REVIEW ARTICLE

Portuguese Primary Care physicians response rate in surveys: A systematic review

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SUMMARY

Introduction: Surveys are a useful tool in primary care. However, low response rates can introduce selection bias, impairing both external and internal validity. The aim of this study was to assess the average response rate in surveys with Portuguese general practitioners (GPs).

Method: We searched the Medline, Web of Science, Scopus, Embase, PsychInfo, SciELO, IndexRMP, RCAAP, *Revista Portuguesa de Medicina Geral e Familiar, Acta Médica Portuguesa* and the proceedings of conferences of general practice from incepton to December 2016. We included all postal, e-mail, telephone and personal surveys to primary care physicians without language restrictions. We did not assess risk of bias of included studies, since the main outcome was survey response rate. We performed planned subgroup analyses of the use of monetary incentives, the use of non-monetary incentives, survey delivery modes and prior contact with participants.

Results: A total of 1,094 papers were identified and 37 studies were included in this review. The response rate in surveys done to Portuguese GPs was 56% (95CI 47-64%). There was substantial heterogeneity among included studies (I2=99%), but subgroup analysis did not explain this heterogeneity.

Conclusion: Consistent with other published studies, the average response rate in surveys done with Portuguese GPs was 56%, with substantial variation among studies. Use of monetary incentives, one of the most effective strategies to increase response rates, was not present in any of the included studies.

Keywords: Physicians. Family Practice. Primary Health Care. Surveys and Questionnaires. Portugal.

INTRODUCTION

Surveys are useful in medical research.[1-3] They can provide insight on knowledge, attitudes and behaviors related to challenging conditions or complex patients. Furthermore, they can be used to assess needs, which can then guide interventions to improve care.[4,5] Surveys are used by a wide range of professionals in primary care research as a standardized tool which is easily applicable.[6]

Low response rates can introduce important selection bias into survey results due to the extent to which non-responders may differ from the study population.[7] Random sampling is done to ensure that the sample shares the same characteristics as the reference population. However, this may be compromised if there is a low number of non-respondents, as often non-respondents and respondents have different characteristics. For example, if respondents are more educated than non-respondents, the survey results may be representative of the most educated elements of the reference population, not the whole reference population. These differences can impair both external and internal validity.[8] International studies report an average response rate of 61% (95CI 59-63%)[9] for surveys in general practitioners (GPs).

GP survey response rates are influenced by monetary incentives, perceived value of the research, concerns about disrupting routine practice, time, confidentiality, volume of requests, questionnaire length and insufficient background information.[10] Furthermore, non-responders in surveys involving GPs seem to be older and less likely to possess a postgraduate medical degree or belong to a practice that is involved with post- or undergraduate training.[11]

Monetary incentives seem to be the most successful strategy to increase physicians' response rates to surveys.[12,13] Other effective approaches include non-monetary incentives, shorter surveys and pre-contact (defined as contacting participants before delivering the survey in order to explain the aim and clarify any doubts).[6,11,12] The survey delivery mode is also important, with postal surveys generally showing higher response rates when compared with telephone, e-mail, fax and online surveys.[11,14] Nevertheless, despite increasing evidence regarding strategies to improve participation, GP response rates to postal surveys over the past decades remain relatively unchanged.[9]

In Portuguese speaking countries, despite growing interest in primary care research, no data is currently available regarding average response rates in general practice surveys. Synthesizing response rates from prior surveys will help researchers adequately plan sample sizes for future projects. Thus, the aim of this study was to assess the average response rate in surveys done with Portuguese GPs, as well as identify its potential influencing factors.

METHOD

Selection criteria

We included studies that involved primary care physicians (family medicine specialists, non-specialists and residents), using all types of survey delivery modes (e.g., postal, e-mail, online, and telephone), and both validated and non-validated questionnaires, regardless of sponsor and knowledge field (e.g., clinical, public health, economics, management, marketing). Both published (journal article, report, thesis) and unpublished studies were considered. No language restriction was applied. Included studies needed to report the percentage of individuals contacted that completed the survey. Excluded studies included surveys directed mostly to public health specialists, physicians not involved with clinical practice (e.g., researchers or managers) or healthcare professionals other than doctors.

Search methods for the identification of studies

We searched international databases (Medline, Web of Science, Scopus, Embase, PsychInfo and SciELO) and Portuguese repositories (IndexRMP, RCAAP); the last search date was December 2016. The search combined free terms and, when supported, controlled vocabulary (full search strategy available in Supplement I). We hand-searched the table of contents of the *Revista Portuguesa de Medicina Geral e Familiar* (RPMGF) (Portuguese Journal of General Practice with previous title: *Revista Portuguesa de Clínica Geral*) and the *Acta Médica Portuguesa* (AMP), as well as the reference lists of eligible articles. We also searched for grey literature in the conference proceedings of Portuguese family medicine conferences.

Study selection

Two authors (NB, SC) independently scanned titles and abstracts from the references retrieved. When the title or abstract did not provide sufficient data to rule out eligibility, full text was obtained and eligibility was assessed independently by the same two authors. Disagreements were solved through discussion with a third author (BH or LL). Reasons for excluding a study were recorded and added to the PRISMA flowchart (Figure 1).

Data extraction, synthesis and analysis

A standardized extraction form with all variables was developed and an identification tag was attributed to each publication. NB and SC abstracted the data for each study and both records were compared for data entry or coding errors; disagreements were solved through consensus. The following variables were collected: first/contact author, title, year when the first participant was recruited, type of publication and study research question. Our main outcome was survey response rate, defined as the number of physicians who provided valid data per number of physicians contacted. We also tried to identify potential explanatory variables to response rate: monetary and non-monetary incentive use, survey delivery mode (postal, telephone, e-mail, online, other) and existence of pre-contact (i.e., whether researchers contacted participants before the survey). Missing data was retrieved, when possible, through e-mail contact with the main author or the corresponding author of the study. As we were exclusively interested in survey participation rates, risk of bias assessment of individual studies was not assessed.

Categorical variables and participation rates were described as proportions. Categorical variables were described with frequencies and percentages. Assessment of publication bias was performed through visual inspection of funnel plots. Meta-analysis of the participation rates was performed using a random effects model (DerSimonian and Laird inverse variance method). Planned sub-
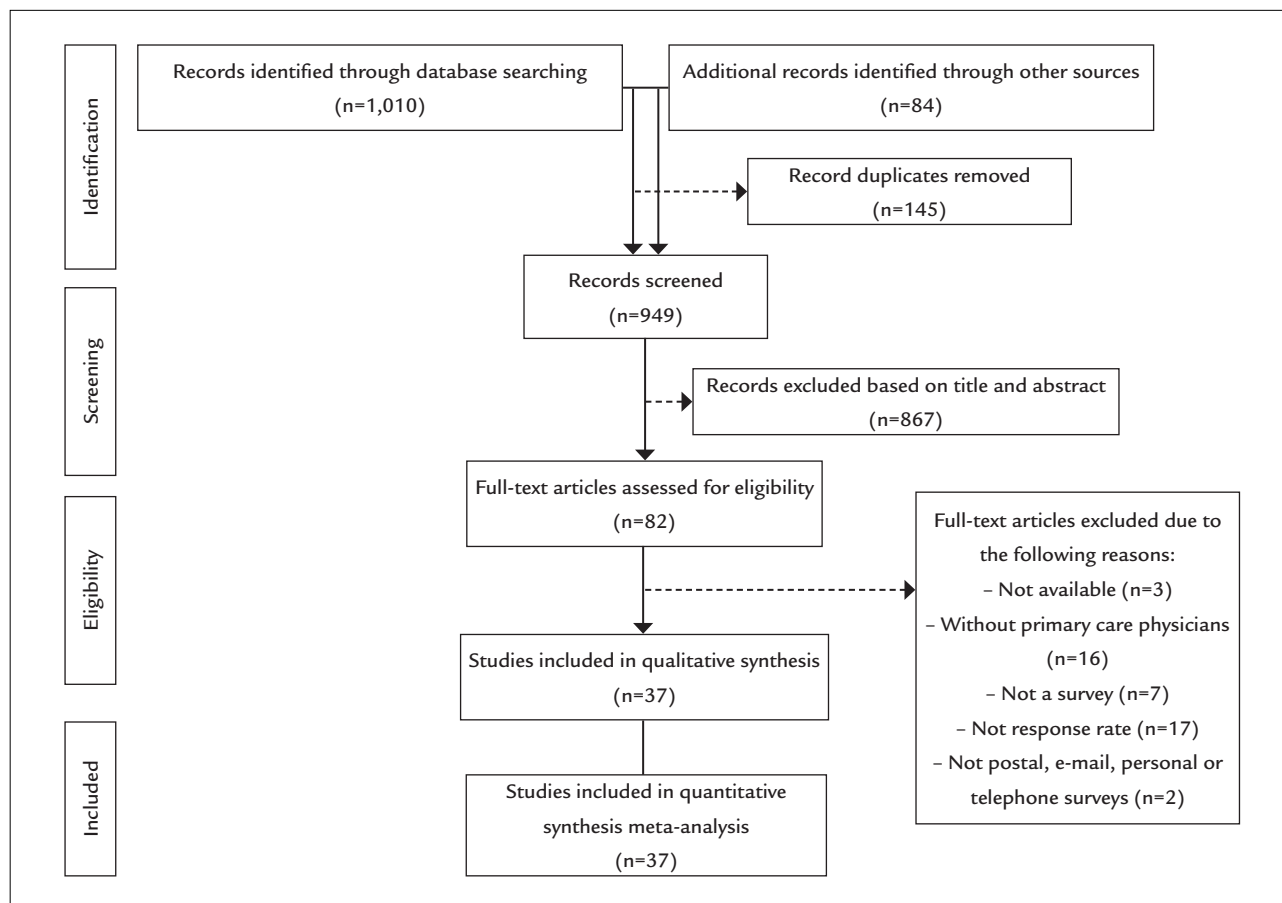
FIGURE 1 PRISMA flowchart of retrieved studies.

group analyses included use of monetary incentives, use of non-monetary incentives, survey delivery modes and contact with participants prior to the survey. Heterogeneity was assessed visually and using I^2.

RESULTS

A total of 1,010 papers were identified through database searching and 84 through a manual search of Portuguese journals, as well as from grey literature sources (Figure 1). Study characteristics are shown in Table 1. The smallest study had a total of 13 participants[15] and the largest had 2,815[16] (mean number of participants approximately 473 per study). The majority of studies addressed clinical practice issues, such as clinical diagnosis or treatment, and work satisfaction. Half of the included studies were developed in primary healthcare units. We also retrieved studies from Portuguese academic institutions, regulatory institutions related to health and pharmaceutics. Twelve (12) studies involved a national sample of physicians; 13 studies were conducted in the region of Lisbon and nine in the northern region of Portugal.

On average, the response rate in surveys done with Portuguese GPs was 56% (95CI 47-64%). There was substantial heterogeneity among included studies (I^2=99%) (Figure 2) and subgroup analyses did not explain this heterogeneity.

Four different delivery modes were used in the included studies: e-mail,[17-22] postal,[16,23-36] personal contact (i.e., researchers delivered the questionnaire directly to the potential respondent)[15,37-50] and telephone-based surveys.[51] Subgroup analysis suggests that response rates differed in studies which used different survey delivery modes (interaction test p<0.0001). The highest response rate (96%) was seen in the single study that was based on a telephone survey[51] (95CI 92-98%) and, on average, studies in which researchers handed out survey forms personally had higher response rates than those using e-mail or postal surveys. Nevertheless, study heterogeneity among subgroups defined by survey delivery mode remained high (I^2=99% for e-mail surveys, I^2=98% for personal delivery, and I^2=99% for postal surveys). Subgroup analysis also suggests that response rates differ in studies using non-monetary incentives (interaction test p=0.04). Only two studies used this kind of

incentive and both with postal reply-paid surveys,[32,50] but response rate was lower compared to no use of incentives. In both subgroups, heterogeneity remained high (I^2=85% and 99%, respectively). We found no evidence of an interaction between contacting study participants beforehand and response rates (interaction test p=0.27). We were unable to perform one of our main pre-specified subgroup analyses, since we found no studies using monetary incentives.

We also performed two non-pre-specified subgroup analyses to further explore the sources of heterogeneity. Firstly, we divided studies into small and large studies using an arbitrary cutoff of 500 participants, adjusted to our mean number of participants per study. Larger studies had lower response rates compared with smaller studies (interaction test p<0.0001), although there was still substantial

heterogeneity in the two subgroups (I^2=95.1% for smaller studies, and I^2=99.3% for larger studies). We also analyzed the impact of different affiliations on response rate but we found no evidence supporting this influence (interaction test p<0.01). Twenty-one (21) studies were affiliated to healthcare provider,[15,17-19,22-26,28,31,34,35,37-39,41,42,44,46,48] fourteen to academic institutions,[21,27,29,30,32,33,36,40,43,45,47,49-51] one related to regulatory institution[16] and other to the pharmaceutical industry.[20] Heterogeneity could not be explained by this subgroup analysis (I^2=99% for academic institution affiliation and I^2=98% for healthcare provider affiliation).

DISCUSSION

On average, the response rate in surveys done to Portuguese GPs was 56%, but we found substantial heteroge-
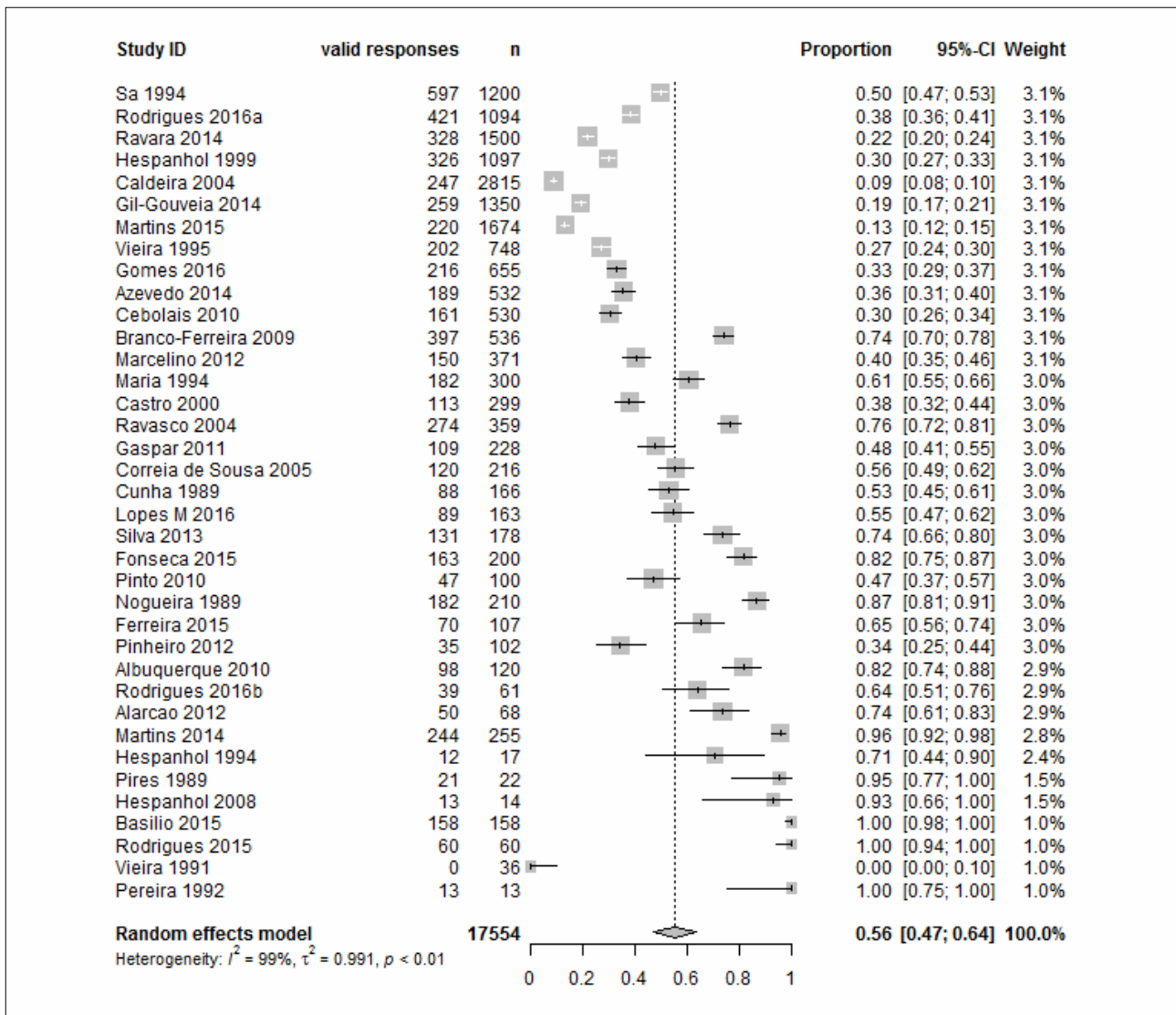

Study ID	valid responses	n		Proportion	95%-CI	Weight
Sa 1994	597	1200		0.50	[0.47; 0.53]	3.1%
Rodrigues 2016a	421	1094		0.38	[0.36; 0.41]	3.1%
Ravara 2014	328	1500		0.22	[0.20; 0.24]	3.1%
Hespanhol 1999	326	1097		0.30	[0.27; 0.33]	3.1%
Caldeira 2004	247	2815		0.09	[0.08; 0.10]	3.1%
Gil-Gouveia 2014	259	1350		0.19	[0.17; 0.21]	3.1%
Martins 2015	220	1674		0.13	[0.12; 0.15]	3.1%
Vieira 1995	202	748		0.27	[0.24; 0.30]	3.1%
Gomes 2016	216	655		0.33	[0.29; 0.37]	3.1%
Azevedo 2014	189	532		0.36	[0.31; 0.40]	3.1%
Cebolais 2010	161	530		0.30	[0.26; 0.34]	3.1%
Branco-Ferreira 2009	397	536		0.74	[0.70; 0.78]	3.1%
Marcelino 2012	150	371		0.40	[0.35; 0.46]	3.1%
Maria 1994	182	300		0.61	[0.55; 0.66]	3.0%
Castro 2000	113	299		0.38	[0.32; 0.44]	3.0%
Ravasco 2004	274	359		0.76	[0.72; 0.81]	3.0%
Gaspar 2011	109	228		0.48	[0.41; 0.55]	3.0%
Correia de Sousa 2005	120	216		0.56	[0.49; 0.62]	3.0%
Cunha 1989	88	166		0.53	[0.45; 0.61]	3.0%
Lopes M 2016	89	163		0.55	[0.47; 0.62]	3.0%
Silva 2013	131	178		0.74	[0.66; 0.80]	3.0%
Fonseca 2015	163	200		0.82	[0.75; 0.87]	3.0%
Pinto 2010	47	100		0.47	[0.37; 0.57]	3.0%
Nogueira 1989	182	210		0.87	[0.81; 0.91]	3.0%
Ferreira 2015	70	107		0.65	[0.56; 0.74]	3.0%
Pinheiro 2012	35	102		0.34	[0.25; 0.44]	3.0%
Albuquerque 2010	98	120		0.82	[0.74; 0.88]	2.9%
Rodrigues 2016b	39	61		0.64	[0.51; 0.76]	2.9%
Alarcao 2012	50	68		0.74	[0.61; 0.83]	2.9%
Martins 2014	244	255		0.96	[0.92; 0.98]	2.8%
Hespanhol 1994	12	17		0.71	[0.44; 0.90]	2.4%
Pires 1989	21	22		0.95	[0.77; 1.00]	1.5%
Hespanhol 2008	13	14		0.93	[0.66; 1.00]	1.5%
Basilio 2015	158	158		1.00	[0.98; 1.00]	1.0%
Rodrigues 2015	60	60		1.00	[0.94; 1.00]	1.0%
Vieira 1991	0	36		0.00	[0.00; 0.10]	1.0%
Pereira 1992	13	13		1.00	[0.75; 1.00]	1.0%
Random effects model		17554		0.56	[0.47; 0.64]	100.0%

Heterogeneity: I^2 = 99%, τ^2 = 0.991, p < 0.01

FIGURE 2 Forest plot of main results.

TABLE 1 Characterization of the studies.

Study ID	Aim of study	Study sample	Sample size	Incentives	Delivery mode	Previous contact	Affiliation
Cunha et al.[37]	To characterize primary and secondary care communication	GPs working on PHCU of Viseu region	166	No	Presential	Yes	Healthcare provider
Nogueira[38]	To determine GPs stress levels and exhaustion	GPs working of PHCU of Oporto region	210	No	Presential	No	Healthcare provider
Pires and Cerdeira[39]	To characterize professional satisfaction in a healthcare unit	GPs working on a PHCU	22	No	Unavailable	No	Healthcare provider
Vieira and Viegas[23]	To determine family doctors professional satisfaction	GPs working on a PHCU	36	No	Postal	No	Healthcare provider
Pereira[15]	To characterize home visits to patients of an healthcare center	GPs working on a PHCU	13	No	Presential	No	Healthcare provider
Hespanhol[40]	To evaluate GPs daily stress levels	GPs working on a PHCU	17	No	Presential	No	Academic institution
Maria et al.[24]	To evaluate knowledge and attitudes of GPs towards HIV infection	GPs working on PHCU of Lisbon region	300	No	Postal	No	Healthcare provider
Sá et al.[25]	To describe attitudes and habits of GPs towards tobacco use	GPs working on PHCU around the country	1,200	No	Postal	No	Healthcare provider
Vieira et al.[26]	To determine job satisfaction in physicians with a career in general clinical medicine	GPs working on PHCU around the country	748	No	Postal	No	Healthcare provider
Hespanhol et al.[27]	To evaluate professional satisfaction in family medicine	GPs working on northern region of Portugal	1,097	No	Postal	No	Academic institution
Castro[28]	To identify reasons to choose family medicine	GP residents on the northern region	299	No	Postal	No	Healthcare provider
Caldeira et al.[16]	To characterize antibiotics prescription on respiratory diseases	GPs around the country	2,815	No	Postal	Yes	Regulatory institution
Ravasco et al.[29]	To determine current practice of nutritional therapy in Portugal	GPs working on PHCU around the country	359	No	Postal	No	Academic institution
Correia-de-Sousa and Mateus[41]	To address family medicine residents and specialists reading habits and needs	GP residents and specialists working on the northern region of Portugal	216	No	Presential	No	Healthcare provider
Hespanhol[30]	To characterize professional satisfaction in a healthcare unit	GPs working on a PHCU	14	No	Postal	No	Academic institution
Branco-Ferreira[42]	To investigate therapeutic options in allergic rhinitis	GPs working on PHCU around the country	536	No	Presential	Yes	Healthcare provider
Albuquerque and von Hafe[17]	Translation of hypertension guidelines into practice	GPs working around the country	120	No	E-mail	No	Healthcare provider
Cebolais et al.[31]	To define reasons why family doctors take, or do not take, flu vaccine	GPs working on the south region of Portugal	530	No	Postal	No	Healthcare provider
Pinto and Corte-Real[18]	To determine the use of the international classification of primary care among family medicine residents	GP residents from south of Portugal, Azores and Madeira	100	No	E-mail	No	Healthcare provider

(*Continues*)

TABLE 1 (Cont.) Characterization of the studies.

Study ID	Aim of study	Study sample	Sample size	Incentives	Delivery mode	Previous contact	Affiliation
Gaspar et al.[32]	To determine professional motivation during family medicine residency	GP residents around the country	228	No	Postal	No	Academic institution
Alarcão et al.[43]	To identify general practitioners' knowledge, attitudes, beliefs, and practices in the management of sexual dysfunction	GPs working in PHCU in the Lisbon region	68	No	Presential	Yes	Academic institution
Marcelino et al.[33]	To investigate burnout levels among Portuguese family doctors	GPs working on PHCU around the country	371	No	Postal	No	Academic institution
Pinheiro et al.[34]	To determine who recommends the adult cervical cancer vaccination	GPs working on PHCU of east Lisbon region	102	No	Postal	No	Healthcare provider
Silva et al.[44]	To determine expectations and difficulties perceived by GPs in mental health	GPs working on Portuguese northern region	178	No	Presential	No	Healthcare provider
Azevedo et al.[19]	To determine residency satisfaction among general practice residents	GP residents of the northern region of Portugal	532	No	E-mail	No	Healthcare provider
Gil-Gouveia[35]	To evaluate doctors' perspective about headache	GPs visited by representatives of study sponsor	1,350	No	Postal	No	Healthcare provider
Martins et al.[51]	To investigate preventive health services implemented by family physicians in Portugal	Portuguese GPs working on PHCU around the country	255	No	Telephone	Yes	Academic institution
Ravara et al.[45]	To characterize smoking behavior among Portuguese physicians	GPs attending two medical conferences	1,500	No	Presential	No	Academic institution
Basílio et al.[46]	To determine the perception of depression and anxiety among family physicians according to patient gender	GP residents and specialists attending to a primary care formation	158	No	Presential	No	Healthcare provider
Ferreira et al.[47]	Detection and intervention strategies by primary health care professionals in suspected elder abuse	GPs working on Coimbra region	107	No	Presential	No	Academic institution
Fonseca and Martins da Silva[20]	The diagnosis and treatment of LUTS due to benign prostatic hyperplasia by primary care family physicians	GPs working around the country	200	No	E-mail	No	Pharmaceutics
Martins et al.[21]	Career satisfaction of medical residents in Portugal	GP residents working around the country	1,674	No	E-mail	No	Academic institution
Gomes[22]	Depressive disorder prevalence in GP residents	GP residents of Portugal south region	655	No	E-mail	No	Healthcare provider
Lopes et al.[48]	Family evaluation tools use among GPs	GPs working on Lisbon region	163	No	Presential	No	Healthcare provider
Rodrigues et al.[49]	To define therapeutic options among family doctors in hypertension	GP residents and specialists working on PHCUs of Lisbon region	60	No	Presential	Yes	Academic institution

(*Continues*)

TABLE 1 (Cont.) Characterization of the studies.							
Study ID	Aim of study	Study sample	Sample size	Incentives	Delivery mode	Previous contact	Affiliation
Teixeira Rodrigues et al.[50]	To develop and validate an instrument to assess the attitudes and knowledge underlying physician antibiotic prescribing	GPs working on Lisbon region	61	No	Presential	No	Academic institution
Teixeira Rodrigues et al.[36]	To assess the influence of the determinants of physician prescribing on the quality of antibiotic use	GPs working on Lisbon region	1,094	No	Postal	No	Academic institution

ID: identification; GPs: general practitioners; PHCU: primary healthcare unit; LUTS: lower urinary tract symptoms.

neity (I^2=99%). Our search did not retrieve any studies using monetary incentives, which is a strategy known to increase response rates.

The funnel plot is very asymmetric, suggesting that smaller studies were more likely to be published or presented at conferences if they had higher response rates.

Strengths and limitations

The main strength of this study is our attempt to reduce bias by following systematic review guidelines.[52] Given that survey response rates may be related to publication status, we have made an effort to identify other surveys through conference proceedings, databases of MSc and PhD theses, and by contacting relevant authors. Yet, it is likely that small studies with low response rates were never published or presented at conferences, which means that the estimated average of 56% for response rates may be optimistic.

The major weakness of the study was the substantial heterogeneity that remains largely unexplained. It is reasonable to question whether a summary measure should be obtained when heterogeneity is high. However, we agree with the view that researchers and clinicians still need a best estimate to inform their decisions[53] and that it is licit to pool the primary studies' estimates together as long as their limitations are acknowledged. In our main meta-analysis, heterogeneity was very high (I^2=99%), and within our pre-specified and post-hoc subgroup analyses heterogeneity was also high (I^2>75.0%). The main factors described in the literature as having an influence in response rates do not explain the variation we found between studies.[11] In hindsight, we could have explored the topic of the survey or its length. Clinicians may be more inclined to reply to a survey if they think the topic is more interesting and if the questionnaire is short.[11]

Interpretation in the context of the available literature

So far, surveys in Portugal have not used monetary incentives to increase GP participation rates. According to the international literature,[11,12] monetary incentives are the most effective method to increase survey participation. However, most of the studies we found were conducted by family medicine residents and the vast majority seemed to be self-funded. Yet, it shows that there is potential for increasing participation rates in Portuguese studies if there is more funding for research in general practice.

Our estimate of 56% response rate is consistent with the average response rate of 61% (95CI 59-63%) found in international studies.[8] We were surprised to find that precontact strategies were not associated with increased response rates (75% vs. 52%, p=0.27 for the interaction test), contrary to what has been previously described.[8] It is possible that this result is due to the small number of studies which described contacting participants before sending the questionnaires (n=6). We found that there were differences according to delivery mode. There was a single study surveying GPs by telephone,[51] which yielded the highest response rate in our review. However, it is impossible to say whether such high response rate is associated with this specific delivery mode or if it was due to other characteristics of this particular study. Personal delivery also seems to produce higher response rates (75%) compared to postal questionnaires (37%); e-mail questionnaires seem to have intermediate response rates (48%). A possible explanation is that in small surveys it is feasible to hand-in questionnaires personally, and that there is often some sort of personal relationship with the researcher (often a co-worker) that may contribute to increase the participation rate. In fact, it is clear in our data that smaller studies have higher response rates than larger studies. Whether this is a true association or just an artifact of publication bias (small

studies with low response rates not being considered for publication or presentation) is unclear to us.

Conclusion

Researchers wanting to conduct surveys with Portuguese general practitioners should anticipate response rates of 56% or lower. There is substantial variation in response rates in this target population, which remains unexplained. Monetary incentives should be considered by researchers in future studies, as this has been shown in the international literature to be an effective strategy in increasing response rates.

Resumo

Taxa de respostas dos médicos de família portugueses a questionários: uma revisão sistemática

Introdução: Questionários são úteis na investigação em cuidados de saúde primários. Contudo, baixas taxas de resposta podem introduzir um viés de seleção, prejudicando a validade externa e interna. O objetivo deste estudo foi identificar a taxa de resposta média a questionários aplicados a médicos de família (MF) portugueses.
Método: Foram pesquisadas as bases de dados Medline, Web of Science, Scopus, Embase, PsychInfo, SciELO, IndexRMP, RCAAP, *Revista Portuguesa de Medicina Geral e Familiar*, *Acta Médica Portuguesa* e resumos em conferências de medicina familiar do início até dezembro de 2016. Incluiram-se estudos realizados a médicos de família portugueses independentemente de sua tipologia, do tipo de entrega (correio, e-mail, pessoalmente e por telefone) e do idioma do artigo. Não foi avaliado o risco de viés dos artigos porque o principal resultado considerado foi a taxa de resposta. Foram efetuadas análises de subgrupos sobre a utilização de incentivos monetários, de incentivos não monetários, o modo de entrega e o contato prévio com os participantes.
Resultados: Foram identificados 1.094 artigos e incluídos 37 estudos. O número de participantes em cada estudo variou entre 13 e 2.815 participantes. A taxa de resposta média foi de 56% (IC95% 47-64%). Identificou-se uma heterogeneidade substancial (I²=99%) não explicável pela análise de subgrupos.
Conclusão: A taxa de resposta média a inquéritos realizados a MF portugueses foi de 56%, o que corresponde aos valores identificados em revisões internacionais, apesar da variação significativa entre os estudos englobados nesta revisão. O uso de incentivos monetários, uma das estratégias mais eficazes para aumentar as taxas de resposta, não foi identificado em qualquer dos estudos incluídos.

Palavras-chave: Médicos. Medicina de Família e Comunidade. Atenção Primária à Saúde. Inquéritos e Questionários. Portugal.

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