

A new measure of physicians' erroneous assumptions towards adults with intellectual disability: A first study

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Abstract

Background Incomplete knowledge and unfamiliarity with intellectual disability (ID) contribute to erroneous assumptions of physicians towards ID, which negatively impact the health equity of people with ID. This study aimed to identify the erroneous assumptions that, based on the ID stakeholders' perceptions, were the most prevalent in physicians and damaging for the healthcare of adults with ID, verify their unidimensionality and that no personal characteristics of ID stakeholders were associated with their ratings of erroneous assumptions' prevalence and damage.

Methods Seventy-four possible physician erroneous assumptions were developed concerning health, daily living skills and quality of life of individuals with ID. ID stakeholders rated each one for perceived prevalence in physicians and damage for the healthcare of adults with ID. Frequency analysis, exploratory factor analysis and correlations were run separately for participants' prevalence and damage ratings.

Results Twenty-seven erroneous assumptions were identified as those perceived most prevalent and damaging. Their unidimensionality was ascertained

and participants' characteristics were not associated with their prevalence and damage ratings.

Conclusions The identified assumptions are appropriate to represent the items of a new instrument that can be used in medical education to guide the development of curricula to change erroneous assumptions.

Keywords Barriers, Beliefs, Healthcare, Medical education, Scale development

Background

Adults with ID experience higher rates of health conditions and are more likely to report fair or poor health status than individuals without disabilities (Krahn and Fox 2014; Havercamp and Scott 2015). These health inequities result from several factors, including healthcare barriers (Doherty *et al.* 2020; Lauer *et al.* 2021). Healthcare barriers occur at various levels: patient level (e.g. inadequate healthcare insurance, previous negative health experiences), healthcare provider level (e.g. inadequate ID knowledge and training, unfavourable attitudes towards ID, erroneous assumptions) and environment-level (e.g. inadequate space, time constraints) (Ali *et al.* 2013; Williamson *et al.* 2017).

Among all these barriers, the assumptions of physicians are particularly important because physicians play a key role in determining the course of treatment (National Council on Disability 2022).

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Assumptions represent judgements or beliefs accepted as true or sure to happen without proof (Zeigler-Hill and Shackelford 2020) and help people to predict and explain phenomena (Baumeister and Bushman 2011). Although both assumptions and knowledge are cognitive constructs, knowledge is based on learned facts, whereas assumptions are unfounded beliefs (Baumeister and Bushman 2011). Assumptions are distinct from attitudes, which represent the evaluation of a particular entity in terms of favour or disfavour that influence personal choices (e.g. 'Would you accept a person with ID as your child's friend?') (Eagly and Chaiken 1993; Arcangeli *et al.* 2020). Erroneous assumptions represent negative beliefs (e.g. 'I think that people with ID have no reason to be happy') and can be due to a lack of familiarity with patients with ID or inadequate knowledge of ID. Erroneous assumptions may affect healthcare decision making and quality of care. For example, a physician who assumes that a patient has a poor quality of life based on their disability may not consider aggressive interventions (Gerhart *et al.* 1994).

Teaching about ID effectively increases ID knowledge of laypeople (Seewooruttun and Scior 2014) and healthcare professionals (Bartkowski *et al.* 2018). Similarly, teaching and especially providing opportunities to engage with people with ID may effectively challenge physicians' erroneous assumptions and improve ID patient care (Crane *et al.* 2021; Rotenberg *et al.* 2022). Indeed, the National Council on Disability (2022) recommended strengthening physician training on disability to achieve healthcare equity for people with disability (Ankam *et al.* 2019). To challenge false assumptions about ID in training, we must understand the most common and damaging erroneous assumptions held by physicians. Indeed, assumptions that are both frequent in physicians and damaging for the health care of adults with ID represent the worse scenario, compared with the assumptions that are frequently held but inconsequential or with damaging assumptions that are endorsed by very few physicians. Challenging the most frequent and damaging assumptions in medical education will have the greatest impact on health care for patients with ID.

Previous research investigated physician attitudes, perceptions towards ID and knowledge of ID (e.g. Bacherini *et al.* 2021; Iezzoni *et al.* 2021) without a

specific focus on erroneous assumptions. To our knowledge, the only instrument to assess misconceptions towards ID is quite old (Mental Retardation Misconceptions Scale, last version by Antonak *et al.* 1989). Other instruments, like the Intellectual Disability Literacy Scale (Scior and Furnham 2011) or the Attitudes Toward Intellectual Disability Questionnaire (Morin *et al.* 2012), assess knowledge about and attitudes towards ID but not the specific beliefs that are damaging in healthcare situations.

The goal of this study was to develop a measure of erroneous assumptions of physicians towards ID, by (1) identifying those that were the most prevalent among physicians and the most damaging to the health care of adults with ID according to ID stakeholders, (2) test their factorial structure and (3) explore the relationships between these assumptions and stakeholders' characteristics.

Methods

An exploratory cross-sectional study was conducted to identify the most prevalent and damaging physicians' erroneous assumptions towards adults with ID, surveying two groups of American disability stakeholders: family members of individuals with ID and disability professionals (ID health professionals, e.g. healthcare providers like nurses or psychologists working in the field of ID; ID professionals like direct support professionals or case managers; and ID experts like researchers or advocates). The perceptions of family members were sought because they represent the main source of support for people with ID (Chadwick *et al.* 2013), contributing to their health and well-being (Grey *et al.* 2018; Friedman 2021). Thus, family members have a unique perspective on the erroneous assumptions of physicians towards adults with ID. Disability professionals were chosen because, like family members, they play a role in directly providing or supporting health care for adults with ID (Lennox *et al.* 2015).

The study was conducted following the ethical standards laid down in the 2013 Fortaleza version of the Declaration of Helsinki, and it was reviewed and approved by the University of Perugia's Bioethical Committee (No. 98826, 12 November 2020).

Development of the survey

Definition of the area of the erroneous assumptions

Erroneous assumptions that are widely held by physicians and damaging may include beliefs about health, about independent functioning and about quality of life (Rubin *et al.* 2016). Therefore, the authors developed items based on the following three content areas: (1) health and healthcare needs, (2) daily living skills and activities and (3) quality of life of individuals with ID. The authors believed that these broad areas covered the most important erroneous assumptions.

The authors based items in the health and healthcare area on the Core Competencies on Disability for the Health Care Education (Haverkamp *et al.* 2021). Each competency represents a learning objective targeting a specific measurable skill or behaviour required to provide quality healthcare to individuals with disabilities (e.g. *Demonstrate communication strategies to best meet the needs/abilities of the patient*).

The items of the Vineland Adaptive Behavior Scale - Third Edition (Vineland-3; Sparrow *et al.* 2016) and those of the Diagnostic Adaptive Behavior Scale (DABS; Tassé *et al.* 2016, 2017) were the references for the daily living skills and activities area. Both measure three domains of adaptive behaviour (conceptual, social and practical skills; Tassé *et al.* 2012) of individuals aged 0–90 and 4–21 years old, respectively.

The items of the Personal Outcomes Scale (POS; Van Loon *et al.* 2008) were the reference for the quality-of-life area. This instrument measures the eight domains of quality of life of adults with ID (Schalock and Verdugo 2002): personal development, self-determination, interpersonal relationships, social inclusion, rights, emotional well-being, physical well-being and material well-being.

Writing of the list of erroneous assumptions

By reformulating some of the competencies and the items of the previously mentioned instruments, the authors developed an initial list of 100 erroneous assumptions. To ensure full coverage of the three areas, the authors classified each assumption according to the following 11 topics based on subscales of the source materials (e.g. Core Competencies, Vineland-3, DABS, POS) and their general area:

Healthcare access, Self-care, ID and associated conditions, Communication, Physician behaviour, Health/life quality, Community living, Caregiver involvement, Self-determination, Supports need and Social relationship. See in Table 1 an example of this process. The authors then ordered the 100 erroneous assumptions alternating them for their main area and content category to set up the survey.

Response scales

The following two questions with the corresponding answer options were developed: (1) *How many physicians do you think would agree with this statement? None—A few—A lot—Most*, and (2) *If physicians agreed with this statement, how damaging would it be for the healthcare of patients with ID? Not all damaging—Possible damage—Significant damage—Very damaging*. These two questions, asked for each assumption, allowed the authors to distinguish assumptions considered only frequent, only damaging or both by study participants.

Questions investigating participant characteristics

Questions were developed to investigate the demographics of all the participants (gender, age, state of residence, community type, race, ethnicity, years of study, job status) and other individual characteristics that were unique to each stakeholder group: (1) family members of individuals with ID were asked for the type of relationship with the family member with ID and their age range, experience in caring for the family member with ID, experience with severe or profound ID; and (2) disability professionals were asked for their professional role, years of experience in the work field, years of experience working with individuals with ID and their age range, experience working with individuals with severe or profound ID, hours of previous training on ID.

Field test and survey refinement

A field test was conducted in October 2020 with one American disability professional specialised in ID and three family members of individuals with ID who were also disability professionals. They were asked to provide feedback about the clarity of the developed items and response scale, as well as to suggest additional erroneous assumptions. Based on their

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Table 1 Examples of the development of physicians' erroneous assumptions from the Core Competencies on Disability for the Health Care Education, Adaptive Behaviour (Vineland-3 and DABS) and quality of life (POS) of Adults With ID

Area	Original source	Behaviour investigated in the original item	Example of developed erroneous assumption ^a	Assigned assumption's content category
Health and healthcare needs of adults with ID	Core Competencies on Disability for the Health Care Education (Haverkamp et al. 2021)	Understand that the patient with disabilities should be the primary source of information regarding their care	When treating adult patients with ID, the perspective of the caregiver is most important, even if the patient can speak and answer questions about their health	Physician behaviour
Daily living skills and activities of adults with ID	Vineland-3 (Sparrow et al. 2016)	Ability to manage money to pay the own expenses	Adults with ID cannot manage money (e.g. read bank documents, pay bills) without support, except possibly making small purchases (e.g. using vending machines)	Community living
Daily living skills and activities of adults with ID	DABS (Tassé et al. 2017)	Ability to maintain relationships with others	Adults with ID should not have a romantic partner	Social relationships
Quality of life of adults with ID	POS (Van Loon et al. 2008)	Presence of people to whom the individual can ask for help, advice or support	Adults with ID can never understand medical findings without help	Supports need

^aThe erroneous assumptions reported are the final version edited following the field test suggestions.

feedback, first, 26 unclear assumptions were removed, and no additional assumptions were suggested. Second, the authors chose to focus on adults with ID and modified each assumption from 'People/A person with ID' to 'Adults with ID'. Third, also in agreement with previous attitude and stigma measures (Morin et al. 2012; Werner et al. 2012) and test development guidelines to avoid potential response set bias, acquiescence bias and social desirability (Nunnally and Bernstein 1994), 31 out of 74 erroneous assumptions were reverse worded to express positive beliefs towards ID (e.g. from *A person with ID always needs a legal guardian* to *Adults with ID do not always need a legal guardian*). The erroneous assumptions were then reordered to alternate the wording formulation (i.e. straight or reverse), their main area and content category. Fourth, the response options were slightly revised and a middle point was introduced to have a 5-point rating scale (1) *How many physicians do you think would agree with this statement?* None—A few—Around half—A lot—Most,

and (2) *If physicians agreed with this statement, how damaging would it be for the healthcare of patients with ID?* Not all damaging—Slightly damaging—Definitely damaging—Significantly damaging—Very damaging.

For the erroneous assumptions reworded to measure physicians' positive beliefs towards ID, the frequency question was unchanged, but its score was reversed, whereas the second question was reformulated as follows: *If physicians disagreed with this statement, how damaging would it be for the healthcare of adult patients with ID?*

Finally, the field test participants and a social psychologist expert in attitudes reviewed and approved the revised version of the survey made up of 74 items.

Recruitment procedure

Participants were recruited through American associations and professional organisations in the field of ID. The research team contacted via email the

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leadership of each identified association/organisation ($n = 86$) asking to disseminate the study flyer among their members. Organisation leaders were contacted up to four times over 4 months. The survey was completed online using Google Forms between January and May 2021.

Participants

A total of 25 associations/organisations (29%) expressed willingness to share the study material. Overall, 139 participants were recruited, but six were excluded because they lived outside the USA ($n = 3$);

Table 2 Characteristics of family members of individuals with ID and disability professionals

	Family members of individuals with ID ($n = 69$)	Disability professionals ($n = 64$)
Gender (%)		
Man	19	12
Woman	81	88
Age		
Mean (SD)	53.84 (13.00)	47.08 (12.92)
Range	23–75	25–75
Years of study		
Mean (SD)	17.62 (3.11)	19.16 (2.55)
Range	12–25	15–26
US region of living (%)		
Northeast	19	14
Midwest	49	42
South	26	25
West	6	19
Community type of living (%)		
Rural	23	27
Suburban	62	42
Urban	15	31
Years of caring for the family member with ID (%)		
0 (no direct caring of the family member with ID)	32	/
1–20 years	19	/
>20 years	49	/
Caring for severe/profound ID ^a (%)		
Yes	72	/
No	28	/
Years of experience in the work field (%)		
<1–5 years	/	13
5–10 years	/	17
10–20 years	/	22
>20 years	/	48
Years of experience working with people with ID (%)		
<1–5 years	/	11
5–10 years	/	20
10–20 years	/	28
>20 years	/	41
Hours of previous training on ID (%)		
0 h		
1–10 h	/	5
10–29 h	/	17
30–50 h	/	20
>50 h	/	11

^a $n = 47$.

were individuals with ID ($n = 2$) (a parallel participatory study using plain language conducted only with individuals with ID is planned); or were healthcare providers without experience with ID ($n = 1$). Of the remaining 133 participants, 69 (52%) were family members of individuals with ID, and 64 (48%) were disability professionals. Family members who were also disability professionals (59%) were assigned to the family member group for analysis assuming that family experience would have more of an impact on perceptions than professional experience. Regardless of their professional role, family members are longstanding and key actors in fostering the health and health care of their loved ones and have unique experiences and perspectives (Wolff 2012; Barnes *et al.* 2020). Within the family member group, there were no differences on the demographic and individual characteristics between those who were and were not also disability professionals (see Table S2 of the Supporting Information).

Overall, participants were recruited in 31 out of 50 US states. Most participants were White (91% of both groups) and had a non-Hispanic Latino ethnicity (96% and 97% of family members and disability professionals, respectively). The two groups of participants were compared for gender (χ^2 test), age and years of study (Student's t -tests for independent groups). Cohen's d was computed for statistically significant differences (Cohen 1988), and effect sizes were interpreted according to the following criteria: negligible ($<.20$), small ($.20-.49$), medium ($.50-.79$) and large ($\geq.80$). Disability professionals were younger ($t_{(131)} = 3.006, p < .01, d = .53$) and had more years of study ($t_{(131)} = -3.111, p < .01, d = .55$) compared to family members. The gender composition, mostly women, did not differ between groups ($\chi^2_{(1)} = 1.61, p = .446$). See Table 2 for other participant characteristics included in the data analysis.

Family members identified their relatives with ID as their child (57%), immediate family member (23%), extended family member (9%) or parent (4%). Most of family members (67%) directly cared for their relatives with ID, who generally were adults (81%). The group of disability professionals was composed of nurses (25%), ID experts (25%), psychologists (16%), case managers (11%) and a variety of other healthcare providers. Most worked with people with ID across the life span (i.e. children,

adolescents and adults; 47%) and had experience working with severe/profound ID (92%).

Data analysis

As prerequisites of all the analysis, first, the equivalence of straight (i.e. negative beliefs towards ID) and reverse items (i.e. positive beliefs towards ID) was investigated. Then, the average differences between family members and disability professionals in rating each assumption as prevalent and damaging were computed to determine whether the two participant groups should be analysed together or separately. Because ratings of family members differed from those of disability professionals (see 'Most prevalent and damaging erroneous assumptions towards ID for the health care of adults with ID among physicians' section), the following analyses were run independently for these two groups.

The data analysis plan consisted of the following four steps.

Step 1. Frequency analysis to identify the physicians' erroneous assumptions considered most prevalent and most damaging by the ID stakeholders. An assumption was classified as prevalent or damaging, respectively, if at least 50% of respondents in the family member or the disability professional group rated it as held by 'A lot' or 'Most' of physicians (prevalence) or 'Significantly damaging' or 'Very damaging' (damage). Items were only retained if they were classified as both prevalent AND damaging by one or both of the participant groups. The minimum number of participants required for precision in the frequency analysis was estimated a posteriori.¹

Step 2. Item analysis of the most prevalent and most damaging erroneous assumptions to explore their score distributions and variability as a prerequisite for subsequent data analyses. Particularly, the presence of univariate and

¹To determine the adequacy of the number of participants for frequency analyses, we used the rule of thumb for the reliability of precision of the proportion on the sample size, a formula also known to calculate the standard error of a proportion ($SE = \sqrt{\frac{P \cdot (1 - P)}{N}}$) (Newcombe 1998). We set the minimum criteria to determine that an assumption is prevalent and/or damaging, P , at .50. N represents the number of participants in the smallest group and was 64 (i.e. disability professionals). The lower bound of the confidence interval of the obtained SE establishes the minimum number of participants required for the frequencies analysis, which was 37.

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multivariate outliers and univariate and multivariate normality was checked (Tabachnick and Fidell 2013) separately for prevalence and damage ratings, as well as the score variability (all five response categories should be endorsed for each item), mean (should be between 2 and 4), standard deviation (different from 0, optimally ~ 0.80 , to ensure enough data variability) and item-total correlation (between .20 and .70 to assure that the items are discriminant and not redundant, respectively) (Nunnally and Bernstein 1994).

Step 3. Exploratory factor analysis (EFA; Fabrigar *et al.* 1999) and computation of Cronbach's alpha for the prevalence and for the damage ratings to verify their unidimensionality and internal consistency. An EFA with principal axis factoring was conducted separately for the prevalence and for the damage ratings of the erroneous assumptions identified as most prevalent and most damaging. A unidimensional structure was hypothesised based on the literature (Zeigler-Hill and Shackelford 2020). Bartlett's test of sphericity and Kaiser–Meyer–Olkin (KMO) test of sampling adequacy were run as prerequisites for the EFA. The number of factors to be extracted was identified considering the Kaiser–Guttman criterion, the scree test and the results of the parallel analysis. The solutions were evaluated considering the following aspects: extracted commonalities of each item $> .10$, factor loadings $\geq .30$ and explained variance $\geq 20\%$ (Slocum-Gori and Zumbo 2011). The reliability of the best factorial solution was evaluated with Cronbach's alpha. The minimum number of participants for the EFA was determined a posteriori.²

The analysis of both Step 2 and Step 3 were computed separately for the two groups of family members and disability professionals and combining them into a unique group. Because the results were

²To determine the adequacy of the number of participants for EFA, the guidelines of Hogarty *et al.* (2005) were followed. Specifically, a range between 100 and 200 individuals is considered adequate if item initial commonalities are close to .50, with a limited number of factors to be extracted (one in this case) each defined by a minimum of 6–7 items (27 in this case), and at least four items with factor loadings higher than .60. Based on these considerations, the obtained $N = 130$ (see Item analysis of the most prevalent and damaging erroneous assumptions section) was considered adequate for this EFA.

similar, for brevity and conciseness, we reported the results of the combined group only.

Step 4. Investigation of the relationships between the overall raw score for the measurement of most prevalent and damaging erroneous assumptions and the characteristics of ID stakeholders to verify the raw score independence. Pearson's correlations were run for continuous variables and for those using a 5-point rating scale (age, years of study, hours of previous ID training), Spearman's rank correlations were run for ordinal variables (community type, years of caring for the family member with ID, years of working with individuals with ID), and point biserial correlations were run for dichotomous variables (experience in caring for individuals with severe or profound ID).

Results

Most prevalent and damaging erroneous assumptions towards ID for the health care of adults with ID among physicians

Straight and reverse items were determined equivalent in measuring prevalence and damage.³ Ratings of family members differed from those of disability professionals by an average of 2 percentage points on prevalence ratings (range 0–13) and 8 percentage points on damage ratings (range 0–27).

Table S1 of the Supporting Information reports the percentages of respondents, independently for family members and disability professionals, who rated each erroneous assumption as prevalent in physicians and damaging to the health care of adults with ID. Twenty-seven erroneous assumptions were identified as both prevalent and damaging by at least one (eight assumptions) or both (19 assumptions) of the two participant groups. Of identified assumptions, 12 (44%) were phrased to measure positive beliefs towards ID, 48% referred to health and healthcare

³The equivalence of straight (i.e. negative beliefs towards ID) and reverse items (i.e. positive beliefs towards ID) were determined with four well-documented methods (e.g. DeVellis 2017), separately for prevalence and damage ratings: (1) inter-correlation coefficients among straight and reverse items and among straight items only had similar magnitudes; (2) item-total correlation coefficients of straight and reverse items were similar; (3) Cronbach's alpha, if an item was deleted, did not increase after the removal of any reverse items; and (4) items reverse did not load all on a separate factor in a two-factor EFA.

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Table 3 Mean (SD), skewness and kurtosis values and factor loadings in EFA of the prevalence and damage ratings of the 27 identified erroneous assumptions based on family members of individuals with ID and disability professionals perspective ($n = 130$)

Erroneous assumption	Area	Prevalence rating					Damage rating				
		Mean	SD	Skewness	Kurtosis	Factor loading	Mean	SD	Skewness	Kurtosis	Factor loading
1. Adults with ID always behave like children, regardless of their real age	QoL	3.38	1.13	-.26	-.83	.643	4.12	.94	-.76	-.19	.650
2. It is helpful to schedule extra time to clearly explain medical findings and recommendations to adults with ID ^a	H	3.33	1.08	-.84	-.34	.545	4.12	1.08	-1.30	1.26	.387
3. An IQ test is not sufficient to diagnose ID ^a	H	3.25	1.07	-.39	-.67	.336	3.54	1.05	-.29	-.35	.379
4. Adults with ID cannot follow medical instructions	H	3.75	.97	-.43	-.49	.624	3.76	1.05	-.41	-.68	.517
5. Adults with ID should not have a romantic partner	AB	3.28	1.11	-.26	-.93	.681	3.97	.91	-.25	-1.16	.616
6. Finding appropriate systems of support for their adult patients with ID is not a responsibility of the physician	H	4.20	.94	-1.20	.89	.533	4.19	.97	-1.17	.85	.430
7. Caregivers should always be present at medical appointments for adult patients with ID, regardless of what the patient wants	H	3.94	1.17	-.83	-.50	.638	3.62	1.04	-.34	-.53	.445
8. Adults with ID should not be parents	QoL	4.18	1.02	-1.16	.38	.679	3.81	1.04	-.33	-1.09	.685
9. Adults with ID always are a burden to their family	QoL	3.47	1.11	-.25	-.98	.688	4.25	.96	-1.07	.02	.538
10. If physicians do not use technical jargon, adults with ID can understand medical information ^a	H	3.27	.91	-.75	-.09	.466	3.52	1.07	-.27	-.49	.473
11. Adults with ID can schedule medical appointments on their own (e.g. via telephone, internet website or email) ^a	AB	3.66	.68	-.99	1.69	.514	3.38	1.04	.06	-1.00	.556
12. Adults with ID enrich cultural and social diversity ^a	QoL	3.55	.91	-1.45	1.49	.684	4.20	.90	-.80	-.42	.667
13. The lives of adults with ID are impacted more by their limitations than by their strengths	H	3.81	1.07	-.53	-.80	.507	4.21	.86	-.94	.60	.527

Table 3. (Continued)

Erroneous assumption	Area	Prevalence rating					Damage rating				
		Mean	SD	Skewness	Kurtosis	Factor loading	Mean	SD	Skewness	Kurtosis	Factor loading
14. Adults with ID can provide reliable information about their life or symptoms during medical appointments ^a	H	3.48	.90	-1.36	1.49	.685	4.09	.89	-.78	.21	.700
15. It is acceptable for adults with ID to keep secrets from their caregivers (e.g. a purchase, activity or new friend) ^a	QoL	3.80	.80	-.91	1.59	.537	3.35	1.08	-.09	-.66	.558
16. Adults with ID cannot understand their medical needs	H	3.55	1.06	-.22	-1.01	.672	4.05	.92	-.63	-.24	.681
17. When treating adult patients with ID, the perspective of the caregiver is most important, even if the patient can speak and answer questions about their health	H	3.65	1.11	-.45	-.76	.495	4.06	1.11	-1.11	.50	.436
18. Adults with ID can be responsible for taking care of others, such as other people or animals (e.g. children, elder care, pets) ^a	QoL	3.68	.79	-1.31	2.27	.597	3.54	1.04	-.13	-.76	.572
19. Adults with ID do not always need a legal guardian ^a	QoL	3.36	1.05	-.94	.171	.584	3.88	1.06	-.63	-.32	.614
20. Because of their disability, physicians may not offer aggressive treatments options to their adult patients with ID	H	3.45	1.09	-.27	-.92	.636	4.46	.83	-1.54	2.10	.384
21. Social discrimination of adults with ID does affect their health ^a	H	3.11	1.09	-.70	-.77	.359	4.21	.95	-1.19	1.02	.507
22. With support, adults with ID are able to compare different medical treatment options to make the best choice for him or herself ^b	AB	3.59	.90	-1.27	1.30	.679	4.16	.96	-.97	.40	.733
23. Adults with ID can never understand medical findings without help	QoL	3.56	1.15	-.26	-1.27	.736	3.90	.99	-.53	-.53	.714
24. Adults with ID can provide help or support for others ^a	AB	3.46	.94	-1.45	1.11	.649	3.65	1.09	-.44	-.56	.623
	QoL	3.58	1.03	-.36	-.54	.644	3.77	1.16	-.75	-.10	.625

Table 3. (Continued)

Erroneous assumption	Prevalence rating					Damage rating					
	Area	Mean	SD	Skewness	Kurtosis	Factor loading	Mean	SD	Skewness	Kurtosis	Factor loading
25. Adults with ID need constant help and supports, in all aspects of their lives	H	4.25	.94	-1.19	.79	.548	3.55	1.31	-.49	-.89	.431
26. ID is a permanent condition, without chance of improvement	H	4.25	.94	-1.19	.79	.548	3.55	1.31	-.49	-.89	.431
27. Adults with ID cannot manage money (e.g. read bank documents, pay bills) without support, except possibly making small purchases (e.g. using vending machines)	AB	3.60	1.02	-.21	-.86	.621	3.62	1.08	-.34	-.73	.671

AB, daily living skills and activities (i.e. adaptive behaviour); H, health and healthcare needs; QoL, quality of life.
 *Assumption measuring a positive belief towards adults with ID.

needs area, 33% to quality of life and 19% to daily living skills.

Item analysis of the most prevalent and damaging erroneous assumptions

No univariate outliers but three multivariate outliers were detected for both the prevalence ratings (two disability professionals and one family member) and the damage ratings (one disability professional and two family members). Thus, 130 participants were included in the item analysis, EFA and correlations (for the latter, independently for the two participant groups), for both the prevalence and damage ratings. Univariate normality was satisfied except for a limited number of cases (see Table 3), whereas Mardia's test revealed slight multivariate non-normality. For all prevalence and damage ratings, each response category was present (except for four damage ratings with a score ranging 2–5), and mean and SD were in the expected ranges (see Table 3). The item-total correlations ranged .32–.67 for prevalence ratings and .35–.68 for damage ratings; therefore, ratings were discriminant and not redundant.

Factorial structure of the most prevalent and damaging erroneous assumptions

The EFA prerequisites were satisfied for both prevalence and damage ratings. The initial item commonalities were around .50 or higher (range: .42–.70 with only one item = .31 for prevalence ratings and range: .35–.69 for damage ratings). The extracted commonalities were higher than .10 for all prevalence and damage ratings (range: .11–.54 and .14–.54, respectively). In both cases, the Kaiser–Guttman criterion and the parallel analysis suggested two factors to be extracted. However, inspection of the scree plots showed a curve inflection point after the first factor, thereby justifying the adequacy of a unidimensional solution, which was also confirmed by the high correlations between the two extracted factors (.69 for prevalence ratings and .71 for damage ratings). Moreover, with a two-factor solution, one prevalence rating and one damage rating loaded on both extracted factors, whereas one damage rating did not load on any factor. Conversely, as can be seen in Table 3, with a one-factor solution, all factor loadings were higher than .30, accounting

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for 38% and 35% of variance of prevalence and damage ratings, respectively.

Cronbach's alpha of the 27 erroneous assumptions was .93 for prevalence ratings and .92 for damage ratings.

These results showed the unidimensionality of prevalence and damage ratings and the appropriateness of their overall raw scores to be used to investigate the relationships between these scores and the characteristics of ID stakeholders.

Relationship between participant characteristics and prevalence and damage ratings

No participant characteristic was found to be associated with their total raw score of prevalence and damage rating, neither for family members nor for disability professionals. Correlations between family member characteristics and prevalence rating ranged $-.03$ – $-.21$ and $-.10$ – $-.03$ for damage rating. Similarly, correlations between disability professionals' characteristics ranged $-.21$ – $-.08$ for prevalence rating and $-.20$ – $-.03$ for damage rating.

Discussion

As a first step to developing a new measure of physician erroneous assumptions towards ID, the authors identified 27 erroneous assumptions that were rated by ID stakeholders as most prevalent in physicians and most damaging to the healthcare of adults with ID. The results of the EFA indicate that both the prevalence and damage ratings loaded on a single factor and have excellent reliability indices. Furthermore, the authors found that participant characteristics were not related to their prevalence and damage ratings. These erroneous assumptions concerned a variety of different topics including but not limited to the health of adults with ID.

The need to include disability content in medical education has received recent attention (Ankam *et al.* 2019; Neill Bowen *et al.* 2020). A specific training component focused on overcoming erroneous assumptions is necessary to prepare physicians to provide high-quality health care to patients with ID, which is fundamental for this population given the high rates of health conditions and health disparities that they experience (Haverkamp and Scott 2015; Lauer *et al.* 2021).

Finding that perceived physician erroneous assumptions did not exclusively concern the health and health care of adults with ID suggests that training for current and future physicians should also address a broader range of topics related to the well-being, quality of life, social relationships and independence of this population (Bacherini *et al.* 2022).

The main limitation of this study was the small number of participants, which limits the generalisability of these findings. It is possible that, with more participants, more sophisticated analyses would have revealed differences in the identified most prevalent and damaging erroneous assumptions or participant characteristics' associations. Interestingly, repeating the frequency analysis to identify the most prevalent and damaging erroneous assumptions in the combined group of family members and disability professionals, four items (i.e. numbers 23, 27, 37 and 54) did not reach the criteria for inclusion. Consequently, by combining the two samples, the authors would miss some potentially important erroneous assumptions. It is important to consider also that participants were not asked to refer to a specific medical specialty in providing their ratings. Future research is needed to explore whether based on the stakeholders' perception, erroneous assumptions may differ across medical specialties.

The critical strength of this investigation is the development of a measure of physicians' erroneous assumptions towards ID, given that no instruments currently existed for this purpose. Specifically, this new measure asks physicians to express their level of agreement with each erroneous assumption, using a 5-point Likert scale (1 = *totally disagree* to 5 = *totally agree*). Using this measure, it will be possible to tailor specific educational interventions to the erroneous assumptions endorsed by specific physician groups. Another valuable strength of this study is the engagement of a diverse group of ID stakeholders. Indeed, community engagement in research and shared decision making is recommended to better address a community's health needs and disparities (Centers for Disease Control and prevention 2011; Cyril *et al.* 2015). Future research in a sample of adults with ID to assess physicians' erroneous assumptions from the patient perspective is needed.

High quality of health care for patients with ID may be affected also by positive physicians' attitudes

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towards people with ID (Bacherini *et al.* 2021; Iezzoni *et al.* 2021), positive patient–physician relationships (Potvin *et al.* 2019; Stringer *et al.* 2019), willingness and comfort interacting with patients with ID (Crane *et al.* 2021; Lagu *et al.* 2022). Research is needed to confirm the unidimensional factorial structure of this instrument, its reliability and its validity compared to other constructs (e.g. attitudes towards ID, self-efficacy in caring for patients with ID). ID training research is needed to assess the effectiveness of training targeting erroneous assumptions, negative attitudes and self-efficacy. Future research is needed to identify the best mode of delivering disability content at each level of physician training: preservice, residency and continuing education (Balogh *et al.* 2015) and the relative impact of providing learners with opportunities to interact with individuals with ID (Rotenberg *et al.* 2022; Selick *et al.* 2022). Finally, consensus guidelines for delivering primary care to patients with ID are available (Sullivan *et al.* 2018) and should be developed for other practice areas.

Conclusions

This study involved ID stakeholders to identify physicians' erroneous assumptions towards ID that are most prevalent and damaging to the healthcare of adults with ID, as the initial phase for the creation of a new instrument to be used in medical education. Evaluating physicians' erroneous assumptions towards ID is needed to guide the development of physician training to promote healthcare equity for adults with ID.

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Conflict of interest

The authors declare no conflict of interest.

Ethics statement

The study was conducted following the ethical standards laid down in the 2013 Fortaleza version of the Declaration of Helsinki and it was reviewed and approved by the University of Perugia's Bioethical Committee (No. 98826, 12 November 2020). Informed consent was obtained from each participant. Participation was voluntary, anonymous, and no incentives were offered.

Data availability statement

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

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Supporting Information

Additional Supporting Information may be found online in the supporting information tab for this article.

Tables S1 and S2. Supporting Information.