each time, people were asked to choose the vignette they preferred.

HLOC was measured with the Italian version (Ubbiali et al., 2008) of the Multidimensional Health Locus of Control Scale – form C (Ross et al., 2015; Wallston

et al., 1994), an 18-item scale assessing *internal, chance, doctor, and other people* HLOC dimensions. People reported their agreement with each statement on a 6-point Likert scale (from 1 = strongly disagree to 6 = strongly agree).

3. Results

Log-linear Bradley-Taylor (LLBT) model analyses were implemented with the R package Prefmod (Cattelan, 2012; Hatzinger, 2017; Hatzinger & Dittrich, 2012) to analyze people's CP. The model allows to analyze paired-comparison data and estimate people's relative worth (π) for each of the five options on a preference scale that sums to one. A greater preference for a specific CP role was indicated by a higher estimated probability (EP) of being preferred. The EP indicates the probability of preferring option x in a comparison between x and the reference category y. For example, the EP of choosing option 'active role' versus option 'passive role' is computed as $\pi_{Active}/(\pi_{Active} + \pi_{Passive})$. We performed four separate models, one for each dimension of HLOC by its dimensions as predictors of CP. HLOC dimensions were median-splitted because the Prefmod package allows the inclusion of only categorical predictors.

The collaborative role is the preferred one (C; π =.53); instead, the least preferred one is the passive role (E; π = .03). Since the passive role was the least preferred option, it was chosen as the reference category in all subsequent analyses.

Results of the first model evaluating the association of *internal* dimension of HLOC with CP showed that differences in HLOC were not related with preference for any of the five options of control preferences. Similarly, also *chance* HLOC was not related with heterogeneity in people's CP. However, differences in both *doctor* and *other people* HLOC were associated with people's CP. Specifically, *doctor* HLOC was related with differences in A-active role (estimate = −0.53, SE = 0.14, p < .001), B-active collaborative role (estimate = −0.56, SE = 0.15, p < .001), and C-collaborative role (estimate = −0.37, SE = 0.16, p = .024). As shown in Figure 1, people with low *doctor* HLOC were more likely to prefer the 'active' (EP = 73.87%), the 'active collaborative' (EP = 94.14%) and the 'collaborative' role (EP = 96.85%) versus the reference category 'passive' than people with high *doctor* HLOC (active: EP = 49.58%; active-collaborative: EP = 83.95%; collaborative: EP = 93.61%). A similar pattern was found for *other people* HLOC that was related with differences in A-active role (estimate = −0.47, SE = 0.14, p < .001), B-active collaborative role (estimate = −0.53, SE = 0.15, p < .001), and C-collaborative role (estimate = −0.61, SE = 0.16, p < .001).

As shown in Figure 2, people with low *other people* HLOC are more likely to prefer the 'active' (EP = 70.03%), the 'active collaborative' (EP = 93.11%), and the 'collaborative' role (EP = 97.10%) versus the reference category 'passive' than people with high *other people* HLOC (active: EP = 47.86%; active-collaborative: EP = 82.54%; collaborative: EP = 90.95%).

4. Discussion

Our study investigated links of people's HLOC with CP. We focused on lay people since only few studies have been conducted on general population while evaluating all HLOC dimensions.
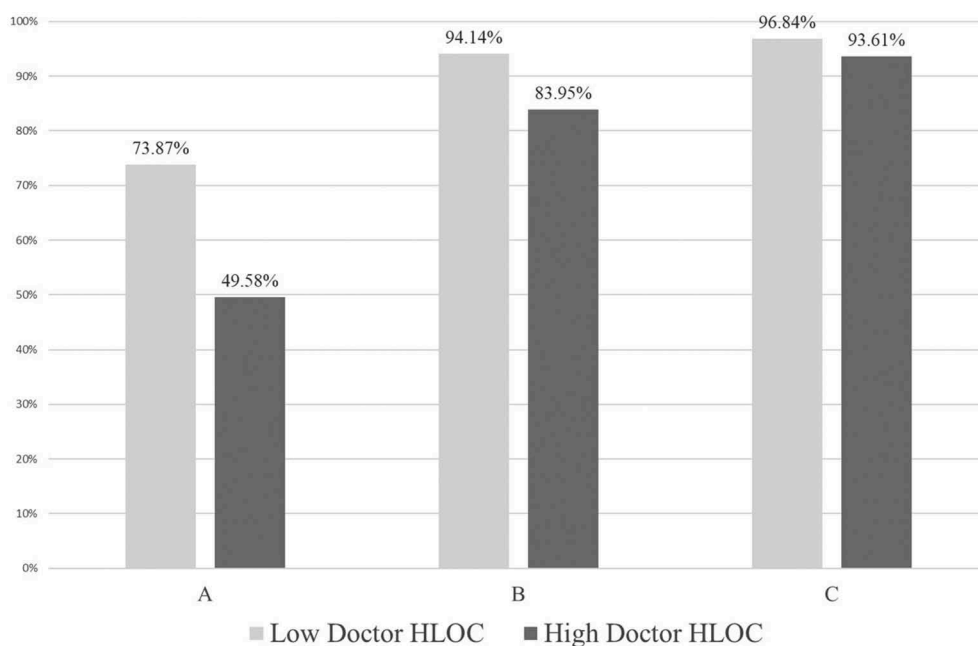
Figure 1. Preferences (estimated probability) for the active, active-collaborative, and collaborative roles versus the passive role for people with low or high doctor health locus of control.

HLOC = Health locus of control; A = Active role; B = Active-collaborative role; C = Collaborative Role

Contrarily to our hypothesis, we did not find any difference in people with high and low *internal* HLOC. Consistently with our hypothesis, though, people with lower *doctor* HLOC showed a greater preference for active and collaborative roles. Moreover, we observed that people with a lower score in *other people* HLOC are more likely to prefer an active role or collaborative role. The fact that *other people* and *doctor* HLOC subscales yield similar results could be because our sample did not suffer from specific conditions: when investigating general health, people do not discriminate between the impact that other people and doctors could have on their health. Doctors could be considered as one of the other powerful people with a direct influence on one's health.

Despite its limitations (e.g. convenience sampling, fictional and hypothetical health conditions, etc.), this paper attested that HLOC could influence people preferences in health care (Russo et al., 2019) inducing an active, collaborative, or passive role in their medical decision-making. Nowadays, patients are rarely asked regarding their preferences in involvement in clinical decision-making (Arnaboldi et al., 2020) and, considering their link with patient's internal and external factors, these information should not be discarded (Monzani et al., 2020). Measuring HLOC and patient's preferences could provide a clearer picture to tailor the decision-making process to personalized medicine fostering the involvement of patients in health care (Cutica et al., 2014; Pravettoni & Gorini, 2011; Vergani et al., 2019).
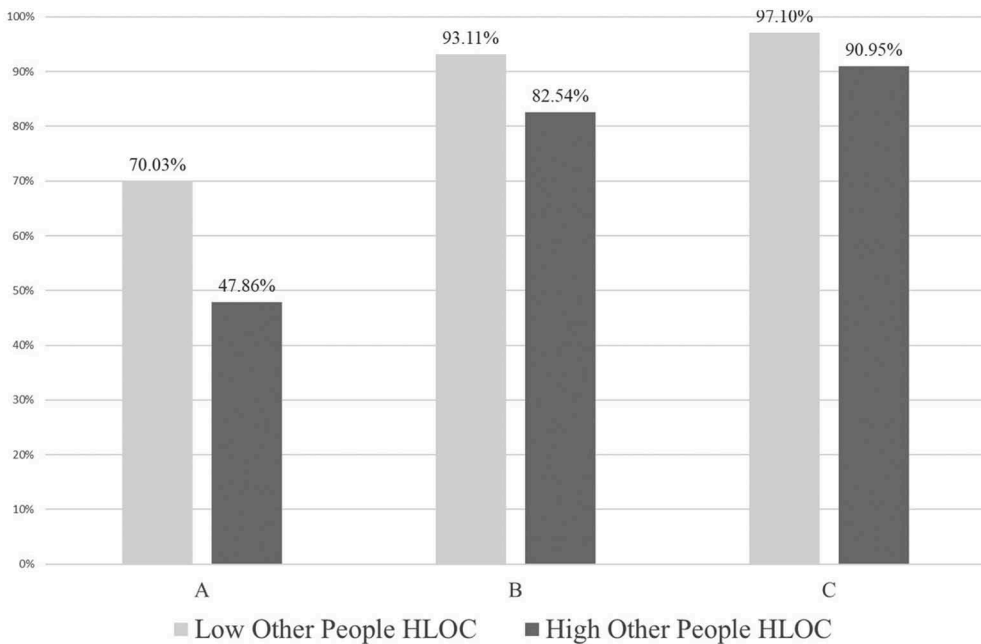
Figure 2. Preferences (estimated probability) for the active, active-collaborative, and collaborative roles versus the passive role for people with low or other people health locus of control.

HLOC = Health locus of control; A = Active role; B = Active-collaborative role; C = Collaborative Role

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Disclosure statement

Funding

Data availability statement

The data that support the findings of this study are available from the corresponding author, G.M., upon reasonable request.

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