

Intangible costs of alcohol dependence from the perspective of patients and their relatives: A contingent valuation study

Costes intangibles de la dependencia alcohólica desde la perspectiva de los pacientes y sus familiares: un estudio de valoración contingente

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Abstract

Alcohol dependence causes multiple problems not only for the person suffering dependence but also for others. In this study, the contingent valuation method is proposed to measure the intangible effects of alcohol dependence from the perspective of the persons directly involved: the patients and their relatives. Interviews were conducted with 145 patients and 61 relatives. Intangible effects of alcohol dependence were determined based on willingness to pay for a hypothetical treatment for dependence, with different success scenarios (100% and 50%). The mean monthly willingness to pay among the alcohol-dependent population was €129 and €168, respectively, for the treatments with 100% and 50% success. The willingness to pay of relatives was greater in both scenarios (€307 and €420, respectively), which could be explained by their greater perception of the family, labour, and health problems resulting from alcohol dependence. Regression analysis showed that patients' willingness to pay is positively related to treatment efficacy, personal income and moderate health deterioration, and negatively related to feeling discouraged and depressed. The results from this study can be applied to economic valuation studies that aim to measure the benefits of programs intended to reduce the prevalence of alcohol dependence. The intangible costs estimated can be added to the direct and indirect costs commonly used.

Keywords: Alcohol; Dependence; Family; Contingent valuation; Willingness to pay.

Resumen

La dependencia alcohólica produce múltiples problemas no sólo a la persona que la padece sino también a su entorno. En este estudio se utiliza la valoración contingente para valorar los efectos intangibles de la dependencia alcohólica, desde la perspectiva de las personas directamente implicadas: pacientes y familiares. Se ha entrevistado a 145 pacientes y 61 familiares. Los efectos intangibles de la dependencia alcohólica se obtienen a partir de la disponibilidad a pagar por un hipotético tratamiento para la dependencia, ante dos escenarios de éxito (50% y 100%). La disponibilidad a pagar media mensual de la población alcohólica es de 129€ y 168€, respectivamente, por los tratamientos con un 50% y un 100% de éxito. La disponibilidad de los familiares es mayor en ambos escenarios (307€ y 420€, respectivamente), lo cual podría ser explicado por su mayor percepción de los problemas familiares, laborales y de salud generados por la dependencia alcohólica. El análisis de regresión realizado muestra que la eficacia del tratamiento, la renta personal y tener un deterioro moderado de la salud influyen positivamente en la disponibilidad a pagar de los pacientes, e influye negativamente estar desanimado y deprimido. Los resultados de este estudio pueden ser aplicados a estudios de evaluación económica cuyo objetivo es medir los beneficios de programas destinados a reducir la prevalencia de la dependencia alcohólica. Los costes intangibles estimados pueden ser añadidos a los costes directos e indirectos habitualmente utilizados.

Palabras clave: Alcohol; Dependencia; Familia; Valoración contingente; Disposición a pagar.

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The excessive consumption of alcoholic beverages is highly prevalent. It is estimated that about 15% of the European population consumes alcohol excessively (Rehm et al., 2004) and about 1.2–3% suffers from alcohol dependence (Anderson & Baumberg, 2006; Rehm, Rehm, Shield, Gmel & Gual, 2013). The effects of excessive alcohol consumption have innumerable direct as well as indirect economic costs (Anderson et al, 2006; Baumberg, 2010). Direct costs refer to expenditures that could have been put to some other productive use, primarily those resulting from greater medical expenses (Johansson et al., 2006). Indirect costs refer, primarily, to the loss of resources caused by reduced participation in the labour market and the lower productivity of workers with alcohol problems (Petersen et al, 2005).

Alcohol dependence also has numerous intangible, or non-financial, costs, such as lowered life expectancy and reduced quality of life (pain, suffering, physical health problems, etc.), for the dependent person, as well as for the persons around them. “These costs are non-financial because they do not have a monetary value, in the sense that you cannot sell or exchange pain. Nevertheless, individuals and society would be prepared to pay something to avoid them, which means they do have a (non-financial) value” (Baumberg, 2010). Most studies that have analysed intangible costs have focused on the effects on the drinker’s health in terms of mortality (Collins & Lapsley, 2008; John et al., 2013) and quality of life. One of the most frequently used quality of life measure is the *quality-adjusted life year*. This measure has been applied to assess both the impact of alcohol dependence (Kraemer et al., 2005; Maheswaran, Petrou, Rees & Stranges, 2013; Petrie, Doran, Shakeshaft & Sanson-Fisher, 2008; Saarni et al., 2007; Sanderson, Andrews, Corry & Lapsley, 2004; Stouthard, Essink-Bot & Bonsel, 2000) and the benefit of interventions aimed at their treatment or prevention (Chisholm, Rehm, Van Ommerem & Monteiro, 2004; Corry, Sanderson, Issakidis, Andrews & Lapsley, 2004; Mortimer & Segal, 2005; Parrott, Godfrey, Heather, Clark & Ryan, 2006; UKATT Research Team, 2005). In Spain, although the clinical guidelines provide an ample description of the intangible consequences, few studies have focused on measurement of these effects. The recent review by García-Pérez et al. (2014) found two studies that quantify the impact of alcoholism on the quality of life (Fernández et al., 2010; Grandes, Montoya, Arietealanizbeaskoa, Arce & Sanchez, 2011) and Mosquera & Rodríguez-Míguez (2015) provide new empirical evidence about the effects of alcohol dependence on the quality of life of the dependent and those around them.

However, the intangible effects on well-being caused by alcohol go well beyond direct effects on the drinker’s health. Thus, alcohol dependence has additional effects on the drinker such as suffering, isolation, family problems, social exclusion, etc. Moreover, this disease has considerable

effects on the drinker’s surroundings (Laslett et al., 2010). Although alcohol is considered the addictive substance that inflicts the most damage to others (Nutt, King & Phillips, 2010), few studies have analyzed these intangible effects. Except some studies have estimated the quality of life lost by cohabiting relatives (Jarl et al., 2008; Mosquera et al, 2015), most of the research in this field focuses on the measurement of direct and indirect costs. So, the research has concentrated on the study of foetal alcohol syndrome and the impact of alcohol abuse on victims of crimes and traffic accidents, using the cost of illness as the primary measurement method (for a review of these studies, see Navarro, Doran & Shakeshaft, 2011). Failure to consider the intangible effects of alcohol consumption can result in significant underestimation of the effects of the disease, as well as of the benefits associated with treatment.

Contingent valuation studies using the willingness to pay (WTP) method have proven to be a useful tool for assessing the effects of certain treatments providing benefits extending beyond health. The WTP method allows valuation of the intangible costs of alcohol dependence based on the maximum amount a person is willing to pay to reduce, eliminate, or avoid the situation. This methodology has been widely applied in the valuation of health consequences (Byrne, O’Malley & Suarez-Almazor, 2005; Fautrel et al., 2007; Greenberg, Bakhai, Neumann & Cohen, 2004; Gueylard-Chenevier & Leloier, 2005; Pinto-Prades, Farreras & de Bobadilla, 2008), as well as clinical procedures (Bergmo & Wangberg, 2007; Boonen et al. 2005; He et al., 2007; Jimoh, Sofola, Petu & Okorosobo, 2007; Sadri, Mackeigan, Leite & Einarson, 2005; Walsh & Bartfield, 2006; Whynes, Frew & Wolstenholme, 2003; Yasunaga, Ide, Imamura & Ohe, 2006; Unutzer et al., 2003) (for a review of studies prior to 2002, see Smith, 2003). Application of this methodology to the area of drugs in general (Bishai et al., 2008; Tang, Liu, Chang & Chang, 2007; Zarkin, Cates & Bala, 2000) and to alcohol dependence in particular has been quite limited. To our knowledge, only two published contingent valuation studies have used the WTP method to measure the effects of abusive alcohol consumption. Jeanrenaud and Pellegrini (2008) utilized a sample of 236 subjects from the general Swiss population to determine the WTP for a curative treatment for alcohol dependence of a hypothetical cohabiting relative. Petrie, Doran & Shakeshaft (2011) used a sample from the general Australian population to determine the WTP for 10% and 20% reductions in damages caused by alcohol within the population. However, we do not know any study that had obtained the WTP of the patients themselves or their relatives. It can be important because there is abundant empirical evidence that shows that the preferences of the general population and the persons directly involved can be quite different (Brazier et al., 2005; Gabriel et al., 1999; Mann, Brazier & Tsuchiya, 2009; Ubel, Loewenstein & Jepson, 2003).

The aim of this study is to quantify the intangible costs of alcohol dependence, from the perspective of the patients themselves and their relatives, in 2010 in Spain. In line with the studies mentioned above, our study applies the WTP method to estimate these intangible effects in an ample sense, not just effects on health. However, unlike them our study measures those effects from the perspective of the persons directly involved, who were personally interviewed by the first author.

Materials and methods

Samples

The patients and relatives were contacted at an alcohol treatment unit within the National Health Service. This care unit treats patients with alcohol dependence from the sanitary area of Vigo (Spain). The sample of patients, all of whom met the DSM-4R criteria for alcohol dependence, included all those who came in for consultation for two months, starting in January of 2010. Participation in the study was voluntary and anonymous. The exclusion criteria were refusal to participate, undergoing the first consultation at the centre, acute alcohol intoxication or untreated mental disorder at the time of the interview, and sufficient cognitive deterioration to hinder comprehension of the questionnaire (in the therapist's opinion). The sample of relatives included all individuals who accompanied the patients participating in the interview on the day it was conducted. If the patients came in for consultation alone at the time of inclusion in the study, the person who usually accompanied them (if there was one) was contacted by telephone to invite them to participate voluntarily. There were no other exclusionary criteria besides the refusal to participate. During the recruitment period, 161 patients came in for consultation. Two patients were excluded for alcohol intoxication, two for untreated mental illness, and six for cognitive deterioration. In addition, five patients were excluded from the analysis because they did not provide a WTP. One subject declined to participate. In only 66 cases were we able to interview a relative (in the remaining cases, no relative was involved in the treatment process). One relative declined to participate and four were excluded because they did not provide a WTP. The first coauthor interview personally and independently to participants, to address potential problems during the interview.

Questionnaire

In the first part of the interview, the participant was informed regarding its voluntary and anonymous nature and informed consent to participate was obtained. At the same time, the participants were also explained that the proposed scenarios were hypothetical and that the answers given would in no way influence the care received. In the

second part of the interview, the following scenario was described to the subject:

"Imagine a hypothetical situation, a situation that is not real. Suppose there is a new treatment to solve the problems related to alcohol. This treatment is not always effective. In 5 out of 10 people (i.e. half of treated patients) is effective, that is, they stop drinking alcohol and have no desire to do so. In the other half of the patients, the treatment is not effective. The effects of the treatment remain for a year. After one year, the subject would have to receive the treatment again with the same probability of success. The treatment is not free, that is, it is not financed by the National Health Service. What is the maximum annual amount you would pay to receive such treatment? Think calmly your answer. You must take into account your level of income. Please note that this payment would mean giving up the consumption of other goods or would reduce their ability to save money".

In addition, as proposed by Blumenschein, Johannesson, Yokoyama & Freeman (2001), a follow-up question was included. After the participants provided the maximum amounts they would be willing to pay for the treatment, they were asked to choose between two answers: *"I'm absolutely certain I would pay it"* and *"I think I would pay but I am not sure"*. If they chose the second answer, they were asked again to provide an amount they were sure they would pay. Next, another scenario was proposed in which the efficacy of the hypothetical treatment was 100% but the patient would have to continue treatment indefinitely, because otherwise there would be a relapse, reverting to the initial situation. As in the previous scenario, the participants were again asked for the maximum they would be willing to pay per month, followed by the follow-up question.

In the third part of the interview, the participants were asked for a subjective opinion regarding the consequences of their alcohol dependence in four areas: health, family relationships, occupational consequences, and legal problems. The possible answers in each case were 'hardly any', 'moderate/some', and 'severe/many'. We also know the date in which the actual treatment started as well as the level of consumption (measured in standard drink units), in a normal day, at that date. Next, standard sociodemographic questions were asked to the participants. Finally, the patients as well as the relatives were asked to complete the 36-item Short-Form Health Survey (SF-36), a generic health-related quality of life questionnaire (information needed for another study underway).

Statistical analysis

The intangible cost of alcohol dependence was estimated based on the mean and median values provided by participants after the follow-up question for both success scenarios. Next, a linear regression was estimated to identify the variables correlated with the WTP. The independent variable was the WTP provided by the participants after the follow-up question and the explanatory variables were

the variables that, a priori, might be related to the WTP. A regression model with random effects was used to take into account that the participants provided two responses, one for the treatment with a 50% probability of success and the other for the treatment with a 100% probability of success.

Validity analysis

There is a consensus that contingent valuation studies, at a minimum, should show a positive correlation between WTP and income level. Therefore, the sign of the regression coefficient for this variable is used as the theoretical validity test. The lack of prior literature regarding an alcohol-dependent population's WTP presents a considerable challenge to our formulation of the hypotheses regarding the remaining variables. In any case, it would seem reasonable that, *ceteris paribus*, the worse the consequences of dependence are, the greater the WTP for treatment should be. Another expected result is for the WTP to be sensitive to the quantity and/or quality of the good (Arrow et al., 1993), known as sensitivity to scale. In our study, we analyse whether or not the WTP for the treatment with 100% success is significantly greater than that for the treatment with 50% success. Failure to support this hypothesis would raise serious doubt about the validity of the results (Diamond & Hausman, 1994).

Compliance with the two preceding analyses of validity is a necessary but not a sufficient condition to guarantee the validity of the results. Criterion validity is the most important validity test, because it analyses the extent to which the results for a hypothetical scenario match those obtained in a real transaction. Since a hypothetical treatment was proposed in our study as a mechanism for obtaining the intangible costs of alcohol dependence, the criterion validity cannot be tested. The impossibility of testing criterion validity is common to other WTP studies (in fact, the lack of a real market is one of the reasons that justifies performing WTP study). However, this test is relevant because the differences between the WTP in a real and a hypothetical situation can be quite large. The study of Blumenschein et al. (2001) on WTP for an asthma treatment found that the overestimation obtained from the hypothetical scenario (compared to a real purchase scenario) was corrected by asking the interviewees if they were absolutely certain they would make the payment they had mentioned. For this reason, to minimize the potential difference between the real and hypothetical WTP, we asked a follow-up question assessing the certainty with which the interviewees would pay the amounts they initially provided.

Results

Description of the samples

Table 1 summarizes the characteristics of the 145 patients and 61 relatives selected. Males dominate the patient sample and about half live with a wife or partner. The

mean personal income is €766 and 20 subjects gave their income as €0 (in seven cases, the family income was also €0). We compared information from the patient sample for sex, mean age and education, with information provided by the institution for all patients under its care and found no significant differences. More than half of the sample of relatives consists of women, spouses of the dependent person. Table 1 also reports the mood (downhearted and depressed) of the dependent person during the last four weeks (obtained from the SF-36) and the percentage that had family support (patients were considered to have family support if we contacted a family member for inclusion in the study).

With regard to the perception of the interviewees regarding the consequences of alcohol dependence, it seems that patients as well as relatives agreed that family problems, followed by health problems, are the most frequent. However, except for legal problems, relatives perceived significantly greater problems than expressed by patients (this conclusion holds when we compare the sample of relatives to the subsample of 61 patients whose relative was interviewed).

All data are available by request to the corresponding author.

WTP results

Table 2 gives the mean and median WTP and Figure 1 provides the WTP distribution. The mean monthly WTP for a treatment with 50% efficacy was €135 after the first question and €129 after the follow-up question. In 23 cases, the answer was €0. The monthly WTP for the treatment with 100% effectiveness was €168, rejecting the existence of insensitivity to scale. Since only one individual changed the response after the follow-up question, the final WTP was practically the same as before. In 22 cases, the answer was €0.

Among patients who were unwilling to pay anything, there is no evidence that their answers can be considered "protest" responses. To start with, 55% of interviewees with zero WTP for the treatment with 100% success had no personal income and 29% had no family income either (they got by with help from other persons or non-governmental institutions). These percentages are slightly reduced (to 52% and 27%, respectively) when the treatment had a 50% success rate. In addition, if we examine only the participants who did have personal incomes, the mean income is 23% greater among those who had a positive WTP, compared to those who provided a zero WTP response. Finally, the participants who provided a zero WTP mentioned their low level of income as the reason for this response. Therefore, we believe that there is not a clear justification for considering these responses as "protest" responses and they have been included in the analysis.

The WTP for the sample of relatives was significantly greater, with a mean monthly WTP of €307 when the

Table 1. *Description of samples of patients and relatives*

| | | Patients (n = 145) | Relatives (n = 61) |
|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|
| Sex (% males) | | 69.66 | 18.03 |
| Age distribution (%) | 18 to 29 years old | 5.59 | 6.56 |
| | 30 to 44 years old | 30.34 | 31.15 |
| | 45 to 59 years old | 48.28 | 39.34 |
| | 60 years old and older | 15.86 | 22.95 |
| Mean personal income (€/month) | | 765.93 | 854.16 |
| Mean family income (€/month) | | 1301.03 | 1826.57 |
| Level of education (%) | Elementary or less | 66.9 | 68.85 |
| | Secondary | 25.52 | 16.39 |
| | Higher | 7.59 | 14.75 |
| Living with a partner (%) | | 45.52 | 85.24 |
| Downhearted and depressed (%) | None/a little of the time | 37.93 | 50.82 |
| | Some/most/all of the time | 62.07 | 49.18 |
| Family consequences (%) | Hardly any | 17.93 | 8.2 |
| | Moderate/some problems | 36.55 | 31.15 |
| | Severe/many problems | 45.52 | 60.66 |
| Health consequences (%) | Hardly any | 31.03 | 19.67 |
| | Moderate/some problems | 40.69 | 44.26 |
| | Severe/many problems | 28.28 | 36.07 |
| Legal consequences (%) | Hardly any | 69.66 | 78.69 |
| | Moderate/some problems | 15.86 | 8.2 |
| | Severe/many problems | 14.48 | 13.11 |
| Occupational consequences (%) | Hardly any | 69.66 | 52.46 |
| | Moderate/some problems | 17.24 | 22.95 |
| | Severe/many problems | 13.10 | 24.59 |
| Alcohol intake before treatment (%) | <4 units/day (men)/ <3 (women) | 12.41 | |
| | >4 and <8 (men) / >3 and <6 (women) | 18.62 | |
| | >8 units/day (men)/ >6 (women) | 68.97 | |
| Duration of treatment (months) | < 4 | 12.41 | |
| | 4 - 6 | 7.59 | |
| | 7 - 12 | 15.17 | |
| | 12 - 24 | 35.86 | |
| | > 24 | 28.97 | |
| Has family support (%) | | 42.76 | |
| Relationship with dependent (%) | Spouse | | 67.7 |
| | Son/daughter | | 4.6 |
| | Sibling | | 10.8 |
| | Parents | | 12.3 |
| | Others | | 4.6 |

Table 2. *Mean and median monthly willingness to pay (WTP) values for patients and relatives*

| | Patients (n = 145) | | | Relatives (n = 61) | | |
|--------------------------|----------------------------|--------------------------|----------------------------------|----------------------------|--------------------------|----------------------------------|
| | Mean (stand. error) | Median (min, max) | Percentiles 25 and 75 | Mean (stand. error) | Median (min, max) | Percentiles 25 and 75 |
| Initial WTP 50% success | 135.41 (14.06) | 100 (0-1000) | 30–200 | 322.95 (48.70) | 200 (0-2000) | 80–400 |
| Final WTP 50% success | 128.95 (14.01) | 90 (0-1000) | 30–150 | 306.72 (48.87) | 200 (0-2000) | 55–300 |
| Initial WTP 100% success | 167.59 (18.05) | 100 (0-1000) | 30–200 | 420.25 (65.21) | 300 (0-2000) | 100–475 |
| Final WTP 100% success | 167.53 (18.05) | 100 (0-1000) | 30–200 | 420.25 (65.21) | 300 (0-2000) | 100–475 |

treatment efficacy was 50% and a mean monthly WTP of €420 when the efficacy was 100%. Only four relatives provided a zero WTP. The median is lower than the mean

but shows the same pattern, with higher values for the 100% success treatment than for the 50% success treatment and higher valuations from relatives than patients.

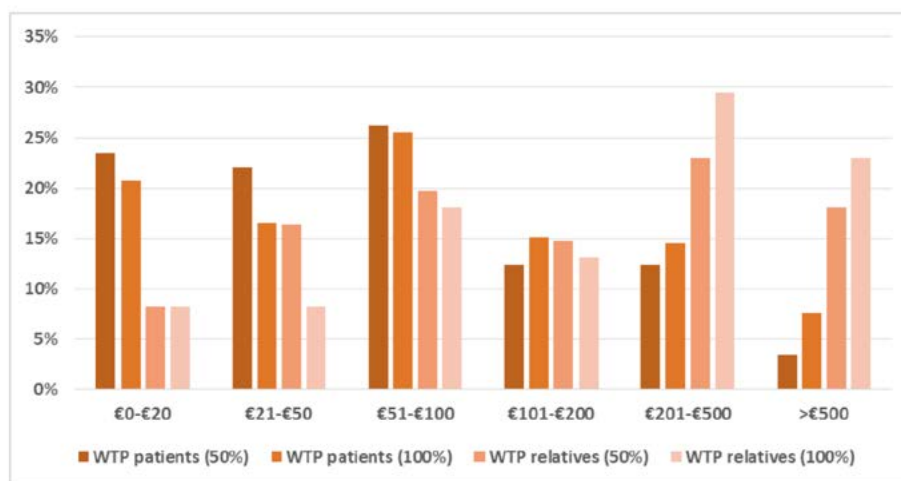


Figure 1: Distribution of willingness to pay (WTP)

Determinants of the WTP

Table 3 shows the results from the regression analysis performed to identify possible determinants of patients' WTP. WTP is positively correlated with treatment efficacy (sensitivity to scale). Accordingly, interviewees were willing to pay an additional €39 for treatment that guaranteed success, compared to one with only a 50% success rate. Personal income is also positively correlated with WTP, supporting the theoretical validity of the results. The WTP is also positively related to having family support (was able to contact a relative involved in treatment) and negatively related to feeling downhearted and depressed during the last four weeks.

[Insert Table 3]

With regard to the effects of alcoholism on health, it was found that persons for whom alcohol dependency had caused moderate health problems were willing to pay €108 more than those who hardly any had health problems. However, when alcohol dependence had caused serious health problems, WTP, although positive, was not significant. In any case, the result that might a priori seem most surprising is the negative correlation between the presence of serious family problems and WTP. This result combined with the fact that WTP is negatively related to feeling downhearted and depressed may be related to the influence of the subject's self-efficacy on his or her expectations. In other words, to pay more for a treatment, there must be some degree of optimism about the possibility of success, which could be less plausible in highly deteriorated family situations. However, these results hold even for the 100% probability of success, which may indicate limited motivation to improve one's life among patients in highly deteriorated situations.

The variable "alcohol intake" (see table 1) has been excluded from regression analysis because it refers to the

date in which the actual treatment started, which is not representative of the current situation. In any case, we estimated the regression with this variable and it was not significant, obtaining similar results in the rest of variables. We also estimated the model excluding the patients who had no personal income. Similar results were obtained with regard to the sign and the significance of parameters, except that *severe family consequences* was not significant ($p=0.127$).

The results of the regression performed on data from relatives (not shown) indicate that none of the variables examined significantly influences WTP, except for the probability of success and income (both significant at the 5% level). In any case, we must be very cautious with these results, given the small size of the sample of relatives.

Discussion

The objective of this study is to obtain a monetary valuation of the intangible costs of alcohol dependence by means of a contingent valuation study conducted with the patients and their families. Although, to our knowledge, no prior study of these characteristics has been conducted, the study with the greatest similarity to ours is that of Jeanrenaud et al (2007), conducted with a sample of the general Swiss population. The authors found that the mean WTP for a curative treatment for alcohol dependence of a hypothetical cohabiting relative accounts for about 7% of the average monthly household income, a percentage that is significantly lower than that obtained in our sample of relatives (23% of the income). This difference may reflect the discrepancy between assuming one has and actually having an alcoholic relative. Our sample of patients also provides, in relative terms, greater WTP (13% of the family income) than that of the Swiss population.

The lower WTP for the dependents than for their relatives could have different explanations. First, the income of the

Table 3. *Determinants of monthly willingness to pay (WTP)*

| | Coefficient | p-value | 95% Conf. Interval |
|--|-------------|---------|--------------------|
| Treatment efficacy (ref. 50%) | 38.59 | .001 | 22.67 – 54.50 |
| Sex (ref. male) | 1.90 | .955 | -63.86 – 67.65 |
| Age | -1.23 | .430 | -4.29 – 1.83 |
| Education (ref. elementary school or less) | | | |
| Secondary school | -2.55 | .944 | -73.26 – 68.16 |
| University | 5.43 | .927 | -110.97 – 121.82 |
| Monthly personal income | 0.10 | .001 | 0.04 – 0.15 |
| Health consequences (ref. hardly any) | | | |
| Moderate/some | 108.29 | .002 | 40.71 – 175.87 |
| Severe/many | 23.98 | .562 | -57.08 – 105.03 |
| Family consequences (ref. hardly any) | | | |
| Moderate/some | -64.27 | .138 | -149.23 – 20.69 |
| Severe/many | -70.97 | .099 | -155.42 – 13.47 |
| Legal consequences (ref. hardly any) | | | |
| Moderate/some | -8.42 | .855 | -98.78 – 81.94 |
| Severe/many | 25.05 | .591 | -66.32 – 116.42 |
| Occupational consequences (ref. hardly any) | | | |
| Moderate/some | -24.80 | .580 | -112.77 – 63.14 |
| Severe/many | -7.02 | .888 | -104.96 – 90.92 |
| Downhearted and depressed (ref. none/a little) | -74.56 | .015 | -134.63 – -14.50 |
| Duration of treatment | -0.46 | .769 | -3.54 – 2.62 |
| Has family support (ref. no support) | 54.34 | .077 | -5.90 – 114.58 |
| Constant | 151.06 | .173 | -66.08 – 368.20 |

Note. R-sq= 0.265. Number of participants, 145; number of observations, 290

patients was lower than that of relatives and so it is to be expected that the WTP would be lower. However, we find those differences to be very large. One should consider that, while the personal income of relatives is 11% greater than that of patients, the WTP is more than double for both scenarios. Second, differences in the perception of problems generated by dependence (relatives perceive these problems to be significantly more severe than the dependent persons themselves do) could reflect another important part of these differences. In other words, these differences could be partly motivated by differences in the perceived gain in well-being. Finally, there is evidence that individuals may be willing to pay more to avoid a risk or treat the disease of a relative than to protect their own health (Amin & Khondoker, 2004; Viskusi, Magat & Huber, 1987).

It is arguable whether the WTP obtained is capturing solely intangible costs, as was our objective, or, instead, is also capturing tangible costs (direct or indirect). Since Spain has a public health care system that requires minimal copayment for services, it is assumed that the direct cost incurred by the dependence treatment was not incorporated by the interviewees (or, if so, only marginally). However, the WTP could well be capturing part of the indirect costs resulting from loss of productivity (loss of employment, lower income from absenteeism, premature disability pension, etc.).

Although we do not know if participants took these effects into account at the time they provided their WTP, we have information suggesting that any influence they may have had was small. Namely, only 13% of the patients considered that drinking has had severe consequences in their work (although this value increased to 26% if we consider the opinions of relatives).

The lack of an increasing positive correlation between the severity of the consequences of alcohol dependence and the WTP should be emphasized. The results suggest that patients with serious problems provide a significantly lower WTP than those with moderate problems. These results relate to phenomena highly relevant to treating drug dependencies, namely, the perception of self-efficacy (Burling, Reilly, Motzen & Ziff, 1989). Self-efficacy has to do with the perception that the addict has of his or her chances of success and, obviously, the higher those chances are, the more they will pay. This is more likely to come into play for patients with less severe problems (in the very initial phases, with greater control of the situation, etc.) and encouraged than for patients with more problems who may have failed in previous attempts for a cure or for patients who have adapted to their situation. The potential influence of these aspects is apparent in the 50% scenario (patients may perceive their personal probability to be greater or less than

that provided). However, secondary regression analyses indicate these results hold when only the answers referring to 100% success scenario are considered. Consequently, factors such as a lower perception of the seriousness of the problem by patients who have more severe problems (and probably a more severe addiction) may have a greater impact on these results. Our study suggests that there is greater willingness to be treated among alcoholic subjects in the less evolved stages of alcohol dependence, with family support, encouraged, and when a large number of secondary problems are not associated.

Our results are subject to several limitations. First, our sample of people with alcohol dependence is small and it is not taken from the general population, which could cause selection bias. If selection bias is present, we do not know in what direction it would alter the composition of the sample. There could be a bias towards subjects with more serious alcohol dependence, as would be the case with those coming into a centre specialized in the treatment of alcoholism. However, the bias could also come from the exclusion of patients with very severe pathology, linked in many cases to situations of social exclusion, who do not come in for treatment. In any case, our sample has some advantages with respect to an extracted sample of the general population. On the one hand, our recruitment method guarantees that all the patients interviewed are alcohol dependent, as diagnosed by a specialist. On the other hand, the type of contact (within an alcoholism treatment unit) and the interview format (direct interview rather than a mail or telephone interview) provided a response rate and valid questionnaire percentage that were very high compared to those ordinarily encountered in this kind of study (Petrie et al., 2008; Saarni et al., 2007), avoiding the bias that a low response rate could cause.

Second, a considerable portion of patients has no relatives committed to the treatment. This resulted in a particularly small sample of relatives and could introduce selection biases that are hard to evaluate. In addition, the small size of the sample of relatives may have contributed to the result that, among the variables measured, only income and probability of treatment success influenced the WTP. Another possible limitation is the question design. Since one of the scenarios proposed a 100% cure rate, it is possible that the WTP values obtained are strongly conditioned by budget constraints. Obviously, any WTP study faces a budget constraint. When participants have to state how much they would pay for a good, this amount is limited by their income and by what they want to consume with the remaining assets. The problem arises when the benefit is so great that the value the participants assign to the good exceeds their income producing an underestimation of the benefit or insensitivity of WTP values to changes in the quantity of the good. To avoid this, the scope of the good being valued is often decreased by introducing, for example, a probability

of obtaining the good lower than 100%. In our study, an additional scenario was proposed in which the probability of success was 50%. The result is that participants were willing to pay 30% more to guarantee the success of treatment (37% more in the case of relatives). Since the differences are significant, we believe that, at least in the first question (50% success), the participants' WTP was not exhausted, because in the second question the amount was increased. The constraint imposed by the 100% cure is hard to assess. In any case, our results agree with the literature. The study of Neuman and Johannesson (1994), for example, analysing WTP for an *in vitro* fertilization treatment, found that participants were willing to pay between 37% and 47% more (depending on the perspective taken) for a program that ensured 100% success than for one that only had a 50% probability of success.

Finally, the WTP obtained could be influenced by the open-ended question format utilized. This format is especially suitable when the sample size is small (Carson & Hanemann, 2005), as in our study. However, there is empirical evidence that the types of elicitation techniques can influence the values estimated. Relevant literature indicates that values obtained with an open-ended or payment card format are often lower than the results from dichotomous choices (Gyrd-Hansen, Jensen & Kjaer, 2014). In addition, in the area of health services, it has been found that the open format, when compared to the payment card format, produces either lower valuations (Whynes et al. 2003; Donaldson, Thomas & Torgerson, 1997) or no significant differences (Gyrd-Hansen et al., 2014). These results suggest that our study should be providing conservative valuations of the intangible costs of alcohol dependence.

The results obtained can be used—with all necessary precautions given the previously mentioned limitations—in the area of economic valuation, specifically in cost-benefit analysis studies. Our study provides a range of values that could be utilized to approximate the benefits derived from programs focused on the prevention, treatment, or cure of the alcohol dependence. However, the selection of a single value is not easy, since one must decide whether to utilize mean or median values, the results from the 100% or the 50% success scenario (in the last scenario, the benefit from curing dependence is assumed to be twice the value provided), or, finally, answers from relatives or patients. Depending on this decision, the annual value for curing one case of alcohol dependence could range from €1200 – the median provided by patients for a 100% cure rate– up to €7361, twice the mean WTP provided by relatives for a 50% cure rate. We suggest that the annual benefit of curing (or preventing) a case of alcoholic dependence should initially be approximated by using the mean values from the 50% cure scenario (€3095 from the perspective of the patients and €7361 from the perspective of the relatives), with a subsequent sensitivity analysis using the remaining

values. The reason for this choice is that cost-benefit analysis usually utilizes mean values and that we assume that the values estimated for the 100% cure scenario could be strongly restricted by the participants' budget constraints. In any case, these values should be taken with caution. This study shows a methodology to evaluate the intangible costs and provides a first approach to these values, but our findings need to be validated by future studies with larger samples and in other settings.

This study suggests that the contingent valuation approach can be a suitable method for measuring the intangible costs resulting from alcohol dependence, from the perspective of patients and relatives. The results show that the valuations obtained are very different, depending on the perspective taken. Although a vast literature in the area of economic valuation shows disparities between the patients' and the general population's perspectives, these results add new empirical evidence regarding disparities between patients and relatives. In our opinion, future investigations on the measurement of intangible effects of alcohol dependence in particular and of drugs in general should study these differences in greater depth. Since dependent patients may distort the true magnitude of the problem, the perspective of relatives could be especially relevant in that context.

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Conflict of interest

The authors declare that they have no conflicts of interest in the research.

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