



Exploring health-related quality of life of Spanish domestic adult adoptees: sociodemographic characteristics, chronic medical conditions, and gender differences

Yolanda Sánchez-Sandoval¹ · Sandra Melero¹ · Natalia Jiménez-Luque¹

Accepted: 30 July 2019 / Published online: 6 August 2019
© Springer Nature Switzerland AG 2019

Abstract

Purpose The main objective is to study the health-related quality of life (HRQoL) as a positive approach to health in adult adoptees. We will also consider comparison with population norms, relation to chronic medical conditions, the role of sociodemographic variables, and gender differences among the variables in this study.

Methods This was a cross-sectional study of 179 adult domestic adoptees from Spain aged between 18 and 44. They were recruited from a longitudinal study, which was on its third wave. They answered an interview and the self-report measure Health Survey Short Form (SF-12). ANOVAs and *t* test analyses to compare groups, and multiple regression to determine predictors of HRQoL, were performed.

Results Adoptees are not different from the general population in terms of perceived physical health (PH) and mental health (MH). Both PH and MH are related to different variables (e.g., current age is negatively associated with PH, as is the number of chronic medical conditions with MH). Despite the absence of gender differences in MH perception, there were common and different predictor variables for males and females. The number of chronic medical conditions predicts HRQoL regardless of gender. For women, employment is also a predictor, and for men, other variables are being in a romantic relationship, having children, and low income.

Conclusions Adult adoptees are comparable to general population in terms of HRQoL, but there are associated variables (chronic medical conditions and gender) that should be considered. Post-adoption services should promote health and support in life transitions for this group.

Keywords Health-related quality of life · HRQoL · Chronic medical conditions · Adult adoptees · Gender · SF-12

Introduction

There is little evidence about health perception in adult adoptees. Most of the research on adopted adults is about psychological difficulties. Although the trend is to find higher maladjustment in this group, results do not always coincide [1]. Adopted people form a very heterogeneous group. Longitudinal studies of adoptees show that adverse childhood experiences (ACEs) increase the risk of psychological maladjustment in adulthood [2]. An explanation for

the long-term effects is that early adversity might interfere with the normal development of psychological functions such as attachment or self-concept. Research with adults showed that ACEs were significantly associated with lower psychological and social well-being [3].

According to the World Health Organization [4], quality of life is not only affected by physical health and psychological status, but also by personal beliefs, social relationships, and people's relation with significant environmental characteristics. The Health-Related Quality of Life (HRQoL) concept includes health perceptions and their correlates (such as certain risks, health conditions, and social support) at an individual level, and resources and policies at a community level [5]. Wilson and Cleary's [6] model is the most widely used in HRQoL [7]. It is particularly useful in social sciences and, more concretely, in the context of child welfare, as it provides both biomedical and social perspectives.

✉ Yolanda Sánchez-Sandoval
yolanda.sanchez@uca.es

¹ Department of Psychology, Faculty of Educational Sciences, University of Cádiz, Avenida República Saharaui, s/n, 11519 Puerto Real, Cádiz, Spain

Despite the insistence of current HRQoL models on considering the individual within his or her context, most of the research analyzes the relation of HRQoL through the presence of chronic medical conditions in clinical populations [8–15]. The study of the HRQoL of people who were adopted during childhood provides an innovative and closer approach to their physical and mental health from a multi-dimensional and broader perspective. Considering only the psychopathological perspective for the analyses might bias the perception of adjustment in adopted people.

Our work aims to provide empirical data about HRQoL as a measure of quality of life in adopted people within their contexts, considering their sociodemographic and health variables. This study is different from other previous ones that are exclusively focused on the presence of difficulties in these people. This construct (HRQoL) has received less attention from a psychosocial perspective in nonclinical samples. Moreover, there are few investigations with vulnerable groups.

HRQoL in adoptive population and other vulnerable groups

People who experienced ACEs tend to show lower HRQoL during adulthood [16–19]. That relation is even stronger in young adulthood, from 19 to 39 years [17]. Adoption, as a protection measure for children, allows some people to switch from an adverse developmental environment to a protective one. Research on HRQoL in adopted population is scarce; one study analyzed the self-reported physical and mental health statuses of 46 domestic Indian adoptees (mostly female, from 20 to 32 years old) through the Health Survey Short Forms (SF-36) [20]. Its findings reported that most adoptees had a good health perception, both physical and mental. However, some of them displayed problems in their mental health perception that correlated with age at adoption, current age, and age at adoption disclosure. Lower scores on mental health perception are related to stress and anxiety levels, rather than to depression [20]. The Health Behaviour in School-aged Children (HBSC) study [21] shows that Spanish adopted adolescents have similar levels of quality of life to those of the non-adoptees. Moreover, the quality-of-life perception decreases as a function of age. Finally, according to the HBSC study, inter-country adoptees have a better health perception than domestic adoptees. Nevertheless, the literature in this area is scarce, so there is not sufficient previous research to take as starting-point in our study.

However, more research on HRQoL has been performed in other vulnerable groups, such as young people aging out of care who were not adopted, but who lived in institutions. There is evidence of a lower HRQoL during childhood and adolescence among people who live in residential care [22,

23]. Young people living in institutions of the welfare system display a lower HRQoL than those who live in kinship care or those who are adopted. The latter show the highest scores on HRQoL [21]. Good assistance conditions in residential care are extremely important for the subsequent development of quality of life, and to prepare these young people for difficult situations when they reach adulthood and age out of care [24].

HRQoL and other personal and sociodemographic variables

Several studies have associated HRQoL with the presence of chronic medical conditions [8, 9, 14, 15]. More medical conditions had a negative effect both on physical and mental functioning and quality of life. Specifically, the presence of three or more physical conditions was associated with a decrease in the Physical Component Score (PCS) and the Mental Component Score (MCS) [14]. However, the impact on HRQoL depends on the type of the condition reported: health perception is lower in the presence of a cardiovascular disease such as congestive heart failure and hypertension [8], breathing illnesses such as chronic lung disease [8] and chronic obstructive pulmonary disease [10, 15], and other diseases such as diabetes [13], allergies [8], anxiety [11, 12], or chronic otitis [9]. Another study with older adults found no associations between medical conditions and mental HRQoL [10].

HRQoL has also been related to sociodemographic variables. Regarding educational level, whereas low education is associated with lower physical HRQoL [10], other studies found no relation between them [25]. In relation to income level, previous research suggests that a low-income level is associated with lower scores in mental [10, 14, 25, 26] and physical HRQoL [10, 25]. Concerning employment status, there is consensus in that people who are employed have better physical and mental health perceptions [14, 26, 27]. De Fazio et al. [27] associated the perception of mental health with a low number of previous job losses. On the other hand, not living alone and being married are related to better mental health perception [14, 26], and being a parent is negatively related to at least one of the components of HRQoL [28–30]. Despite the fact that previous research tends to agree about the relation between physical and mental health perceptions and other sociodemographic variables, exceptionally, the findings of De Fazio et al. [27] showed that variables such as marital status, living arrangement, educational level, or length of unemployment do not predict physical or mental health perception. On the contrary, these authors stated that age is the only sociodemographic variable that influences both the perception of physical and mental health statuses. Gender is another variable to consider. Previous studies found that females scored lower in

the physical and mental components of HRQoL [31–34], but some works found no differences between females and males in the perception of physical or mental health [20, 27, 35].

In conclusion, chronic medical conditions are associated with lower mental and physical HRQoL, considering also the type and number of conditions. In addition, some sociodemographic variables are negatively associated with HRQoL (educational level, income level, and being a parent), and others are positively associated (employment, living alone, and being married). Finally, results about gender are inconclusive.

The current research is guided by the following purposes: (1) to evaluate the perception of physical and mental health in adoptees in comparison with the norms; (2) to determine the relation between health perception and chronic medical conditions; (3) to analyze the role of sociodemographic characteristics in health perception; (4) to explore gender differences; and (5) to determine the roles of sociodemographic variables and chronic medical conditions in health perception.

It was hypothesized that (1) This group of adopted young adults will show, on average, a more negative health perception than the Spanish general population. (2) The presence of chronic medical conditions will be related to a lower HRQoL. (3) HRQoL will be related to some sociodemographic variables (e.g., lower health perception will be related to lower educational and income levels). As there is no consensus about gender differences on HRQoL, this relation will be explored in our sample.

Methodology

Participants

Participants were 179 Spanish adult domestic adoptees (56% women). This sample came from a longitudinal study with adoptive families that adopted children between 1987 and 1994 in Andalusia (Spain). They were not international adoptions. In this paper, we analyzed the results of participants who completed all the protocols of the three waves and the cases with no missing data. The mean age was 27.62 years ($SD=5.39$, range 18–44 years). Regarding age at adoption, 48.7% were adopted before their first birthday, 34.9% between ages 1 and 5, and 16.4% at age 6 or later ($M=2.23$, $SD=3.05$). At the time of the research, 37.4% were still studying. Concerning educational level, 10.1% had finished primary education, 64.2% had completed high school, and 25.7% had a college degree. Moreover, 49.2% were working, 62.0% had a stable romantic relationship, and 24.6% were parents. Finally, 50.3% were still living with their parents.

Measures

Adoption and life trajectories

A semistructured interview was designed to obtain information from the adopted adults about different areas: academic trajectory, career path, physical and mental health, romantic and family situation, adoption, and personal resources. Data about the number of chronic medical conditions, educational level, income, work status, independent living, romantic status, and having children were obtained from this interview. Concerning the number of chronic medical conditions, participants were asked about the presence or the absence of 35 illnesses (see Appendix). Regarding educational level, they indicated the highest level they had accomplished (primary education, high school, or college). Referring to net income, we established three categories according to the family monthly salary, considering the minimum established in the country at that time: low (≤ 655.20 €), medium (655.21 €–1965.60 €), high (≥ 1965.61 €). Participants answered “yes” or “no” to questions related to having a job, living independently, having a stable romantic relationship, and having children.

Health-related quality of life (HRQoL)

We used the Spanish short form of the Health Survey v.1 (SF-12) [36, 37], which includes questions about health perception on two different subscales: Physical Component Summary (PCS), which assesses physical health perception, and Mental Component Summary (MCS), which evaluates the perception of mental health. Scores are calculated through a weighted mean, and components have a mean score of 50 and a standard deviation of 10. Higher scores in both subscales indicate better HRQoL. This measure showed acceptable reliability in this study: $\alpha = .71$ and $\alpha = .74$, for PCS and MCS, respectively.

Procedure

The current research has a cross-sectional design, although it is part of a longitudinal study. Wave 1 (W1) was assessed in 1995 ($n=394$), when the children had been living with their adoptive parents for an average of 6 years. Wave 2 (W2) took place in 2001 ($n=273$), and Wave 3 in 2016–2018 ($n=179$). Attrition across waves was not systematic regarding sociodemographics from W1 and W2: gender ($\chi^2(1)=.436$, $p>.05$); current age ($t(208.97)=-.812$, $p>.05$); age at adoption ($t(391)=.091$, $p>.05$); sibling groups ($\chi^2(1)=.121$, $p>.05$); ethnicity ($\chi^2(1)=.324$, $p>.05$); disability ($\chi^2(1)=.084$, $p>.05$); institutionalization ($\chi^2(2)=.648$, $p>.05$); pre-adoption maltreatment ($\chi^2(1)=.738$, $p>.05$); parental educational level ($\chi^2(2)=1.027$, $p>.05$); family structure

($\chi^2(1) = 1.384, p > .05$); and satisfaction with adoption at W1 ($t(373) = -.74, p > .05$). More information about these measures can be found in [38].

With the consent of the Public Administration, the authors' university sent letters to every participant. If adoptees accepted being interviewed, an appointment was made for this purpose. Face-to-face interviews took place in the participants' homes or other places they considered comfortable, and lasted around 1 h. All the interviewers were Psychology graduates with experience in interviewing people. They also received specific training to become part of the project. Before the interview, every participant signed informed consent. The data collection followed the principles in the Real Decreto-Ley 5/2018, of July 27, of the urgent measures to adapt the Spanish law to the European Union regulation for data protection. In addition, the project was approved by the Bioethics Committee of the University of Cádiz.

Data analysis

Data were coded and analyzed using statistical software SPSS v.21. First, the descriptive statistics (means, standard deviation, proportions) of all the variables were explored. Then, one-sample t tests were used to determine whether the PCS and MCS means of the adopted group were similar to the means of general population in Spain. Correlations were calculated for quantitative variables. In addition, for qualitative variables, we compared groups of every variable in terms of PCS and MCS, using two independent sample t tests for cases of two categories and analysis of variance (ANOVAs) for more than two categories. To compare variables according to gender, two independent sample t tests (quantitative variables) and Chi-square tests (qualitative variables) were used. Finally, we performed stepwise multiple regression analysis to determine predictors of PCS and MCS, and as a function of gender.

Results

The first analysis compared adoptees' means in HRQoL with the SF-12 Spanish norms developed by Vilagut et al. [39]. Adoptees' means in every gender-age group were not significantly different from the Spanish norms of their reference group (Table 1).

Table 2 presents the correlations between SF-12 scores both for the mental and physical components and the quantitative variables considered herein. Significant negative correlations were found between the PCS and current age, and also with age at adoption. The MCS correlated significantly and negatively with the number of chronic medical conditions. For qualitative variables, mean comparisons were made between the groups determined by all those variables (Table 3). Findings with PCS revealed no significant differences according to educational level, income, employment, living independently, or having a stable romantic relationship. Only people who had children showed a significantly lower PCS than those who did not. In MCS, significant differences were found as a function of educational level. There were no significant differences in MCS concerning the other variables. Bonferroni post hoc test showed that the MCS scores of people who had achieved primary school were significantly lower than those of people who had completed high school or university studies.

We also established some categories for the variable number of chronic medical conditions to analyze possible significant differences in the PCS and MCS means. The categories were: "no medical conditions" (19.0%), "1 or 2 medical conditions" (40.2%), and "3 or more medical conditions" (40.8%). No significant differences were observed in the PCS depending on the number of medical conditions. However, means were statistically significant in the case of MCS, where the groups without medical conditions scored 53.25, the group with one or two medical conditions scored 50.14, and the group with three or more scored 43.04 ($p < .001$). The post hoc tests (Bonferroni), 95% confidence interval

Table 1 Comparison of SF-12 scores with Spanish norms

	Females			Males		
	Mean	Norms	p	Mean	Norms	p
PCS						
18–24	54.00	54.35	.790	55.79	54.62	.278
25–34	52.87	53.53	.610	53.97	54.51	.519
35–44	47.84	52.08	.157	53.90	53.22	.665
MCS						
18–24	48.43	49.24	.623	49.85	51.60	.479
25–34	46.94	49.77	.083	48.88	51.69	.050
35–44	49.38	49.50	.967	39.60	51.79	.067

MCS mental component summary, PCS physical component summary

Table 2 Correlations with SF-12 scores

	PCS	MCS	Age	Age at adoption	Nr. of chronic medical conditions
PCS					
MCS	-.040				
Age	-.177*	-.045			
Age at adoption	-.209**	-.012	.438**		
Nr. of chronic medical conditions	-.121	-.411**	.195**	.135	
Mean	53.49	47.84	27.62	2.23	2.50
SD	7.46	11.10	5.39	3.05	2.26

MCS mental component summary, PCS physical component summary
 * $p < .05$. ** $p < .01$

Table 3 SF-12 Mean score comparisons by sociodemographic characteristics

	PCS	<i>p</i>	MCS	<i>p</i>
Educational level				
Primary ($n = 18$)	53.39 (7.91)	.960	39.42 (16.82)	.003
Secondary ($n = 115$)	53.39 (7.60)		48.78 (10.39)	
University ($n = 46$)	53.76 (7.07)		48.78 (8.68)	
Income				
Low ($n = 13$)	53.32 (9.35)	.982	41.70 (16.74)	.062
Medium ($n = 94$)	53.42 (6.89)		47.47 (11.42)	
High ($n = 72$)	53.61 (7.46)		49.42 (9.00)	
Employment				
Yes ($n = 88$)	53.18 (7.53)	.582	49.45 (9.16)	.054
No ($n = 91$)	53.79 (7.41)		46.27 (12.55)	
Living alone				
Yes ($n = 89$)	52.47 (8.63)	.069	49.95 (11.94)	.292
No ($n = 90$)	54.50 (5.96)		48.71 (10.20)	
Romantic relationship				
Yes ($n = 111$)	52.74 (8.12)	.068	48.95 (10.81)	.086
No ($n = 68$)	54.70 (6.09)		46.02 (11.40)	
Having children				
Yes ($n = 44$)	50.55 (9.82)	.016	44.68 (14.47)	.079
No ($n = 135$)	54.45 (6.26)		48.86 (9.60)	

Standard deviations in brackets

MCS mental component summary, PCS physical component summary

(CI), revealed significant differences between people who had 3 or more chronic medical conditions (lower scores), and those who had 1 or 2 [$p < .001$, 95% CI (- 11.25, - 2.93)] or no chronic medical conditions [$p < .001$, 95% CI (- 15.41, - 5.01)].

Results of the gender comparison are shown in Table 4. Before the analyses, we tested homogeneity of variances among females and males. Levene’s test was nonsignificant

Table 4 Characteristics of respondents by gender

	Females (97)	Males (82)	<i>p</i>
SF-12 (mean, SD)			
PCS	52.77 (8.67)	54.34 (5.63)	.145
MCS	47.73 (11.79)	47.96 (11.79)	.894
Age (mean, SD)	27.02 (5.32)	28.33 (5.43)	.106
Age at adoption (mean, SD)	2.30 (2.93)	2.15 (3.20)	.737
Nr. of chronic medical conditions	2.89 (2.32)	2.05 (2.12)	.013
Educational level (%)			.916
Primary	10.3	9.8	
Secondary	62.9	65.9	
University	26.8	24.4	
Income (%)			.101
Low	6.2	8.5	
Medium	59.8	46.4	
High	31.7	47.4	
Employment (%)	46.4	52.4	.420
Living alone (%)	50.5	48.8	.817
Romantic relationship (%)	67.0	56.1	.134
Having children (%)	26.8	22.0	.452

MCS mental component summary, PCS physical component summary

(.411; $p > .05$), indicating homoscedasticity between the groups. Gender comparison analyses were statistically nonsignificant, except for the number of chronic medical conditions. Females had significantly more than males. Multiple regressions on the MCS were different for females and males, as well as the percentage of explained variance ($R^2 = .23$ females, $R^2 = .33$ males) (Table 5). The number of chronic medical conditions was a predicting variable both for females and males. The MCS decreased as the number of chronic medical conditions increased. For women, another predictor variable was being employed, increasing the MCS. However, for men, predicting variables were having

Table 5 Multiple linear regression: MCS by gender

	β	SE	<i>P</i>	Collinearity statistics	
				Tolerance	VIF
Females (<i>n</i> = 97) (<i>R</i> ² = .23)					
Nr. of chronic medical conditions	− 1.922	.410	<.001	1.000	1.000
Employment	4.848	1.900	.012	1.000	1.000
Males (<i>n</i> = 82) (<i>R</i> ² = .33)					
Nr. of chronic medical conditions	− 1.553	.553	.006	.877	1.140
Romantic relationship	6.984	2.345	.004	.863	1.159
Having children	− 8.747	2.836	.003	.878	1.139
Income (low)	− 11.201	4.124	.008	.896	1.117

a romantic relationship, having children, and low income. Having a romantic relationship improved the MCS, but having children or a low-income level reduced it. Multiple regression was also performed with the PCS, but no significant predictors emerged.

Multicollinearity was assessed through the tolerance and VIF values. There was no multicollinearity among the variables included in each regression, as their VIF values were lower than 10 [40] (Table 5). In addition, the condition indexes were lower than 5, indicating no multicollinearity [41].

Discussion

The present study sought to provide empirical evidence of the quality of life of adults who were adopted domestically as infants. Results in this sample show that adoptees are not different from the general Spanish population in terms of perceived physical and mental health. Physical and mental health are related to different variables, such as current age or the number of chronic medical conditions. Despite the absence of gender differences in mental health perception, predictor variables were different as a function of gender. In women, mental health perception was partially explained by the number of chronic medical conditions and employment. However, for men, the main variables were number of chronic medical conditions, having a romantic relationship, having children, and low income.

Based on previous research where adoptees showed more prevalence of difficulties and more long-term negative repercussions of ACEs, we hypothesized that HRQoL would be lower in this sample. However, our findings do not support this hypothesis. There were no significant differences

between adult adoptees and the general Spanish population. Only the group of adopted males between 25 and 34 years showed a nearly significant difference (*p* = .05) in the mental component. Adopted people in this study displayed a comparable physical and mental health perceptions to the general population, coinciding with previous findings [20]. This study contributes to existing research on adoptees' adjustment over the life course and provides information not only focused on adoptees' difficulties, but also from a positive health perspective. According to Wilson and Cleary's [6] model, many different variables affect quality of life and, probably, a favorable context in adoptive families was a protective factor to make up for possible effects of ACEs during adoptees' first years. Oke et al. [20] also suggested that resilience, which promotes adjustment in terms of HRQoL, might be characteristic of this group.

Our findings partially confirm our second hypothesis. The presence of chronic medical conditions is related to lower HRQoL in its mental component, as in previous studies [8, 9, 14, 15]. However, contrary to our expectations and differently from other works [9, 14], more chronic medical conditions did not have a negative influence on the physical perception. This result suggests that the impact on HRQoL depends on the type and severity of the reported conditions. Results from regression analyses support the idea that medical conditions contribute to perceived mental quality of life in adopted people. Simultaneously, other social and personal variables affect HRQoL, supporting the third hypothesis.

With the increasing age, the physical HRQoL showed a downward trend, which was not the case for mental HRQoL. These data provide partial support to the research performed by De Fazio et al. [27], who found age to be the only sociodemographic variable that influenced the perceptions of physical and mental health, as well as the results of Lim

et al. [14] and Vives et al. [42]. Something similar was observed with age at adoption. Our results show that people who were adopted later had lower physical HRQoL, but not lower mental HRQoL. These findings contrast with those of Oke et al. [20], who found differences in the mental component. Nevertheless, we agree with other authors that, at higher age at adoption, the predicting variable might be the type and duration of pre-adoption adversities [43], in addition to the periods spent in institutional care [44]. The higher the age at adoption, the more the probability of exposure to a greater accumulation of ACEs in these children. This might influence their HRQoL in adulthood, as shown in previous studies [17–19, 45]. However, other variables might mediate or moderate the relation between ACEs and physical health. In that case, resilience seems to mitigate the effects of early adversity [46].

Another important finding, which confirms the third hypothesis, is the relation between educational level and MCS scores. Participants who had reached a lower educational level had more negative MCS scores than those who had finished high school or college. Most of the previous studies consider that education is positively related to health [47]. A possible interpretation of these findings is that people who reach a higher educational level have more life opportunities and, consequently, better health perception. However, people who have a lower educational attainment tend to have less aspirations and resources to cope with life, and this might affect their health perception.

Although the number of chronic diseases had a negative impact on the mental HRQoL for both genders, other predictors differed as a function of gender. Among women, consistently with previous studies [14, 26, 27, 42], unemployment was related to a lower health perception. This suggests that the change of role in women's incorporation into the labor market has promoted a good mental health perception. However, for men, the variable with a positive impact on HRQoL is having a high level of income, as found in previous researches [10, 14, 25]. This might be related to the greater availability of material and psychosocial resources among people with higher economic resources [Mirowsky and Ross 25], which may promote improved health conditions. For males in our sample, having a stable romantic relationship and having children also improved HRQoL, as were shown in previous findings [14, 28–30]. A possible interpretation is related to the availability of a good support network, which can be essential for adult well-being, as shown previously [48]. Supporting this idea, Su and Wang

[49] found a negative association between loneliness and HRQoL.

This work has some limitations that should be considered. The cross-sectional study includes a small and specific sample of adult adoptees. In previous literature, the construct of HRQoL has not been widely studied in this type of population. Although we have national norms as a reference of the measures used, the findings might have been richer using a comparison group of non-adopted people with similar characteristics. The possibilities of accessing this sample were low because of their wide geographic dispersion and the lack of some contact information. Therefore, we could not obtain a higher number of participants. Considering the characteristics of the sample, it would be difficult to replicate the study with a higher number of participants, although it would be interesting to increase the validity of results. Other studies with adult adopted populations used similar sample sizes (e.g., [20]). Lastly, we used self-report measures, which might bias our results because it is difficult to contrast the information provided by other sources.

In conclusion, the most important finding in this work is that the HRQoL of adult adoptees is comparable to that of non-adoptees, despite possible early adversity during their first years of life. As a practical implication, considering the analyzed variables that influence HRQoL, it would be interesting to create post-adoption services oriented toward the promotion of health, especially in groups of people with fewer social and material resources. Post-adoption services should take into account personal health situations of adult adoptees, not only psychopathological symptoms. Medical issues (maybe related to genetics) are a reason for people's demanding post-adoption support to seek their birth families [50–52]. In addition, to consider their mental health perception might help professionals to provide a more personalized service. Our contributions about gender differences suggest the need to adopt a gender perspective to promote higher HRQoL in adults. However, this is an innovative study in adoptive population, so future research based on longitudinal studies is required to validate these findings and to achieve a clinical practice based on scientific evidence.

Acknowledgements This work was supported by the Ministerio de Economía y Competitividad of the Spanish Government [Project PSI2014-52336-R, Young Adult Adoptees' Psychological Adjustment and Developmental Tasks: a 20-year follow-up and keys for intervention].

Appendix: participant's interview

1. Participant Identification Code
2. Province
3. Gender
 - a. Male
 - b. Female
4. Age
5. Age at adoption
6. Are you currently studying?
 - a. Yes
 - b. No
7. What is the highest educational level you have completed?
 - a. Primary education
 - b. High school
 - c. College
8. In which of the following intervals would you place the monthly net income of your family unit?
 - a. Low (≤ 655.20 €)
 - b. Medium (655.21 € – 1965.60 €)
 - c. High (≥ 1965.61 €)
9. Are you currently working?
 - a. Yes
 - b. No
10. Nowadays, do you live alone?
 - a. Yes
 - b. No. Who do you live with?
11. Are you in a stable relationship?
 - a. Yes
 - b. No
12. Do you have children?
 - a. Yes
 - b. No
13. Next, I am going to show you a list of chronic medical conditions. Please tell me whether you suffered any of them (if it was reported by a health professional). If the answer to the first question is negative, go on to the next line.

Chronic medical conditions	Have you ever suffered this condition?	Was this condition reported by a health professional?		Have you suffered it during the last 12 months?		Are you receiving treatment or therapy because of this condition?	
		YES	NO	YES	NO	YES	NO
Diabetes mellitus/high blood glucose/Urine sugar							
Hypertension/high blood pressure							
High cholesterol							
Cancer (malignant tumor,							

including leukemia, lymphoma)							
Colitis/Chronic Bowel Diseases/ Inflammatory Bowel Diseases/ Crohn 's Disease							
Stomach Ulcer/ Duodenal Ulcer							
Chronic constipation							
Chronic lung disease/ Pulmonary Emphysema/ Chronic Bronchitis							
Asthma							
Heart Diseases/ Heart Failure/ Congestive Heart Failure							
Myocardial Infarction/ heart attack							
Angina Pectoris							
Back Pain, neck pain, shoulder pain, low back pain (neck and low-back pain)							
Fibromyalgia							
Chronic skin disease/ Skin Disease							
Immune System Diseases/Chronic allergies (Rhinitis, eye inflammation or endophthalmitis, food allergy, etc.), allergic asthma excluded							
Anemia, Blood Disease							
Blood circulation							
Varicose veins in lower extremities							
Hemorrhoids							
Migraine Disorders/ Headaches/Chronic headache/frequent headaches							
Stroke/ Cerebral Hemorrhage							
Depression/ anxiety							
Other mental problems							
Hypoacusis/hearing problems							
Cataract s							
Arthritis							
Osteoporosis							
Cirrhosis/liver disease/ Liver dysfunction							
Kidney disease							
Urinary incontinence							
Sterility							
Sexually Transmitted Diseases							
Eating disorders (bulimia, anorexia...)							
(Only Male s). Prostate disorders							
Do you have any other medical condition not listed above? If so, please specify them:							

References

- Melero, S., & Sánchez-Sandoval, Y. (2017). Mental health and psychological adjustment in adults who were adopted during their childhood: A systematic review. *Children and Youth Services Review*, 77, 188–196. <https://doi.org/10.1016/j.chilyouth.2017.05.006>.
- van der Vegt, E. J. M., van der Ende, J., Ferdinand, R. F., Verhulst, F. C., & Tiemeier, H. (2009). Early childhood adversities and trajectories of psychiatric problems in adoptees: Evidence for long lasting effects. *Journal of Abnormal Child Psychology*, 37(2), 239–249. <https://doi.org/10.1007/s10802-008-9272-2>.
- Mosley-Johnson, E., Garacci, E., Wagner, N., Mendez, C., Williams, J. S., & Egede, L. E. (2018). Assessing the relationship between adverse childhood experiences and life satisfaction, psychological well-being, and social well-being: United States longitudinal cohort 1995–2014. *Quality of Life Research. Advance Online Publication*. <https://doi.org/10.1007/s11136-018-2054-6>.
- World Health Organization. (1999). *Annotated bibliography of the WHO quality of life assessment instrument - WHOQOL*. Geneva, Switzerland. Retrieved from <http://www.who.int/healthinfo/survey/WHOQOL-BIBLIOGRAPHY.pdf?ua=1>.
- Centers for Disease Control and Prevention. (2000). *Measuring healthy days. Population assessment of health-related quality of life*. Atlanta, GA: CDC.
- Wilson, I. B., & Cleary, P. D. (1995). Linking clinical variables with health-related quality of life. A conceptual model of patient outcomes. *JAMA: The Journal of the American Medical Association*, 273(1), 59–65. <https://doi.org/10.1001/jama.273.1.59>.
- Bakas, T., McLennon, S. M., Carpenter, J. S., Buelow, J. M., Otte, J. L., Hanna, K. M., ... Welch, J. L. (2012). Systematic review of health-related quality of life models. *Health and Quality of Life Outcomes*, 10, 134. <https://doi.org/10.1186/1477-7525-10-134>.
- Alonso, J., Ferrer, M., Gandek, B., Ware, J. E., Aaronson, N. K., Mosconi, P., ... IQOLA Project, G. (2004). Health-related quality of life associated with chronic conditions in eight countries: Results from the International Quality of Life Assessment (IQOLA) Project. *Quality of Life Research*, 13, 283–298. https://doi.org/10.1007/s11136-004-69672-5_1.
- Bakir, S., Kinis, V., Bez, Y., Gun, R., Yorgancilar, E., Ozbay, M., ... Meric, F. (2013). Mental health and quality of life in patients with chronic otitis media. *European Archives of Otorhino-Laryngology*, 270, 521–526. <https://doi.org/10.1007/s00405-012-2031-6>.
- Clay, O. J., Perkins, M., Wallace, G., Crowe, M., Sawyer, P., & Brown, C. J. (2018). Associations of multimorbid medical conditions and health-related quality of life among older African American men. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 73(2), 258–266. <https://doi.org/10.1093/geronb/gbx090>.
- Henning, E., Turk, C., Mennin, D., Fresco, D., & Heimberg, R. (2007). Impairment and quality of life in individuals with generalized anxiety disorder. *Depression and Anxiety*, 24, 342–349.
- Karaaslan, Ö., & Hacımusalar, Y. (2018). Evaluation of body image, sexual dysfunctions and quality of life in female patients with generalized anxiety disorder. *Archives of Clinical Psychiatry*, 45(6), 150–153. <https://doi.org/10.1590/0101-60830000000178>.
- Khunkaew, S., Fernandez, R., & Sim, J. (2018). Health-related quality of life among adults living with diabetic foot ulcers: A meta-analysis. *Quality of Life Research. Advance Online Publication*, 1, 10. <https://doi.org/10.1007/s11136-018-2082-2>.
- Lim, L., Jin, A.-Z., & Ng, T. P. (2012). Anxiety and depression, chronic physical conditions, and quality of life in an urban population sample study. *Social Psychiatry and Psychiatric Epidemiology*, 47(7), 1047–1053. <https://doi.org/10.1007/s00127-011-0420-6>.
- Mewes, R., Rief, W., Kenn, K., Ried, J., & Stenzel, N. (2016). Psychological predictors for health-related quality of life and disability in persons with chronic obstructive pulmonary disease (COPD). *Psychology & Health*, 31(4), 470–486. <https://doi.org/10.1080/08870446.2015.1111369>.
- Becker, G., Merk, C. S., Meffert, C., & Momm, F. (2014). Measuring individual quality of life in patients receiving radiation therapy: The SEIQoL-Questionnaire. *Quality of Life Research*, 23, 2025–2030. <https://doi.org/10.1007/s11136-014-0661-4>.
- Corso, P. S., Edwards, V. J., Fang, X., & Mercy, J. A. (2008). Health-related quality of life among adults who experienced maltreatment during childhood. *American Journal of Public Health*, 98(6), 1094–1100. <https://doi.org/10.2105/AJPH.2007.119826>.
- Espeleta, H. C., Bakula, D. M., Delozier, A. M., Perez, M. N., Sharkey, C. M., & Mullins, L. L. (2018). Transition readiness: The linkage between adverse childhood experiences (ACEs) and health-related quality of life. *Translational Behavioral Medicine. Advance Online Publication*. <https://doi.org/10.1093/tbm/iby130>.
- Salinas-Miranda, A. A., Salemi, J. L., King, L. M., Baldwin, J. A., Berry, E. Lo, Austin, D. A., ... Salihi, H. M. (2015). Adverse childhood experiences and health-related quality of life in adulthood: Revelations from a community needs assessment. *Health and Quality of Life Outcomes*, 13(123), 1–12. <https://doi.org/10.1186/s12955-015-0323-4>.
- Oke, M., Groza, V., Park, H., Kalyanvala, R., & Shetty, M. (2015). The perceptions of young adult adoptees in India on their emotional well-being. *Adoption and Fostering*, 39(4), 343–355. <https://doi.org/10.1177/0308575915611776>.
- Moreno, C., Paniagua, C., Rivera, F., Palacios, J., Román, M., Ramos, P., ... Villafuerte-Díaz, A. (2016). *Adolescentes adoptados: análisis de su estilo de vida, salud, ajuste psicológico y relaciones en sus contextos de desarrollo. Resultados del Estudio HBSC-2014 en España*. Seville (Spain), Ministerio de Sanidad, Servicios Sociales e Igualdad.
- Carbone, J. A., Sawyer, M. G., Searle, A. K., & Robinson, P. J. (2007). The health-related quality of life of children and adolescents in home-based foster care. *Quality of Life Research*, 16, 1157–1166. <https://doi.org/10.1007/s11136-007-9227-z>.
- Nelson, T. D., Kidwell, K., Hoffman, S., Trout, A. L., & Epstein, M. H. (2014). Health-related quality of life among adolescents in residential care: Description and correlates. *American Journal of Orthopsychiatry*, 84(3), 226–233. <https://doi.org/10.1037/h0099812>.
- Lukšík, I., & Hargašová, L. (2018). Impact of residential care culture on quality of life of care leavers. *International Journal of Child, Youth and Family Studies*, 9(2), 86. <https://doi.org/10.18357/ijcyfs92201818214>.
- Pinxten, W., & Lievens, J. (2014). The importance of economic, social and cultural capital in understanding health inequalities: Using a Bourdieu-based approach in research on physical and mental health perceptions. *Sociology of Health & Illness*, 36(7), 1095–1110. <https://doi.org/10.1111/1467-9566.12154>.
- Glynn, K., Maclean, H., Forte, T., & Cohen, M. (2009). The association between role overload and women's mental health. *Journal of Women's Health*, 18(2), 217–223. <https://doi.org/10.1089/jwh.2007.0783>.
- De Fazio, P., Cerminara, G., Calabró, G., Bruni, A., Caroleo, M., Altamura, M., ... Segura-García, C. (2016). Unemployment, perceived health status and coping: A study in southern Italy. *Work*, 53(1), 219–224. <https://doi.org/10.3233/WOR-152246>.
- Coyle, S. B. (2009). *Concerns, social support, and health-related quality of life of mothers (Dissertation)*. Morgan Town, WV: West Virginia University.

29. Latas, M., Stojković, T., Ralić, T., Jovanović, S., Špirić, Ž., & Milovanović, S. (2014). Medical students' health-related quality of life—A comparative study. *Vojnosanitetski Pregled*, *71*(8), 751–756. <https://doi.org/10.2298/VSP1408751L>.
30. Muhwezi, W. W., Okello, E. S., & Turiho, A. K. (2010). Gender-based profiling of quality of life (QOL) of primary health care (PHC) attendees in central Uganda: A cross-sectional analysis. *African Health Sciences*, *10*(4), 374–385.
31. Cherepanov, D., Palta, M., Fryback, D. G., & Robert, S. A. (2010). Gender differences in health-related quality-of-life are partly explained by sociodemographic and socioeconomic variation between adult men and women in the US: Evidence from four US nationally representative data sets. *Quality of Life Research*, *19*, 1115–1124. <https://doi.org/10.1007/s11136-010-9673-x>.
32. Coley, S. L., Mendes de Leon, C. F., Ward, E. C., Barnes, L. L., Skarupski, K. A., & Jacobs, E. A. (2017). Perceived discrimination and health-related quality-of-life: Gender differences among older African Americans. *Quality of Life Research*, *26*(12), 3449–3458. <https://doi.org/10.1007/s11136-017-1663-9>.
33. del Río Lozano, M., García-Calvente, M. del M., Calle-Romero, J., Machón-Sobrado, M., & Larrañaga-Padilla, I. (2017). Health-related quality of life in Spanish informal caregivers: Gender differences and support received. *Quality of Life Research*, *26*, 3227–3238. <https://doi.org/10.1007/s11136-017-1678-2>.
34. Prigent, A., Kamendje-Tchokobou, B., & Chevreul, K. (2017). Sociodemographic, clinical characteristics and utilization of mental health care services associated with SF-6D utility scores in patients with mental disorders: Contributions of the quantile regression. *Quality of Life Research*, *26*, 3035–3048. <https://doi.org/10.1007/s11136-017-1623-4>.
35. Kwon, J. Y., & Sawatzky, R. (2017). Examining gender-related differential item functioning of the Veterans Rand 12-item Health Survey. *Quality of Life Research*, *26*(10), 2877–2883. <https://doi.org/10.1007/s11136-017-1638-x>.
36. Ware, J. E., Kosinski, M., & Keller, S. D. (1996). A 12-item short-form health survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care*, *34*(3), 220–233. <https://doi.org/10.1097/00005650-199603000-00003>.
37. Alonso, J., Prieto, L., & Anto, J. M. (1995). La versión española del SF-36 Health Survey (Cuestionario de Salud SF-36): Un instrumento para la medida de los resultados clínicos. *Med Clin (Barc)*, *104*, 771–776.
38. Sánchez-Sandoval, Y. (2011). Satisfacción con la adopción y con sus repercusiones en la vida familiar. *Psicothema*, *23*(4), 630–635.
39. Vilagut, G., Valderas, J. M., Ferrer, M., Garin, O., López-García, E., & Alonso, J. (2008). Interpretación de los Cuestionarios de Salud SF-36 y SF-12 en España: Componentes físico y mental. *Medicina Clínica*, *130*(19), 726–735. <https://doi.org/10.1157/13121076>.
40. Kleimbaum, D. G., Kupper, L. L., Muller, K. E., & Nizam, A. (1988). *Applied regression analysis and other multivariable methods*. Belmont, CA: Duxbury Press.
41. Belsey, D. A. (1991). *Conditioning diagnostics: collinearity and weak data in regression*. New York: Wiley.
42. Vives, A., Amable, M., Ferrer, M., Moncada, S., Llorens, C., Muntaner, C., ... Benach, J. (2013). Employment precariousness and poor mental health: Evidence from Spain on a new social determinant of health. *Journal of Environmental and Public Health*, *2013*, 1–10. <https://doi.org/10.1155/2013/978656>.
43. Groza, V., & Ryan, S. D. (2002). Pre-adoption stress and its association with child behavior in domestic special needs and international adoptions. *Psychoneuroendocrinology*, *27*(1–2), 181–197. [https://doi.org/10.1016/S0306-4530\(01\)00044-0](https://doi.org/10.1016/S0306-4530(01)00044-0).
44. Hawk, B., McCall, R. B., Groark, C. J., Muhamedrahimov, R. J., Palmov, O. I., & Nikiforova, N. V. (2012). Age at adoption: A measure of time in the orphanage or child-specific factors? *Adoption Quarterly*, *15*(1), 18–34. <https://doi.org/10.1080/10926755.2012.661331>.
45. Whitaker, R. C., Dearth-Wesley, T., Gooze, R. A., Becker, B. D., Gallagher, K. C., & McEwen, B. S. (2014). Adverse childhood experiences, dispositional mindfulness, and adult health. *Preventive Medicine*, *1*, 147–153. <https://doi.org/10.1016/j.ypmed.2014.07.029>.
46. Spencer-Hwang, R., Torres, X., Valladares, J., Pasco-Rubio, M., Dougherty, M., & Kim, W. (2018). Adverse childhood experiences among a community of resilient centenarians and seniors: Implications for a chronic disease prevention framework. *The Permanente Journal*, *22*, 17–146. <https://doi.org/10.7812/TPP/17-146>.
47. Kamin, T., Kolar, A., & Steiner, P. M. (2013). The role of cultural capital in producing good health: A propensity score study. *Slovenian Journal of Public Health*, *52*(2), 108–118. <https://doi.org/10.2478/sjph-2013-0013>.
48. Sánchez-Sandoval, Y., Melero, S., & López-Jiménez, A. M. (2019). Mediating effects of social support in the association between problems in childhood and adolescence and well-being in adult domestic adoptees. *Journal of Happiness Studies. Advance Online Publication*. <https://doi.org/10.1007/s10902-019-00124-8>.
49. Su, S. W., & Wang, D. (2019). Health-related quality of life and related factors among elderly persons under different aged care models in Guangzhou, China: A cross-sectional study. *Quality of Life Research*, *28*(5), 1293–1303. <https://doi.org/10.1007/s11136-019-02107-x>.
50. Amorós, P., Fuentes, N., Maldonado, E., & Mateo, M. (1998). *Adultos adoptados: el conocimiento de sus orígenes*. Pedagogía Social: Situación en España.
51. Curtis, R., & Pearson, F. (2010). Contact with birth parents: Differential psychological adjustment for adults adopted as infants. *Journal of Social Work*, *10*(4), 347–367.
52. Rosset, D., Le Run, J.-L., & Pelloux, A.-S. (2013). La consultation postadoption à l'espace Paris adoption et la recherche des origines. *Enfances & Psy*, *59*(2), 134.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.