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Oral cleft research: Intraobserver agreement in the use of questionnaires

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In epidemiological studies, when the data is collected by interview, it is of importance to analyse the reliability of the information. This study was carried out with the purpose of examining the self-agreement of mothers in answering questions about variables of interest in oral cleft researches on two different occasions. A sample of 91 mothers of oral cleft babies were interviewed on two different occasions. The capacity of giving the same answer to questions related to heredity, type of clefts, period of gestation of the mother and birthweight were studied. The statistics type kappa (κ) and intraclass correlation coefficient (ρ) by point and by 95% of confidence interval were applied. The intra-observer agreement for the variables history of oral clefts in the family, type of cleft, period of gestation of the mother and birthweight of the newborn was, respectively, $\kappa=0.9492$, $\kappa=1.0000$, $\kappa=0.9281$ and $\rho=0.9996$. We concluded that the background on oral cleft in the family history of patients with this anomaly is a variable with an excellent degree of reliability. Also, the information given by the mothers related to the period of gestation, type of the baby's cleft and birthweight are reliable.

Key words: Oral clefts, cleft lip, cleft palate, registry, reproducibility.

INTRODUCTION

Although bias remains a concern in case-control studies, few investigations have found evidence of differential recall (Mitchell et al., 1986). In the field of reproductive health, the type of information being sought from mothers and the methods used to elicit the information are both thought to be important factors in the reliability of

reporting and recall bias. A study by Teschke et al. (2000) examined whether differences in occupational exposure reporting occur in volunteered versus prompted questionnaire responses. Case parents were more likely to volunteer information about other exposures or activities (1.35< OR <1.71). Case mothers were also more likely than control mothers to report activities involving indirect exposures (OR = 1.41). Case-control studies of antenatal drug exposure and birth defects often rely on maternal recall of drug use in pregnancy, and the opportunity for such bias increases, as ascertainment of

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drug exposure diminishes. In a case-control, birth defects study of 5,435 mothers of malformed children, information on drug use in pregnancy was obtained by asking questions in sequence about indications and specifically named drugs (Mitchell et al., 1986).

Among the women who reported use of any of 11 drugs, 6 to 40% did so only when asked about specific drug by name. These findings suggest that completeness of ascertainment of antenatal drug exposure varies according to how the mother is questioned and is directly related to the specificity of the questions asked (Mitchell et al., 1986). Rockenbauer et al. (2001) looked for indicators of recall bias by comparing self-reported drug intake with medically notified intake for specific diseases in the Hungarian Case-Control Surveillance System of Congenital Abnormalities, which includes 22,865 cases with congenital abnormalities and 39,151 controls. The timing of drug intake was reported slightly closer to the time of interview for cases compared with controls. Severe or visible congenital abnormalities did not appear to be more conducive to recall bias than other abnormalities under study. A case-control surveillance system of this type may frequently cause spurious associations.

Khoury et al. (1994) analyzed data from a population-based case-control study of birth defects in Atlanta, in which there were 4,918 babies with serious defects ascertained in the first year of life and 3,029 babies without defects. They compared the magnitude of the odds ratios of the likelihood for reporting of risk factors in cases and controls for 10 specific defects. The risk factor associations between normal and affected controls included demographic factors, chronic maternal illnesses, chronic exposures and acute exposures. In all instances, the use of affected controls did not change etiologic inferences derived from using normal controls and there were only moderate changes in odds ratios. Oral clefts are congenital defects caused by an embryonic malformation of the maxillary development and provoked by multifactorial influences during pregnancy (Fogh-Andersen, 1971, 1967; Fraser, 1980). These anomalies have different etiologies and several factors have been studied (Fraser, 1980; Loffredo et al., 1994). In the search for risk factors for oral cleft anomalies, heredity is always considered in the analysis as family history of oral clefts in the family confers a predisposition to the recurrence of the same malformation (Fogh-Andersen, 1971, 1967; Fraser, 1980; Leck, 1972; Loffredo et al., 1994; Moller, 1965). According to Fogh-Andersen (1971), heredity is the most important factor in the etiology of facial clefts and it is responsible for 50% of cleft lip and palate and for 25% of isolated cleft palate. In a case-control study for clefts, the relative risk of the variable heredity was estimated at 4.96 for cleft lip and palate and 2.82 for isolated cleft palate (Loffredo et al., 1994). According to Leck (1972), it seems that liability to neural tube defects is influenced much

more by environment and less by genotype than is the occurred with cleft lip/palate.

In general, in epidemiological studies related to risk factors, the data are collected by questionnaires, in which the interviewers obtain the answers for a predetermined set of questions of interest (Loffredo et al., 1994; Mitchell et al., 1986). These answers are commonly obtained by a standardized procedure. We know that some factors may produce bias in measurements, and that the variability, in subject and in measurement method may lead to measurement error (Light, 1971). According to Rozendaal et al. (2010), it is important to validate data on registry of oral clefts. The quantification of measurement error is crucial when reliability is concerned (Swennen et al., 2004). We need a set of replicate readings, obtained interviewing each mother of a sample twice. In order to study the reliability of the information related to variables in relationship to oral cleft studies, we analyzed the repeatability of the answers, when we applied formularies, so that we could verify the capacity of obtaining the same answer in two different occasions of the interview, that is the intra-observer agreement.

MATERIALS AND METHODS

The sample of subjects in this study comprised the mothers of 91 children with non-syndromic orofacial clefts less than one year old, presented consecutively at a hospital specialized in the treatment of craniofacial malformations-Hospital de Reabilitação de Anomalias Craniofaciais (HRAC/ USP), located in Bauru City, São Paulo State, Brazil. During the admission procedure, their co-operation in this study was requested and over a six-month period all those who were invited to participate did so. When they had agreed to participate, the questions were asked in a face-to-face interview by the same interviewer, a nurse in Public Health, in all cases. The analyzed variables were (a) whether there was a family history of clefts in either maternal or paternal families, (b) type of cleft of the infant: CL (cleft of lip), CLP (cleft of lip and palate) or CP (cleft of palate), (c) the period of gestation for the index child, and also (d) the birthweight (in grams).

Family history

For the question related to family history, the response variable was classified as YES (Persons with family history) or NO (No known family history) or IGNORED (if the mother had no idea of whether there was a history of clefts in the family).

Type of cleft

For isolated orofacial clefts, children with CP, CLP or CL were generally recalled six months after the first presentation and the same children were identified at a recall visit six months later. The same questions were asked by the same interviewer at this appointment, six months after the first interview, and the responses were recorded in the same manner.

Table 1. Classification of the history of oral clefts in the family, in two interviews. HRAC-USP.

1st Interview	2nd interview			
	No	Yes	Ignored	Total
No	63	-	-	63
Yes	1	24	-	25
Ignored	1	-	2	3
Total	65	24	2	91

κ = 0.9492, s_κ = 0.0679, CI: 0.8813−1.0000.

Table 2. Classification of the type of cleft of the baby, in two interviews (HRAC-USP).

1st Interview	2nd interview			
	CL	CP	CLP	Total
CL	7	-	-	7
CP	-	13	-	13
CLP	-	-	71	71
Total	7	13	71	91

κ = 1.0000, CL: cleft of lip; CP: cleft of palate; CLP: cleft of lip and palate.

Period of gestation

With regard to period of gestation, the mother was asked if the baby was born At TERM (within 10 days before or after the term date), PRE-TERM if the baby was born more than 10 days early, POST-TERM if the baby was born more than 10 days late and IGNORED if the mother was unable to provide this information.

Birthweight

For the birthweight, the mother gave the value in grams (g). In order to measure the repeatability of the variables of interest, the Kappa statistics was used for categorical responses by point (κ) (Light, 1971) and by 95% confidence interval (CI). For the variable birthweight, the measurements were plotted on a scatter plot, and the intra-class correlation coefficient by point (ρ) (Fermanian, 1984) with its CI were used for examination the intra-observer agreement for quantitative responses. The statistical software used was STATA.

RESULTS

The information obtained by the use of the methodology aforestated permitted the intraobserver agreement calculations with no missing values for the variables family history, type of clefts and period of gestation. Tables 1, 2 and 3 show the frequency matrix of classifications in two different occasions. The main

diagonal represents the concordant responses. The cells out of the diagonal present the variation of the mothers of the patients, that is, the measurement error. The smaller the measurement error, the better the agreement and vice-versa. The findings were as follows:

1. The intra-observer agreement with respect to the history of oral clefts in the family was κ=0.9492 (CI: 0.8813−1.0000), and it was statistically significant (p<0.001).
2. The intra- observer agreement in relation to the type of the cleft in the baby was excellent (κ=1,0000).
3. The intra-observer agreement in relation to the period of gestation of the mother was k=0.9281 (CI: 0.8301−1.0000), statistically significant (p< 0.001).
4. Among 91 mothers, only 83 remembered the birthweight of their babies (Table 4).

For those who did respond, the average birthweight was 3212.77 g, with a standard deviation of 623.79 g. There was a high level of agreement, where ρ= 0.9996 (CI: 0.9995 to 0.9997). The high level of agreement can be represented, as it can be seen in Figure 1. In Figure 1, it can be seen that most of the points lie along the line of equality, what was expected (ρ= 0.9996).

DISCUSSION

This research aimed to verify the intra-observer agreement related to some variables in relationship to oral cleft studies, such as family history, type of cleft, period of gestation of the mother and birthweight. Maternal report of the history of oral clefts in the family was highly reliable, with κ=0.9492. The mothers had a good knowledge of the anomaly and reliable information in respect to the presence of other cases of oral cleft among the relatives. Also, mothers knew the type of the cleft that their babies presented, and this is due to the fact that the hospital HRAC-USP has a multi-professional approach, including paediatricians, clinical psychologists, nurses, and other health professionals, and psychological support to the mother, where it is explained to the mother, the type of malformation of the baby and its implications.

The mothers also showed excellent knowledge about the period of the gestation (k=0.9281) and also the birthweight of their babies (ρ= 0.9996). With regard to both of these parameters in reproductive health, the high level of reliability was expected. Mothers tend to remember these measures because of the anxiety about the birthweight and either prematurity or exceeding the gestational term. The importance of having a good birthweight is recognized in clinical and epidemiological evaluation because it is related to nutritional status. As it

Table 3. Classification of the period of gestation of the mother, in two interviews (HRAC-USP).

1_{st} 2_{nd}	In-term	Pre-term	Post-term	Ignored	Total
In term	74	-	-	-	74
Pre-term	-	10	-	-	10
Post-term	-	-	1	-	1
Ignored	2	-	-	4	6
Total	76	10	1	4	91

$\kappa = 0.9281$, $s_\kappa = 0.098$, CI: $0.8301-1.0000$.

Table 4. Birthweight (g) of clefting patients, according to the interviews in two different occasions (HRAC- USP).

Patient	X	Y	Patient	X	Y	Patient	X	Y	Patient	X	Y
1	3600	3600	27	3450	3450	53	4300	4300	79	2000	2000
2	2950	2900	28	2700	2700	54	2600	2600	80	3000	3000
3	3300	3300	29	3330	3330	55	3300	3300	81	2900	2900
4	2650	2650	30	2340	2340	56	3300	3300	82	3270	3270
5	3300	3300	31	3800	3800	57	3330	3330	83	2650	2650
6	3100	3100	32	3000	3000	58	3750	3750			
7	3640	3640	33	4000	4000	59	2500	2500			
8	3875	3800	34	3380	3380	60	3250	3250			
9	3620	3600	35	3200	3200	61	3310	3310			
10	3400	3400	36	3750	3750	62	3730	3700			
11	3900	3900	37	3950	3950	63	3510	3500			
12	3550	3550	38	3200	3200	64	3020	3020			
13	3430	3400	39	2200	2200	65	3550	3520			
14	2250	2250	40	2520	2500	66	2530	2500			
15	2450	2450	41	1800	1800	67	3080	3080			
16	2400	2400	42	2750	2750	68	2600	2600			
17	2420	2420	43	3500	3500	69	3750	3700			
18	3000	3000	44	3120	3100	70	4100	4100			
19	3680	3680	45	2500	2500	71	2600	2600			
20	3330	3300	46	3760	3750	72	3055	3050			
21	3850	3850	47	3300	3300	73	3120	3100			
22	3650	3650	48	1300	1300	74	3000	3000			
23	3800	3800	49	3250	3200	75	3400	3400			
24	2430	2430	50	3150	3100	76	4680	4650			
25	4500	4500	51	4600	4600	77	3300	3300			
26	2680	2680	52	3850	3850	78	4000	4000			

$\rho = 0.9996$ (CI: $0.9995-0.9997$).

can be seen, the answers given by the mothers in relation to the studied variables (family history, type of cleft, period of gestation and birthweight) are reliable. These information take part of the recording system of the hospital specialized in the rehabilitation of oral cleft patients (HRAC-USP), with additional information as, for example, the cephalometric and topographic-anatomical exams, supporting the feasibility of this recording system. We point out that some factors helped to reach the excellent level of reliability for the studied variables, such as the experience of the interviewer in epidemiological surveys, her training in collecting data, and the piloting of
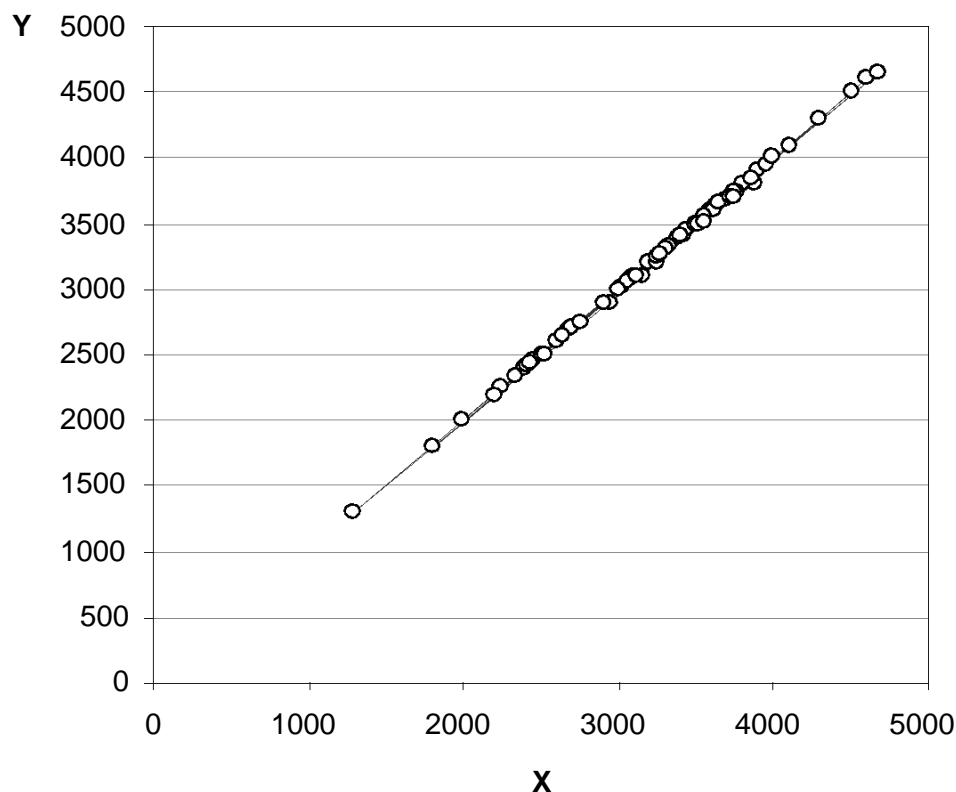
Figure 1. Birthweight (g) of clefting patients according to interviews in two different occasions (X and Y) HRAC-USP.
SOURCE: LOFFREDO LCM. Qualidade da informação em um trabalho científico. In: Gricolli AAG. Metodologia do Trabalho Científico e Recursos Informacionais na Área da Saúde.São Paulo: Santos; 2008. p.155-166.

the questions used. It has to be considered that inferences regarding risk factors for oral clefts are often based on researches with case-control methodology conducted after birth (Khoury et al., 1994) and it is important to inform the degree of reliability of the questionnaires used, in order to guarantee a trusty research on etiologic inferences.

The underlying relation of exposure with oral cleft disease is usually verified in case-control studies, using sampling and, as the recorded data on the use of medicine are often not available, the self reported data can be used, but they are not expected to be accurately recalled, especially for drug intake to treat trivial diseases of short duration. Recall bias can lead to spurious inferences and may be a problem when exposed data are collected after the outcome of the birth is known, due to the fact that women who had a child with a serious malformation may try to recall all events that could be associated with the disease. As stated earlier, we believe that the high quality of recording oral cleft information

contributes to the etiologic research based on registry data.

Conclusion

We conclude that, in oral cleft studies, variables such as family history, type of cleft, period of gestation of the mother and birthweight of the affected baby are all highly consistent, with an excellent degree of intra-observer agreement, when reported by mothers in personal interview.

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