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Husbands' and wives' discordant self-reports on couple-level variables: implications for data analysis

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Abstract

Background: Using the couple as unit of analysis raises methodological challenges. This study aims to discuss the appropriate proxy to use in statistical analyses when couples provide discordant answers on the following couple-level variables: household monthly income and length of marital relationship.

Methods: During 12 months (July 2013–June 2014), parents of very preterm infants admitted at all level III Neonatal Intensive Care Units of the North of Portugal were consecutively and systematically invited to participate in this study. Mothers and fathers were surveyed separately, 15 to 22 days after birth. In the current analysis, 82 couples living in the same household were included. A socioeconomic position factor score was computed through a principal component analysis. To seek the most appropriate proxy of the couple's value, the association between the individual answers and the summary measures of couple-level variables, and the factor's score was estimated using generalized linear models.

Results: Almost 40% of couples gave discordant answers about household monthly income [weighted kappa=0.68 (95% confidence interval: 0.58–0.79)], with no association with sex. Approximately 19% of couples disagreed regarding the length of marital relationship [weighted kappa=0.95 (95% confidence interval: 0.92–0.98)], with men declaring longer relationships. No associations were observed between women's and men's answers or the summary measures with the socioeconomic position score.

Conclusions: Suggestions regarding how to handle the methodological problems related with spousal discrepancies include the collection of individual variables through separate interviews alongside couple-level variables using joint interviews.

Keywords: data analysis, discordance, family studies, methods, spouses, surveys and questionnaires

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

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Background

Recent quantitative studies focused on health-related family issues have used the couple as the unit of analysis.^{1–3} This insight enhances the probability of recruiting men in a context where family and parenthood studies have been mainly focused on women's experiences,^{4–6} and enables the analysis of sex patterns and intersectionality regarding personal experiences on health.⁷ Listening both women and men is also essential for a successful design and implementation of evidence-based practices of family integrated care, defined as provision of care that is respectful of and responsive to parents' preferences, needs, and values.⁸

A primary issue to consider in couple-based studies is whether to inquire the couples separately or jointly, since being alone or in the presence of the partner shapes the reporting of experiences and emotions,^{5,9} with spousal presence leading to greater agreement on a variety of attitudinal and behavioral items.^{5,10} In any of these designs, using the couple as a unit increases the complexity of data throughout the research process, from recruitment and data collection to data analysis and interpretation.^{10–12} However, the empirical work around the methodological challenges involved in couples' research is sparse and has been mainly grounded on qualitative data, covering 3 main areas: ethical dilemmas regarding informed consent, voluntary participation, confidentiality, and privacy^{13,14}; issues regarding study design and sampling⁵; and difficulties in data analysis and interpretation.^{3,15} The last topic has also been discussed in quantitative studies, with a focus on the strengths and weaknesses of dyadic analysis,¹⁶ whereas the strategies to deal with

husbands' and wives' discordant self-reports on couple-level variables in data analysis and their implications for measurement, when the couple is questioned separately, are clearly underexplored.¹⁷

Thus, the aim of this article is to discuss the most appropriate proxy to use in statistical analyses when couples provide discordant answers, drawing on a study in which authors observed discordance on household monthly income and length of marital relationship as reported by each spouse when questioned separately.

Methods

This study is based on a cohort of mothers and fathers of very preterm infants, previously described.⁴ The study was approved by the National Data Protection Commission and the Ethics Committees of all hospitals where the data were collected (Centro Hospitalar Universitário de São João, Centro Hospitalar de Vila Nova de Gaia/Espinho, Centro Hospitalar do Alto Ave, Centro Materno-Infantil do Norte, Hospital de Braga, Centro Hospitalar Entre Douro e Vouga, and Unidade Local de Saúde de Matosinhos) and written informed consent was obtained from all participants.

Between July 2013 and June 2014, parents of very preterm infants, born before 32 weeks of gestation,¹⁸ and hospitalized in all level III Neonatal Intensive Care Units (NICU) in the Northern Health Region of Portugal ($n=7$) were systematically invited to participate in a study about parental roles and knowledge in NICU. Parents with illness that precluded NICU visitation (eg, severe chronic conditions) and those who were absent in NICU were excluded. Among the 126 eligible families, 122 (96.8%) accepted to participate, with a total of 83 heterosexual couples living in the same household.

Trained interviewers questioned couples separately, although in approximate times, 15 to 22 days after a very preterm birth, using a structured questionnaire. The decision to inquire couples separately was taken to assess gender-specific lived experiences,^{19,20} without the influence of one partner in another, while respecting privacy and confidentiality as fundamental ethical principles.²¹

Data on sociodemographic characteristics (age, educational level, occupation, employment status, subjective social class, and existence of previous children) was self-reported. Occupations were classified by major professional groups, according to the Portuguese Classification of Occupations (PCO) 2010²² and then grouped in 3 categories: upper white collar, lower white collar, and blue collar. The upper white collar category comprised individuals classified in the upper 3 major groups of the PCO2010: executive civil servants, industrial directors, and executives; professionals and scientists; and middle management and technicians. The lower white-collar category comprised individuals classified in the fourth and fifth major group of the PCO2010: administrative and related workers and service and sales workers. The blue-collar category comprised individuals classified in the sixth to ninth major groups of the PCO2010. These major groups included farmers and skilled agricultural, fisheries workers, skilled workers, craftsmen and similar, machine operators and assembly workers, and unskilled workers. Unemployed participants were classified considering their previous main occupation ($n=23$).

The length of marital relationship was assessed through an open-ended question: "How long have you been living together?" and then the answers were classified in categories with a

12 months interval each (from <12 to ≥ 230 months). Household monthly income question inquired about using previously defined categories ($\leq 500\text{€}$; 501€ – 1000€ ; 1001€ – 1500€ ; 1501€ – 2000€ ; 2001€ – 2500€ ; $>2500\text{€}$). When the answer of one spouse did not match with the partner's answer, participants were classified as "discordant couples."

The data regarding perceived social support and parental stress were collected through self-administered questionnaires. The Portuguese version of the Multidimensional Scale of Perceived Social Support²³ measures the perceived adequacy of social support received from a significant other, family, and friends, through 12 items on a 7-point Likert scale, ranging from 1 (completely disagree) to 7 (completely agree). The Portuguese version of the Parental Stressor Scale: NICU²⁴ measures the parental perception of sources of stress arising from the environment of NICU through 26 items on a 5-point Likert scale, ranging from 1 (not at all stressful) to 5 (extremely stressful). In the present study only the domain "Overall stress" was considered.

After exclusion of a couple with missing values on household monthly income and length of marital relationship, 82 couples were included in the statistical analysis. Descriptive data are presented as count and proportions, mean and standard deviation, and median and interquartile range (P25-P75), according to the type of variables and distribution. The Chi-square test or the Fisher exact test, as well as the 2 independent samples t test or the Mann-Whitney test were used, as appropriate, to compare "discordant couples" with "concordant couples." The agreement within couples was calculated using weighted kappa coefficients and the respective 95% confidence intervals (95% CI).

Looking for the most appropriate proxy of the couple's discordant answer, a principal component analysis with varimax rotation was performed to identify the number and the factors explaining the individual socioeconomic variables (education level, occupation, and subjective social class), and to compute the factors' score of the socioeconomic position for each individual. Considering that household income is an indicator of the socioeconomic position,²⁵ and that the latter shapes the transition for stable family formation,²⁶ we assumed that self-reported household monthly income and length of marital relationship would be associated with individual socioeconomic position score. The association between the wife's answer, the husband's answer, and the summary measures for each couple with the socioeconomic position factor score was assessed using generalized linear models,²⁷ assuming that the strongest association would reveal the most appropriate proxy of couple's answer. Beta regression coefficients (β) were standardized (z scores) and presented with 95% CI.

Statistical analyses were performed using Stata 11.0 (College Station, TX, 2009) and R Statistical Programming Language version 3.2.2.

Results

A total of 40.2% (95% CI: 29.6–51.7) of couples disagreed about household monthly income [weighted kappa=0.68 (95% CI: 0.58–0.79)]. No association with sex was observed: 18 women and 15 men reported higher household income than their spouses. Regarding the length of marital relationship, 18.8% (95% CI: 10.9–29.0) of couples disagreed [weighted kappa=0.95 (95% CI: 0.92–0.98)], with 13 men and 2 women declaring longer relationships than their spouses (Fig. 1). Concordant and

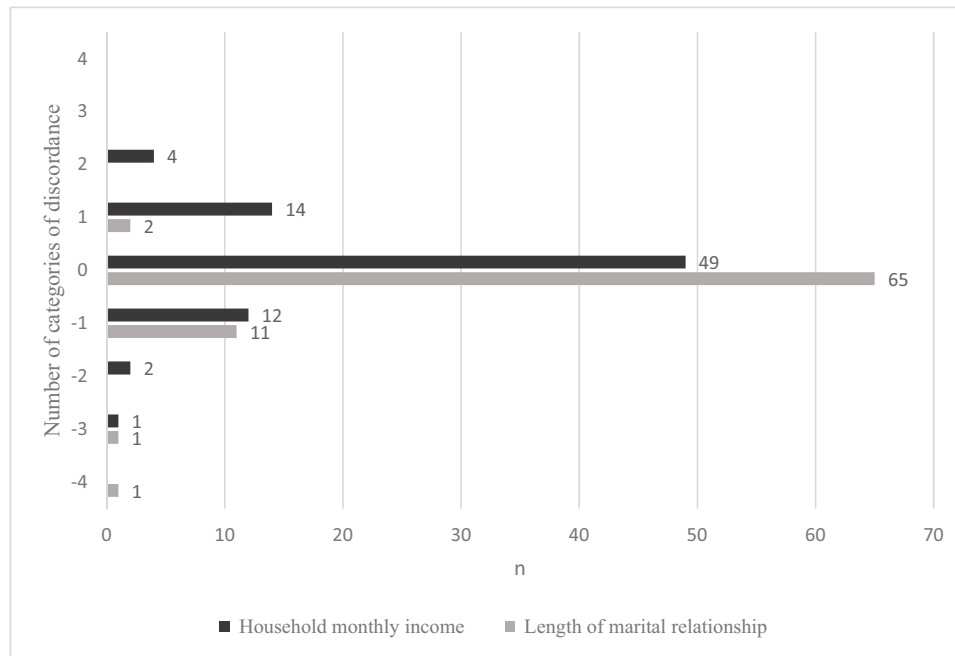


Figure 1. Discordance within the couple regarding the report of household monthly income and length of marital relationship, calculated as the difference between the woman’s and the man’s categories, for each couple. Note: For the household monthly income, 1 category represents a discordance up to 500€; for the length of marital relationship, 1 category represents a discordance up to 12 months.

discordant couples did not differ significantly regarding socio-demographic characteristics, perceived social support, and parental stress (Table 1).

Principal component analysis revealed that individual socioeconomic position variables (educational level, occupation, and subjective social class) were aggregated in 1 factor, explaining 54% of total variance (Table 2).

Household monthly income was positively and strongly associated with the socioeconomic position factor score, whereas length of marital relationship was weakly associated with the score (Table 3). No significant differences were observed regarding the association between women’s answers, men’s answers, or the summary measures of each couple with the socioeconomic position score, both for household monthly income and for length of marital relationship.

Discussion

Approximately 40% and 19% of the couples gave discordant reports about household monthly income and length of marital relationship, respectively, when questioned separately. Men tended to indicate longer relationships than their spouses, whereas no sex differences were observed on the report of household monthly income. The lack of evidence regarding the most appropriate proxy to use in statistical analysis when couples gave discordant answers on household monthly income and length of marital relationship sustains the use of any of the tested measures—the woman’s answer, the man’s answer, the maximum, the minimum, or the mean, while lending strength to the need for developing guidance on how to handle discrepancies analytically. Two major issues arise when assessing self-reported couple-level variables: what type of variables should be used—individual measures, household measures, or both; and the adequate mode of inquiry—separate interview, joint interview, or both.

This study reveals measurement errors when couple-level variables are reported by only one spouse. Our findings show a men’s tendency to report longer relationships, but do not support previous data according to which men tend to state higher income levels,²⁸ neither suggest that the existence of children under 12 years-old in the household is associated with higher levels of discordance among couples on household income’s report.²⁹ Although cohabitation has become progressively prevalent in contemporary societies,³⁰ with couples often moving in together gradually, without a clear start date,³¹ women seem more likely to elect marriage as the landmark of couple’s trajectory, whereas men may have focused on when cohabitation began. Regarding household income, each partner may overstate his/her own income and understate their partner’s income,²⁸ or one of the partners may omit the income resulting from informal occupations.³²

In order to minimize the measurement error, it would be helpful, whenever feasible, to collect individual variables through separate interviews alongside couple-level variables using joint interviews with both spouses. Epidemiological survey studies should consider collecting data from both members of the couple on the start date of the current cohabitation and the start date of the current marriage (when applicable), using the life-history calendar or the time line techniques. In addition, both individual and household monthly income should be assessed, together with household financial and physical assets, such as the value of housing, cars, investments, inheritance, or pension rights,²⁸ and perceived income adequacy.

This study is limited by the sample size, although participants were recruited systematically during 1 year in all the level III NICU located in North of Portugal. The present article reveals several aspects that may be used by different areas of the medical and social sciences, namely regarding: the discussion about the influence of having the partner present in the research setting during a self-administered questionnaire in healthcare stud-

Table 1

Sociodemographic and psychosocial characteristics of discordant and concordant couples on household monthly income and length of marital relationship, stratified by sex

	Household monthly income		P	Length of marital relationship		P
	Concordant (n = 49)	Discordant (n = 33)		Concordant (n = 65)	Discordant (n = 15)	
Women (n=82)						
Age, mean (SD)	32.0 (4.5)	31.5 (5.0)	.641	32.1 (4.5)	31.8 (5.1)	.815
Educational level (yr), n (%)						
Secondary or less	24 (49.0)	20 (60.6)		34 (52.3)	9 (60.0)	
University	25 (51.0)	13 (39.4)	.301	31 (47.7)	6 (40.0)	.590
Occupation*, n (%)						
Upper white collar	18 (39.1)	11 (35.5)		25 (41.0)	3 (21.4)	
Lower white collar	19 (41.3)	12 (38.7)	.809	22 (36.1)	8 (57.1)	.356
Blue collar	9 (19.6)	8 (25.8)		14 (23.0)	3 (21.4)	
Employment status, n (%)						
Employed	38 (77.6)	28 (84.8)		52 (80.0)	12 (80.0)	
Other†	11 (22.4)	5 (15.2)	.414	13 (20.0)	3 (20.0)	1.000
Subjective social class, n (%)						
Low/medium-low	36 (75.0)	23 (69.7)		48 (75.0)	10 (66.7)	
Medium-high/high	12 (25.0)	10 (30.3)	.598	16 (25.0)	5 (33.3)	.527
Previous children, n (%)						
No	24 (49.0)	21 (63.6)		36 (55.4)	7 (46.7)	
Yes	25 (51.0)	12 (36.4)	.191	29 (44.6)	8 (53.3)	.542
Social support (total)‡, median (P25-P75)	6.9 (6.3–7.0)	6.9 (6.3–7.0)	.697	6.9 (6.3–7.0)	6.4 (5.5–7.0)	.119
Parental stress (overall)§, median (P25-P75)	4.0 (3.0–5.0)	4.0 (3.0–5.0)	.871	4.0 (3.0–5.0)	4.0 (3.0–5.0)	.990
Men (n=82)						
Age, mean (SD)	33.7 (5.1)	32.1 (5.7)	.174	33.7 (5.4)	31.1 (4.5)	.086
Educational level (yr), n (%)						
Secondary	32 (65.3)	23 (69.7)		42 (64.6)	11 (73.3)	
University	17 (34.7)	10 (30.3)	.678	23 (35.4)	4 (26.7)	.520
Occupation*, n (%)						
Upper white collar	23 (50.0)	16 (50.0)		32 (51.6)	5 (35.7)	
Lower white collar	7 (15.2)	7 (21.9)	.695	11 (17.7)	3 (21.4)	.542
Blue collar	16 (34.8)	9 (28.1)		19 (30.7)	6 (42.9)	
Employment status, n (%)						
Employed	40 (81.6)	30 (90.9)		57 (87.7)	11 (73.3)	
Other†	9 (18.4)	3 (9.1)	.344	8 (12.3)	4 (26.7)	.224
Subjective social class, n (%)						
Low/medium-low	39 (79.6)	29 (87.9)		55 (84.6)	12 (80.0)	
Medium-high/high	10 (20.4)	4 (12.1)	.328	10 (15.4)	3 (20.0)	.702
Previous children, n (%)						
No	23 (46.9)	20 (60.6)		35 (53.8)	6 (40.0)	
Yes	26 (53.1)	13 (39.4)	.224	30 (46.2)	9 (60.0)	.334
Social support (total)‡, median (P25-P75)	6.2 (5.8–6.8)	6.5 (5.9–7.0)	.266	6.4 (5.7–6.9)	6.3 (6.0–6.7)	.787
Parental stress (overall)§, median (P25-P75)	3.0 (2.5–4.0)	3.0 (3.0–4.0)	.309	3.0 (2.0–4.0)	3.0 (3.0–4.0)	.259

In each variable, the total may not add 82 women or 82 men due to missing values; percentages may not add up to 100% due to rounding.

SD = standard deviation;

* Students and armed forces occupations were excluded.

† Unemployed, housewives, students, and retired.

‡ Higher values indicate higher perceived social support (range: 1–7).

§ Higher values indicate higher overall parental stress in Neonatal Intensive Care Unit (range: 1–5).

Table 2

Factor loadings for the individual socioeconomic position, obtained from principal component analysis

	Factor loadings
	Factor 1
Educational level (woman)	0.82
Educational level (man)	0.74
Occupation (woman)	-0.84
Occupation (man)	-0.71
Subjective social class (woman)	0.64
Subjective social class (man)	0.64
Variance explained (%)	54

ies^{10,33}; the implications for measurement and marital quality of the discordance among couples on the report of courtship stages in sociological studies³⁴; and the impact of the mode of inquiring the couple on the spouses views of family’s income and wealth in economic studies.²⁸ In addition, our achievements challenge traditional methodological approaches of epidemiological research on family issues, often based only on the women’s report to collect information about the household,²⁸ in the sense that they call for the analysis of the couple as a unit, using individual variables alongside couple-level variables and collecting it through both separate and joint interviews, which may add robustness and accuracy to health-related family survey studies. However, it should be acknowledged that this approach can lengthen the application of the questionnaires, which can be

Table 3
Association between the household and relationship variables and the individual socioeconomic position factor score

	Scores factor 1 $\hat{\beta}$ -sd (95% CI)
Household monthly income	
Woman value	0.66 (0.49; 0.84)
Man value	0.68 (0.52; 0.85)
Maximum value	0.66 (0.49; 0.83)
Minimum value	0.71 (0.55; 0.87)
Mean value	0.71 (0.55; 0.87)
Length of marital relationship	
Woman value	-0.11 (-0.35; 0.12)
Man value	-0.12 (-0.35; 0.12)
Maximum value	-0.12 (-0.36; 0.12)
Minimum value	-0.11 (-0.35; 0.13)
Mean value	-0.12 (-0.35; 0.12)

Factor 1 is characterized by the socioeconomic status (educational level, occupation, and subjective social class).

CI=confidence interval, $\hat{\beta}$ -sd=standardized beta regression coefficients.

considered a study-related reason for refusals.³⁵ This discussion can be useful for teaching and applied advance training on epidemiological research methods of students interested on family issues, regardless their background and research field.

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Conflicts of interest

The authors declare that they have no competing interests.

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