Systematic Review

A meta-analytic review of attitudes towards the sexuality of adults with intellectual disabilities as measured by the ASQ-ID and related variables: Is context the key?

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Abstract

Background The attitudes of others towards the sexuality of people with intellectual disabilities are one of the main perceived barriers to them expressing their sexuality. Research on what influences these attitudes yields heterogeneous results.

Method A systematic review of the literature and a meta-analysis were carried out.

Results Eleven studies using the Attitudes to Sexuality Questionnaire—Individuals with an Intellectual Disability (ASQ-ID) were included. Within the included studies, the country’s socio-economic development and level of individualism were associated with attitudes towards the sexual rights, parenting and self-control of adults with intellectual disabilities. General population and staff samples held more favourable attitudes than family samples in terms of sexual rights and parenting. Age and gender did not yield significant results.

Conclusions Variables related to country context may underlie the differences observed between countries and therefore influence the population’s general thinking and ideologies. Unexpectedly, no age differences were observed. Gender-related results may reflect rapprochement between genders in sexuality. These findings are relevant for researchers and practitioners, as they suggest the importance of considering contextual factors when developing effective interventions that aim to support adults with disabilities to live their sexuality.

Keywords ASQ-ID, Attitudes, Intellectual disability, Meta-analysis, Sexuality

Introduction

Living and expressing our sexuality is a right. However, in practice, not everyone enjoys this right. The sexuality of adults with intellectual disabilities (ID) is surrounded by myths and stigma (Pebdani and Tashjian 2022), which directly interfere with their experience of sexuality. The perceptions of others are one of the main barriers to the sexuality of adults with ID (Sinclair et al. 2015), and these attitudes may be key to explaining why sexuality issues are not adequately reflected in individual support plans (Stoffelen et al. 2017). Adults with ID themselves...
report how influential the attitudes of staff carers and family members are on their experience of sexuality, which sometimes needs to be experienced with secrecy and deception (Healy et al. 2009).

The attitudinal landscape appears to be changing with regard to these perceptions. Prior to the 2000s, the sexuality of adults with ID was not at the forefront of researchers’ agendas (Aunos and Feldman 2002), and attitudes were not entirely favourable. In the last two decades, these attitudes seem to have somewhat improved (Correa et al. 2022), although they are not as inclusive as they should be. If we intend to intervene on these attitudes, with the aim of improving the support given to adults with ID to express their sexuality as they wish, we should carefully analyse the current attitudinal scenario.

More specifically, we should try to address what these attitudes are like and what factors may be influencing less favourable attitudes or misconceptions. Different variables have been proposed to explain what would influence more or less favourable attitudes, with different results across studies. The type of relationship maintained with disabilities, cultural aspects, age and gender have been singled out as being relevant to this issue (Correa et al. 2022).

Regarding the type of relationship, people with a family member with ID, staff carers for people with ID and general population samples (not directly related to someone with ID) hold different attitudes. Apparently, general population samples seem to hold more favourable attitudes, followed by sector workers and family members (Aunos and Feldman 2002; Lam et al. 2021; Correa et al. 2022).

Attitudes towards the sexuality of people with ID have not been found to be equally favourable in all countries. A comparison between five different countries with a common measure revealed apparent differences (no statistical analysis was performed) between them, finding that White Westerns in the UK held the most favourable attitudes and Indonesian participants the least (Winarni et al. 2018). Moreover, people from different backgrounds showed different attitudes even when living in the same country. South Asians living in the UK had less favourable attitudes than White Westerns living in the UK (Sankhla and Theodore 2015). Although this study proposes that acculturation might be occurring, and that South Asians living in the UK may be more favourable than those living abroad, differences emerge.

Previous studies have explored differences according to cultural orientation variables. One study found that up to 27% of the variability in attitudes may be explained when considering measures of individualism and collectivism (Ditchman et al. 2017). According to the latter study, the constructs of individualism or collectivism are a fundamental way of examining culture. Societies that are more individualistic or collectivistic differ from each other in significant cultural aspects, such as social norms and values (Hofstede et al. 2010), both of which are directly associated with how people relate to each other and how sexuality is addressed in a geographical area. In fact, individualism has already been related to general sexuality and has even shown a positive correlation with behavioural aspects such as sexual frequency (Ubillos et al. 2000). However, it should not be ignored that the degree of individualism of a country is often related to a higher socio-economic development (Hofstede et al. 2010).

In addition, the socio-economic development of a country may be related to the acceptance of self-expressive sexual values, among others (Lottes and Alkula 2011), so a similar pattern in attitudes towards the sexuality of adults with ID could be expected.

Age has been extensively examined in relation to attitudes towards the sexuality of people with ID (Lam et al. 2021; Correa et al. 2022; Pebdani and Tashjian 2022). Older age appears to be associated with less favourable attitudes (Karellou 2003; Cuskelly and Bryde 2004; Esterle et al. 2008), reflecting the ideological paradigms of each generation in terms of sexuality. Although some studies did not replicate these findings (Ryan and McConkey 2000; Sankhla and Theodore 2015), this difference has been proposed as an explanatory hypothesis for differences between samples (Cuskelly and Bryde 2004; Evans et al. 2009).

Finally, gender has also been proposed as a moderator variable, yielding heterogeneous results (Lam et al. 2021; Correa et al. 2022). Some studies found that women have more favourable attitudes than men in some aspects such as their right to an affective or sexual life, marriage or sex education (Franco et al. 2012; Ditchman et al. 2017), whereas others did not replicate this relationship. One study found that men had more favourable attitudes towards parenting and sex education among adults.
with ID (Ryan and McConkey 2000). Another study found that women had less favourable attitudes than men regarding socio-sexual behaviours among people with ID in the context of different-gender relationships, but more favourable than men in the context of same-gender relationships (Oliver et al. 2002). Other studies found no relationship between respondents’ gender and attitudes (Karellou 2003; Cuskelly and Bryde 2004; Grieve et al. 2009).

One difficulty in comparing results across studies is the heterogeneity of the approaches used (Morales et al. 2010). According to previous review studies, the Attitudes to Sexuality Questionnaire—Individuals with an Intellectual Disability (ASQ-ID) was found to be the most frequently used measure in different projects and countries (Lam et al. 2021; Correa et al. 2022). Up to eight studies using the ASQ-ID measure in its final form were identified, followed by a case-scenario proposal used in three studies, the POS and GSAQ-LD scales used in two studies, and the SAQ and SMRAI measures, used in only one study each (Correa et al. 2022). Other studies used self-generated interviews and questionnaires to assess attitudes, the use of which was not widespread to other studies as much as the ASQ-ID (Correa et al. 2022). The ASQ-ID (Cuskelly and Gilmore 2007) is a 28-item scale that covers different aspects of sexuality, such as those related to the sexual rights of adults with ID, the capacity or possibility of the adult with ID to be a parent, the right to maintain non-reproductive sexual behaviours and the capacity for self-control (related to sexuality).

The current attitudinal paradigm has recently been systematically reviewed, with interesting but heterogeneous results (Lam et al. 2021; Correa et al. 2022; Pebdani and Tashjian 2022). However, to our knowledge, no study has attempted to compile data from different studies with a statistical approach to try to clarify this issue. Therefore, the present study aims to examine how attitudes are influenced by previously reported variables in different studies and countries using meta-analytic methods. Given that the ASQ-ID has been identified as the most commonly used measure, four independent meta-analyses were conducted for the different ASQ-ID subscales, including all the identified primary studies using this measure. In addition, the potential moderation role of several variables of interest were tested, such as the sample type (family, staff or general population), variables related to country of origin (individualism and socio-economic development), age and gender.

Method

The present research conducted a meta-analytic review of studies on attitudes towards the sexuality of adults with intellectual disabilities, as assessed by the ASQ-ID questionnaire. This meta-analytic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA-P) tool (Moher et al. 2015). The corresponding review protocol was registered on the open science framework network (https://osf.io/b9f37) and the PRISMA 2020 checklist is available as Data S1.

This meta-analytical review is part of a broader project in the field of attitudes towards the sexuality of adults with intellectual disabilities, which began with a general and broad systematic review by Correa et al. (2022). After this first approach, it was observed that several studies used the ASQ-ID measure. This made it possible to carry out a statistical approach to the issue, which had not been previously attempted and had two main purposes. (1) Try to confirm the consistency of some of the previously reported outcomes across studies, with a statistical support, giving strength to any conclusions made. (2) To draw out broader data related to the context of different countries with regard to attitudes, such as individualism and GDP per capita, and to perform a comparison that had not previously been possible, supported by statistical analysis which could evaluate different studies. Compared with that first broad approach, this meta-analysis offers more specific and strong conclusions and allows us to explore new contextual and cultural factors that were not adequately explored in our previous work nor previous literature.

Search strategy and selection of studies

Initial search and reference retrieval was conducted in July 2021 through the following databases: PubMed, Scopus-Elsevier, ProQuest Central, Education Resource Information Centre (ERIC) and Web of Science. Search terms were introduced in Boolean
search as follows: (((attitudes AND sexuality) AND (((intellectual OR learning) AND disability) OR (mental AND retardation)) AND ASQ) OR ASQ-ID). Search results were limited to those published between September 2007 (publication date of the ASQ-ID measure) and July 2021. The initial retrieval of references was carried out by one author, whereas the process of screening and selection for inclusion was performed independently by the first and third authors of the manuscript. There were no disagreements. This process is summarised in Fig. 1, and the descriptive statistics of the final sample of studies are shown in Table 1.

Inclusion criteria
Studies included in this review had to meet the following inclusion criteria: (1) used the ASQ-ID measure (Cuskelly and Gilmore 2007); (2) used the original, full version of the ASQ-ID, not a modified or partially applied one; and (3) included or provided data on at least one of the following characteristics of the sample: country of origin, mean age, percentage of women or specify the type of sample responding to the scale (family, staff or general population).

Data extraction and treatment
The three study authors agreed and designed a CSV data extraction sheet to extract and process the data from the included studies. This sheet was completed by one author and reviewed by a second author, with no disagreements arising. For those studies that included information from different subsamples (family, staff or general population), each subsample was recorded independently. The data collected on this sheet included the mean response scores (and standard deviation) for each subscale of the ASQ-ID and data for the six selected moderator variables (commented in the moderator variables section). This sheet was also used to conduct the necessary data transformations.

ASQ measurement and data transformations
The selected studies provided a full administration of the original ASQ-ID measure (Cuskelly and Gilmore 2007). The ASQ-ID is a 28 items (in its final version) scale, which aims to assess general attitudes towards the sexuality of adults with a mild to moderate intellectual disability. This scale is answered on a 6-point Likert scale, where 1 = strongly disagree and 6 = strongly agree. Rather than using an

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Figure 1. Systematic review flowchart.

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Once transformed, the overall mean scores needed a final transformation (described below).

Third, some studies gave an overall subscale score (Cuskelly and Gilmore 2007; Gilmore and Chambers 2010; Pebdani 2016; Chou et al. 2018; Deffew et al. 2022), rather than a mean response score for each subscale (used value, allowing for intra-study comparisons between subscales and not just across studies). Therefore, these overall means and standard deviations were converted according to the ASQ-ID structure data (dividing by 13, 7, 5 or 3) to obtain mean response scores for each subscale.

Fourth, and related to moderator variables, some studies did not report a mean value for age (Cuskelly and Gilmore 2007; Gilmore and Chambers 2010; Meaney-Tavares and Gavidia-Payne 2012; Sankhla and Theodore 2015; Winarni et al. 2018; Deffew et al. 2022). In these cases, the study authors were contacted in an attempt to obtain these data. The same was done for gender in the study of Winarni et al. (2018), who provided the corresponding data. For those cases where a response on mean age was received, these data were reported as not available due to the method of data collection (by age ranges). For these studies, a mean age value was calculated by generating the weighted mean value of the means of the age ranges provided.

Table 1  Effect size estimates and 95% CI of the studies included in the meta-analysis for each ASQ subscale

| Studies                        | N   | Sexual Rights | Parenting | Non-reproductive Sexual Behaviour | Self-Control |
|--------------------------------|-----|---------------|-----------|-----------------------------------|--------------|
| Chou et al. (2018), S1         | 130 | 3.48 [3.38;3.59] | 2.62 [2.45;2.79] | 4.24 [4.11;4.37] | 3.50 [3.32;3.68] |
| Chou et al. (2018), S2         | 173 | 4.06 [3.97;4.15] | 3.24 [3.06;3.41] | 4.99 [4.88;5.10] | 3.77 [3.62;3.91] |
| Chou et al. (2018), S3         | 645 | 4.34 [4.30;4.38] | 4.40 [4.33;4.47] | 4.99 [4.93;5.05] | 4.38 [4.22;4.53] |
| Cuskelly and Gilmore (2007)    | 261 | 4.53 [4.43;4.63] | 4.37 [4.25;4.49] | 3.00 [2.91;3.09] | 4.50 [4.40;4.61] |
| Deffew et al. (2022)           | 86  | 4.71 [4.58;4.84] | 4.84 [4.65;5.02] | 5.32 [5.17;5.47] | 5.13 [4.96;5.31] |
| Di Marco et al. (2013)         | 122 | 4.34 [4.24;4.44] | 4.22 [4.05;4.39] | 4.53 [4.38;4.68] | 4.46 [4.30;4.62] |
| Ditchman et al. (2017)         | 227 | 4.42 [4.33;4.51] | 4.50 [4.38;4.62] | 4.13 [4.04;4.21] | 4.30 [4.18;4.42] |
| Gilmore and Chambers (2010), S1| 169 | 4.81 [4.72;4.89] | 4.51 [4.39;4.64] | 4.90 [4.80;5.01] | 4.89 [4.77;5.01] |
| Gilmore and Chambers (2010), S2| 50  | 4.70 [4.55;4.85] | 4.81 [4.61;5.01] | 4.99 [4.85;5.12] | 4.72 [4.55;4.89] |
| Meaney-Tavares and Gavidia-Payne (2012) | 66 | 4.98 [4.84;5.11] | 4.85 [4.65;5.06] | 5.05 [4.85;5.24] | 5.07 [4.87;5.26] |
| Pebdani (2016)                 | 71  | 5.09 [4.96;5.23] | 4.94 [4.78;5.10] | 5.18 [5.02;5.34] | 5.37 [5.23;5.51] |
| Sankhla and Theodore (2015), S1| 183 | 4.98 [4.89;5.07] | 5.11 [5.01;5.21] | 5.08 [4.97;5.19] | 4.92 [4.80;5.04] |
| Sankhla and Theodore (2015), S2| 143 | 4.45 [4.33;4.57] | 4.48 [4.31;4.65] | 4.70 [4.55;4.85] | 4.40 [4.20;4.60] |
| Tamasi et al. (2019), S1        | 137 | 3.41 [3.32;3.49] | 3.16 [3.02;3.30] | 3.66 [3.53;3.76] | 3.48 [3.34;3.61] |
| Tamasi et al. (2019), S2        | 137 | 3.96 [3.86;4.06] | 3.76 [3.60;3.92] | 4.44 [4.32;4.55] | 3.69 [3.54;3.84] |
| Tamasi et al. (2019), S3        | 137 | 3.50 [3.41;3.58] | 3.17 [3.07;3.27] | 3.71 [3.63;3.76] | 3.23 [3.11;3.34] |
| Winarni et al. (2018)           | 28  | 3.70 [3.62;3.78] | 3.50 [3.39;3.61] | 3.40 [3.33;3.57] | 3.40 [3.33;3.67] |

N, sample size; S1, Study 1; S2, Study 2; S3, Study 3.
The four columns to the right show the effect size and its 95% CI calculated for each measure obtained from each of the studies included in the meta-analysis.
Quality assessment

All the studies that met the inclusion criteria were included for analysis, without quality assessment being an exclusion or inclusion criteria. However, with the exception of one study (Di Marco et al. 2013), all the included studies were published in peer-reviewed academic journals, ensuring minimum quality standards.

Effect size calculation and statistical analysis

Given the design of the studies analysed, the effect size measure selected for the present meta-analysis was the sample mean. The heterogeneity of the estimations was analysed by $Q$ tests and $I^2$ indexes (Huedo-Medina et al. 2006). Statistical analyses assumed a random-effects model, as it is more conservative than a fixed-effects model, allowing generalising conclusions beyond the specific set of studies analysed (Hedges and Vevea 1998; Raundebush 2009; Borenstein et al. 2010). The combined estimates were calculated weighting the individual studies by the inverse of their variances. The method used to estimate between-study variability was the Hartung–Knapp–Sidik–Jonkman method for random-effects meta-analysis (IntHout et al. 2014). All the statistical analyses were performed with R Statistical Software (R Core Team 2021) in the 4.1.2 version, using the metafor package—Version 3.0-2 (Viechtbauer 2010a, 2010b) for the combined estimates, the $Q$ statistic, the $I^2$ statistic estimates and the meta-regression analyses for the continuous moderator variables. We also used the meta package to generate the forest plots—Version 5.1-1 (Schwarzer 2007). In addition, we used the SPSS macros of Lipsey and Wilson (2001) to analyse the categorical moderator variables. To test the publication bias, we calculated Kendall’s tau and the Egger’s test (Borenstein et al. 2010; Botella and Sánchez-Meca 2015), also through metafor. Separate meta-analyses were performed for each of the four subscales.

Moderator variables

In order to analyse the heterogeneity between the results of the studies, we conducted several moderator analyses for each of the four subscales. Six different moderator variables were selected based on their potential explanatory role in the results of the analysed studies. On the one hand, four categorical moderator variables were included in the analyses. First, to assess the socio-economic development of the samples, we included data on the annual per capita income level of the participants’ country of origin, measured by the gross domestic product (GDP) per capita in dollars (<25 000$; $>25 000$), as a moderator variable. Data from the human development reports data centre (available at: https://hdr.undp.org/en/indicators/194906#) in 2018 were used. Data for Taiwan was not available, so based on previous studies (Bergmüller 2013), data from the world factbook (Central Intelligence Agency n.d.) were used instead. It was possible to retrieve GDP data in 2018. Second, we considered the different country origins of the participants (classified by continents, North America, Oceania, Asia and Europe) as a moderator variable. Third, we also included the type of participant sample from the primary studies (family, staff and general population) as another moderator variable. Finally, we considered the level of individualism–collectivism of a significant number of countries has previously been assessed by IBM studies in the form of an individualism index, as reported by Hofstede et al. (2010). This index is reported with scores from 0 to 100, in which higher ratings refer to more individualistic countries and lower scores to more collectivistic countries. For this meta-analysis, the individualism scores reported by Hofstede et al. (2010) for the countries of the included studies were retrieved and considered in a dichotomous format (<50; >50) for the statistical analysis. Furthermore, two continuous moderator variables were also included in the analyses, the mean age of the participants of the primary studies and the gender (in proportions) of these participants.

Results

A total of 11 studies using the ASQ-ID measure were retrieved. Studies including family, staff and/or general population samples were carried out in the UK (Sankhla and Theodore 2015), Ireland (Deffew et al. 2022), the USA (Pebdani 2016; Ditchman et al. 2017), Australia (Cuskelley and Gilmore 2007; Gilmore and Chambers 2010; Meaney-Tavares and
Gavidia-Payne (2012), Italy (Di Marco et al. 2013), Taiwan (Chou et al. 2018), Serbia (Tamas et al. 2019) and Indonesia (Winarni et al. 2018).

Combined effect size estimates

A summary of the results obtained for the four ASQ subscales is shown in Table 2. The combined effect size estimates offer information about the general mean for the set of studies in each of the subscales. The combined effect sizes ranged from 4.15 to 4.49 for each dependent measure. Significance tests were performed with the Hartung–Knapp–Sidik–Jonkman method (IntHout et al. 2014). The effect size was positive for the four measures and all of them reached p-values under .001. The forest plots presented in Figs 2–5 provide a graphical overview of the effects studied for the four ASQ subscales. In addition, all homogeneity tests showed significant values for the Q statistic (P < 0.001), allowing the null hypothesis of homogeneity for the four measures to be rejected. In accordance, the values of the I² statistic reached high values, ranging from 99.01 to 99.42%, indicating that the heterogeneity was considerably higher than expected from random sampling. Following the criteria proposed by Higgins and Green (2011), the heterogeneity of the four measures should be assessed as considerable (>75%). Thus, for all the measures, there was a large amount of heterogeneity that could be explained by the presence of potential moderator variables.

Publication bias

As can be checked in Table 3, the results for Kendall’s tau and Egger’s test did not show any tendency of publication bias in the sample of studies analysed in the present meta-analysis.

Table 2 Combined estimates for each ASQ subscale using a random-effects model (significance tests with the Hartung–Knapp–Sidik–Jonkman method; IntHout et al. 2014)

| ASQ subscale                  | k  | M     | 95% CI  | t     | Q (df)     | I²       | F²       |
|-------------------------------|----|-------|---------|-------|------------|---------|---------|
| Sexual Rights                 | 17 | 4.32  | 4.04; 4.60 | 32.30 | 2019.79(16) | 99.30%  | 30      |
| Parenting                     | 17 | 4.15  | 3.76; 4.53 | 22.64 | 1844.08(16) | 99.23%  | 56      |
| Non-reproductive Sexual Behaviour | 17 | 4.49  | 4.13; 4.84 | 26.66 | 2945.65(16) | 99.42%  | 48      |
| Self-Control                  | 17 | 4.30  | 3.95; 4.65 | 26.19 | 1352.93(16) | 99.01%  | 45      |

k = number of studies analysed for each subscale; M = mean effect size (sample mean).

Figure 2. Forest plot for Sexual Rights.

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Moderator analyses

The moderator analyses for categorical variables are summarised in Table 4. For the socio-economic development variable according to GDP per capita ($<25,000; >25,000$), a statistically significant effect was observed for the Sexual Rights, Parenting and Self-Control subscales. This effect was led by higher subscale scores for participants with an income level over 25,000$. According to the participant’s continent of origin variable (North America, Oceania, Asia, Europe), no statistically significant differences were observed in any subscale. Regarding the type of participant sample variable (family, sector workers, general population), a statistically significant effect was observed for the Sexual Rights and Parenting subscales. This effect was led by higher subscale scores for sector workers and general population than for family samples. Finally, according to the categorization based on the individualism scores variable ($<50; >50$), a statistically significant effect was observed for the Sexual Rights, Parenting and Self-Control subscales. This effect was led by higher subscale scores for participants with individualism scores over 50.

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The moderator analyses for continuous variables are summarised in Table 5. As can be observed, the age of the participants of the primary studies and the gender (in proportions) of these participants did not show statistically significant results in the meta-regression analyses.

Discussion

Current attitudes towards the sexuality of adults with ID play an important role in their experience of sexuality. Understanding current attitudes, and which variables explain differences between studies, is crucial to be able to design effective interventions that are adjusted to peoples’ attitudes. Based on previous studies, this meta-analysis expected that differences would emerge according to the country of origin of the study (especially according to the associated per capita income as an index of socio-economic development and related level of individualism), sample type (family, staff, general population), age and gender. This was partially supported by the data (age and gender were not related to more favourable attitudes).

The comparison of the studies by continent of origin did not yield any statistically significant results. However, this could be expected, as differences were proposed according to cultural orientation variables (Ditchman et al. 2017) attributed to the country of study, or socio-economic indicators of development (Lottes and Alkula 2011) according to the annual GDP per capita data used for this study. Both variables yielded significant results for sexual rights, parenting and self-control.

Levels of individualism or collectivism refer, in general terms, to the degree in which individual interests prevail over group interests, or vice versa (Hofstede et al. 2010). Higher levels of individualism could be related to a relaxation of norms surrounding the topic of marriage and sexuality (Twenge

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**Figure 5.** Forest plot for Self-Control.

**Table 3** Statistical tests for publication bias for each ASQ subscale

| ASQ Subscale                  | Kendall’s tau | Egger’s test |
|-------------------------------|---------------|--------------|
| Sexual Rights                 | 0.29 (P = 0.11) | 1.98 (P = 0.07) |
| Parenting                     | 0.06 (P = 0.78) | 0.35 (P = 0.73) |
| Non-reproductive Sexual Behaviour | 0.09 (P = 0.66) | 1.09 (P = 0.29) |
| Self-Control                  | 0.04 (P = 0.84) | −0.49 (P = 0.63) |
### Table 4: Moderator analysis for categorical variables

#### Sexual Rights

| Variable   | Level       | $k$ | $M$     | 95% CI     | $Q_B$     |
|------------|-------------|-----|---------|------------|-----------|
| Rent       | $< 25,000$ | 7   | 3.79    | 3.56; 4.02 | 35.64 ($P < 0.001$) |
|            | $> 25,000$ | 10  | 4.69    | 4.50; 4.89 | 35.64 ($P < 0.001$) |
| Culture    | North America | 2   | 4.75    | 4.08; 5.42 | 7.39 ($P = 0.06$) |
|            | Oceania     | 4   | 4.75    | 4.27; 5.23 | 4.63 ($P = 0.06$) |
|            | Asia        | 5   | 4.02    | 3.59; 4.44 | 3.65 ($P = 0.06$) |
|            | Europe      | 6   | 4.15    | 3.76; 4.54 | 4.04 ($P = 0.06$) |
| Type of sample | Family   | 2   | 3.44    | 2.84; 4.05 | 2.04 ($P = 0.06$) |
|            | Sector workers | 6   | 4.52    | 4.16; 4.87 | 4.25 ($P = 0.06$) |
|            | General population | 8   | 4.46    | 4.16; 4.77 | 4.46 ($P = 0.06$) |
| Individualism | $< 50$  | 8   | 3.87    | 3.63; 4.11 | 2.04 ($P = 0.06$) |
|            | $> 50$      | 9   | 4.72    | 4.50; 4.95 | 4.68 ($P = 0.06$) |

#### Parenting

| Variable   | $k$ | $M$     | 95% CI     | $Q_B$     |
|------------|-----|---------|------------|-----------|
| Rent       | 7   | 3.41    | 3.09; 3.73 | 35.31 ($P < 0.001$) |
|            | 10  | 4.66    | 4.40; 4.93 | 40.02 ($P < 0.001$) |
| Culture    | North America | 2   | 4.72    | 3.76; 5.68 | 4.63 ($P = 0.06$) |
|            | Oceania     | 4   | 4.63    | 3.95; 5.31 | 4.63 ($P = 0.06$) |
|            | Asia        | 5   | 3.65    | 3.04; 4.26 | 3.65 ($P = 0.06$) |
|            | Europe      | 6   | 4.04    | 3.49; 4.60 | 4.04 ($P = 0.06$) |
| Type of sample | Family   | 2   | 2.89    | 2.06; 3.72 | 11.04 ($P < 0.001$) |
|            | Sector workers | 6   | 4.25    | 3.77; 4.73 | 4.25 ($P = 0.06$) |
|            | General population | 8   | 4.46    | 4.04; 4.87 | 4.46 ($P = 0.06$) |
| Individualism | $< 50$  | 8   | 3.54    | 3.20; 3.89 | 22.33 ($P < 0.001$) |
|            | $> 50$      | 9   | 4.68    | 4.36; 5.01 | 4.68 ($P = 0.06$) |

#### Non-reproductive Sexual Behaviour

| Variable   | $k$ | $M$     | 95% CI     | $Q_B$     |
|------------|-----|---------|------------|-----------|
| Rent       | 7   | 4.21    | 3.71; 4.71 | 2.04 ($P = 0.06$) |
|            | 10  | 4.68    | 4.27; 5.10 | 4.77 ($P = 0.06$) |
| Culture    | 2   | 4.65    | 3.60; 5.71 | 0.11 ($P < 0.001$) |
|            | 4   | 4.48    | 3.73; 5.22 | 4.79 ($P = 0.06$) |
|            | 5   | 4.48    | 3.81; 5.14 | 3.88 ($P = 0.06$) |
|            | 6   | 4.45    | 3.84; 5.06 | 4.15 ($P = 0.06$) |
| Type of sample | 2   | 3.95    | 3.08; 4.82 | 3.34 ($P = 0.09$) |
|            | 6   | 4.86    | 4.35; 5.36 | 4.57 ($P = 0.06$) |
|            | 8   | 4.48    | 4.04; 4.91 | 4.41 ($P = 0.06$) |
| Individualism | 8   | 4.27    | 3.80; 4.74 | 1.53 ($P = 0.022$) |
|            | 9   | 4.68    | 4.24; 5.13 | 4.81 ($P = 0.06$) |

#### Self-Control

| Variable   | $k$ | $M$     | 95% CI     | $Q_B$     |
|------------|-----|---------|------------|-----------|
| Rent       | 7   | 3.63    | 3.67; 3.89 | 42.43 ($P < 0.001$) |
|            | 10  | 4.77    | 4.55; 4.99 | 7.02 ($P = 0.07$) |
| Culture    | 2   | 4.83    | 3.99; 5.66 | 7.02 ($P = 0.07$) |
|            | 4   | 4.79    | 4.20; 5.38 | 7.02 ($P = 0.07$) |
|            | 5   | 3.88    | 3.35; 4.41 | 7.02 ($P = 0.07$) |
|            | 6   | 4.15    | 3.67; 4.63 | 7.02 ($P = 0.07$) |
| Type of sample | 2   | 3.49    | 2.66; 4.31 | 5.07 ($P = 0.06$) |
|            | 6   | 4.57    | 4.09; 5.05 | 5.07 ($P = 0.06$) |
|            | 8   | 4.41    | 4.00; 4.82 | 5.07 ($P = 0.06$) |
| Individualism | 8   | 3.73    | 3.46; 4.00 | 33.29 ($P < 0.001$) |
|            | 9   | 4.81    | 4.56; 5.06 | 33.29 ($P < 0.001$) |

$k$ = number of studies analysed for each subscale; $M$ = mean effect size (sample means); $Q_B$ = between-groups heterogeneity statistic.
jointly, as correlated factors, rather than of a country may explain attitudinal differences in individualism and the socio-economic development of a country has been previously been related to less favourable attitudes towards the sexuality of adults with ID (Lottes and Alkula 2011) and more determined by the group membership and the state ideology (Hofstede et al. 2010). Therefore, positions towards sexuality are more linked to societal thinking. Indeed, the included studies from countries with lower attributed individualism scores describe their outcomes as linked to their countries’ norms and values, including religious influences (Chou et al. 2018; Winarni et al. 2018). Religion has previously been related to less favourable attitudes towards general sexuality (Lefkowitz et al. 2004; Lottes and Alkula 2011).

The socio-economic development of a country measured by GDP has also been related to sexuality issues (Lottes and Alkula 2011). More specifically, this meta-analysis shows that samples from the higher socio-economic group hold more favourable attitudes towards the sexuality of adults with ID. The socio-economic development of a country has been related to changes in ideological aspects, including more tolerant sexual norms (Inglehart and Welzel 2005; Lottes and Alkula 2011) and more egalitarian gender attitudes (Lippa et al. 2010). In general, a country’s socio-economic development is accompanied by other social and political circumstances that may affect the societal thinking and thus explain the observed and past relationships with sexuality issues.

Per capita income data is also related to a country’s attributed level of individualism or collectivism (Hofstede et al. 2010). Therefore, the level of individualism and the socio-economic development of a country may explain attitudinal differences jointly, as correlated factors, rather than independently. The combination of different cultural variables (i.e. income, religious background and gender empowerment) could be behind different patterns in attitudes towards different sexuality issues (Lottes and Alkula 2011), so this could also be expected to explain cross-countries differences in attitudes towards the sexuality of adults with ID. These findings may be particularly relevant, as even if individual differences exist, they highlight that context and general thinking, or the way in which many different aspects of life are socially conceived, are crucial to attitudes and in turn the support given.

According to our results, general population and sector workers held more favourable attitudes than family members for the sexual rights and parenting subscales, as expected (Aunos and Feldman 2002; Lam et al. 2021; Correa et al. 2022). However, the fact that the general population hold the most favourable attitudes may be related to an important aspect. Participants may have reported their attitudes guided by a sense of political correctness, as this can be perceived as a sensitive topic. In addition, this population is expected to have little knowledge about the general functioning of adults with intellectual disabilities, which may have interfered with the adjustment of their responses. The lack of knowledge coupled with the need to give a politically correct answer may be denoting discomfort in answering these questions. This may suggest that the general population perceives a significant gap between the lifestyles, goals, needs and desires of adults with intellectual disabilities and adults without disabilities. Ultimately, this may reflect a problem involving a lack of acceptance of the adult with a disability as any other adult, regardless of their support needs.

Most of the studies that included family samples were composed of parents. Parents may hold more

| Table 5 Meta-regression analysis for continuous variables for each subscale |
|---------------------------------|-------|-------|-------|-------|
| **ASQ Subscale**               | **Age** |       | **Gender** |       |
|                                 | **k**  | **b [95% CI]** | **t**  | **k**  | **b [95% CI]** | **t**  |
| Sexual Rights                  | 17    | -0.01 [-0.04: 0.01] | -1.10 (P = 0.29) | 17    | -0.49 [-2.46; 1.48] | -0.53 (P = 0.60) |
| Parenting                      | 17    | -0.03 [-0.07: 0.01] | -1.81 (P = 0.09) | 17    | -0.99 [-3.66; 1.68] | -0.79 (P = 0.44) |
| Non-reproductive Sexual Behaviour | 17    | -0.02 [-0.05; 0.02] | -0.95 (P = 0.35) | 17    | 0.62 [-1.86; 3.10] | 0.54 (P = 0.60) |
| Self-Control                   | 17    | -0.01 [-0.05: 0.02] | -0.69 (P = 0.50) | 17    | -0.35 [-2.78; 2.09] | -0.30 (P = 0.77) |
overprotective attitudes and behaviours, due to the cultural aspects by which they have learned about sexuality (Evans et al. 2009). Parents of adults with ID are usually older, and age could be an explanatory factor for these differences (Cuskelley and Bryde 2004). Also, misconceptions about sexuality and disability, linked to the reported lack of information and education on the issue (Evans et al. 2009), may also explain the observed differences. Interestingly, parents of people with ID are more supportive of the sexuality of their own child with ID than of others with ID (Karellou 2003).

Therefore, the degree of perceived responsibility over the person with ID and involvement in their life plan could be an additional factor to consider when addressing this issue.

According to our results, age did not explain differences in attitudes between studies. This result was unexpected, as it seemed to be widely accepted in systematic review studies (Lam et al. 2021; Correa et al. 2022; Pebdani and Tashjian 2022). However, this could be explained by the characteristics of the included samples. According to the current literature, older samples hold less favourable attitudes compared with younger ones (Oliver et al. 2002; Meaney-Tavares and Gavidia-Payne 2012). For this analysis, a mean age value was used to compare studies. The youngest sample had a mean age value of 20 and the oldest had one of 54, but the majority was in the 30–45 age range. Therefore, comparisons between the oldest and the youngest were not representative enough. The expected relationship with age seemed logical, as age would reflect the societal thinking of each generation, and current ideologies towards sexuality and relationships seem to be more favourable and diverse than decades ago. This has already been found for sexual permissiveness regarding premarital and extramarital sexuality (Thornton and Young-DeMarco 2001; Kraaykamp 2002) and non-marital co-habitation (Thornton and Young-DeMarco 2001).

Finally, gender was not related to attitudes in our results. Although we expected there to be a relationship between gender and attitudes, it is true that previous literature has already cautioned that this relationship is unclear (Lam et al. 2021; Correa et al. 2022). However, when found, researchers have proposed that women may identify themselves as historically sexually repressed and therefore are more likely to promote the sexual rights of others (Ditchman et al. 2017). A meta-analytic review on general attitudes and sexual behaviour examining gender differences proposed that gender differences in sexuality and attitudes are in fact smaller than researchers think, and when they exist, they may be explained by biological factors, societal power differentials and social pressures to assigned roles (Petersen and Hyde 2011), which could explain the lack of relatedness.

Limitations should be addressed. Relevant variables related to attitudes may have been missed. The variables included in this meta-analysis were based on previous literature and the possibilities offered by the data available in the included studies. However, it is possible that other variables may underlie attitudinal differences. In terms of the interpretability of the results and as highlighted previously, the representativeness of the age variable was compromised by a narrow age range, limited to availability in the included studies. In addition, studies involving survey designs are susceptible to particular biases. In this case, especially respondents from the general population may have been guided by a sense of political correctness, as they have little knowledge about disability. Only studies using the ASQ-ID measure were included. Therefore, relevant information provided by studies with other measures may have been missed in order to preserve maximum comparability of the attitudinal measure.

In addition, other methodological limitations should be mentioned. Due to the nature of the studies analysed, risk of bias analyses were not conducted in the present meta-analysis. The studies included in this meta-analysis do not present the same risks in the design, conduct, analyses and reporting as other kind of studies, as, for example, revisions including randomised trials, interventional or observational studies (e.g. Higgins and Green 2011). Therefore, no differences would be detected for the risk of bias measures in this sample of studies. However, Egger’s and Kendall’s tests for publication bias were included in the analyses, showing that there is not any tendency of publication bias in the sample of studies analysed in the present meta-analysis.

Despite these limitations, we consider that the present study yields relevant information to the field and more specifically to the field of attitudinal studies on the issue. First, it is because to our knowledge, it is
the first meta-analytical approach to this issue, comparing studies across different contexts and countries. Second, it is because it allows to reinforce the known relationship between attitudes and aspects related to the country context, especially socio-economic and cultural orientation (measured by individualism and collectivism) factors. Third, it is because it explores the relationship with age and gender in greater depth.

Due to the nature of the analysed studies, the sample mean was selected as the effect size measure for the present meta-analysis, as so far there are no available primary studies in the existing literature testing comparisons between different groups in their ASQ-ID responses. Future studies should deeply analyse potential sources of differences between groups of interest. For this purpose, we think that the moderator variables analysed in this study can be useful to design future research. This study provides important information for professionals and families when approaching the topic of sexuality of adults with ID, who should consider how attitudes may be limiting their interventions and support actions and be aware of how different populations may react to the sexuality of adults with ID. Particular perceptions should not limit desires and access to a healthy sexual life for anyone, regardless of a person’s disability. On the other hand, adequate support must be provided. Likewise, for professionals involved in health promotion and sexual education, we suggest that they include information towards the normalisation of sexuality among people with disabilities in their interventions and actions. This could be crucial in bringing about an attitudinal change in the population. If we intend to help those adults with ID who want to live their sexuality more efficiently, it is crucial to understand to what extent they are experiencing barriers so that we can direct the necessary efforts to help them.

Finally, these intervention and practical proposals should be considered without ignoring an important and consistent finding across this meta-analysis: the significant differences between countries. In this sense, any proposal may seem utopian, given that these attitudinal differences may be marked by societal thinking, religion and how general sexuality and romantic relationships are perceived. Furthermore, perhaps the way disability is viewed in these areas or how having a family member with a disability is experienced could have an important impact. Therefore, a double reading can be made: First, intervention becomes even more urgent than in other geographical areas, as we should not forget that we are talking about a right, which in those cases is somewhat denied for adults with intellectual disabilities. And second, any action should emphasise some general aspects, such as general human sexuality and functioning, interpersonal relationships, human rights and the rights of adults with intellectual disabilities as analogous and identical to those of any other person. Of course, all of this should be done while maintaining a balance with the utmost respect for all cultures and ideologies.

Conclusions

People’s attitudes towards the sexuality of adults with ID are a major barrier to adults with ID who want to experience their sexuality (Healy et al. 2009). Several variables have been related to more or less favourable attitudes, this study being the first meta-analytic approach to the topic.

Belonging to the general population or being a staff member, being from more individualistic countries and belonging to countries with a higher socio-economic development are related to more favourable attitudes. By contrast, we did not find the expected relationship with gender or age. The latter one could be explained by methodological issues, as differences would be expected when comparing younger and older participants, according to previous studies (Oliver et al. 2002; Meaney-Tavares and Gavidia-Payne 2012).

Therefore, this study leads us to propose that factors regarding the societal and ideological thinking of the population may be limiting attitudes towards the sexuality of adults with ID. According to these findings, factors related to the context in which we grow up may be determining our way of thinking about an issue that should be seen for what it is—a right. This is extremely relevant. Therefore, raising awareness and training actions should be carried out considering the general and specific ideological background of the target populations, in order to support people with disabilities in fulfilling their sexual rights in an effective and healthy way.
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Conflict of interest
All authors declare they have no conflict of interest.

Data availability statement
Data sharing is not applicable to this article as no new data were created or analysed in this study.

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Data St. Supporting Information