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Routinely asking patients about income in primary care: a mixed-methods study

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Table 1: Test of association between responding to two-part income question and sociodemographic characteristics of patients.

	Responders n = 10,441 (73%)	Non-Responders n = 3,806 (27%)	P-Value (χ^2 for categorical, Mann-Whitney U-Test for continuous variables (Age) as Age data not normally distributed)
Gender			p < 0.0001
Male	4435 (42.5%)	1252 (32.9%)	
Female*	5738 (55%)	2133 (56%)	
Other**	98 (0.9%)	30 (0.8%)	
missing	170 (1.6%)	391 (10.3%)	
Age			p < 0.0001
< 10 years old	99 (1%)	98 (2.6%)	
10-19 years	78 (0.8%)	125 (3.3%)	
20-29 years	1294 (12.4%)	625 (16.4%)	
30-39 years	2704 (25.9%)	757 (19.9%)	
40-49 years	2117 (20.3%)	618 (16.2%)	
50-59 years	1944 (18.6%)	661 (17.4%)	
60-69 years	1327 (12.7%)	494 (13%)	
70+ years	878 (8.4%)	428 (11.3%)	
Median (IQR)	44 (34 - 57)	44 (31 - 59)	p = 0.01
Language [spoken]			
English*	9764 (93.5%)	3382 (88.9%)	p < 0.0001
Other	624 (6%)	316 (8.3%)	
missing	53 (0.5%)	108 (2.8%)	
Immigration Status			p < 0.0001
Born outside Canada	4193 (40.2%)	1689 (44.4%)	
Canadian Born*	6167 (59.1%)	1677 (44.1%)	
missing	81 (0.8%)	440 (11.6%)	
Housing Status			p < 0.0001
Own home*	4301 (41.2%)	1173 (30.8%)	
Rent	4846 (46.4%)	1300 (34.2%)	
Other	935 (9%)	359 (9.4%)	
missing	359 (3.4%)	974 (25.6%)	
Ethnicity			p < 0.0001
White*	6128 (58.7%)	1414 (37.2%)	
Non-white	3901 (37.4%)	1636 (43%)	
missing	412 (4%)	756 (19.9%)	
Sexual Orientation			p < 0.0001
Heterosexual*	8173 (78.3%)	2611 (68.6%)	

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Gay/Bisexual /Lesbian /Queer /Two-Spirit /Other	1777 (17%)	345 (9.1%)	
missing	491 (4.7%)	850 (22.3%)	
Mental health			
Severe mental illness***	296 (2.8%)	107 (2.8%)	p = 0.99
Neighbourhood Income Quintile			
Q1*	2469 (28%)	1041 (32.4%)	p < 0.0001
Q2	1458 (16.5%)	543 (16.9%)	
Q3	1379 (15.6%)	493 (15.4%)	
Q4	1399 (15.9%)	417 (13%)	
Q5	2114 (24%)	717 (22.3%)	

* Reference group

** Includes trans-FTM, trans-MTF, intersex, "other", and those who selected multiple gender terms

*** Includes patients with a bill submitted that includes the diagnostic code for schizophrenia, bipolar disorder, psychosis, paranoia or psychosis not otherwise specified

Abstract

Background: Income is a key social determinant of health yet it is rare for data on income to be routinely collected and integrated with electronic health records.

Aim: To examine response bias and evaluate patient perspectives of being asked about income in primary care.

Design and setting: Mixed-methods study in a large, multi-site primary care organization in Toronto, Canada where patients are asked about income in a routinely administered sociodemographic survey.

Methods: We examined data from the electronic health records of patients who answered at least one question on the survey between December 2013 and March 2016 (n=14,247). We compared those who responded to the income question to non-responders. We also conducted structured interviews with 27 patients.

Results: 10,441 (73%) patients responded to both parts of the income question. Female patients, minorities, caregivers of young children and seniors were less likely to respond. From interviews, many patients were comfortable answering the income question, particularly if they understood the connection between income and health, and believed the data would be used to improve care. Several patients found it difficult to estimate their income or felt the options did not reflect fluctuating financial circumstances.

Conclusions: Many patients will provide data on income in the context of a survey in primary care, but accurately estimating income can be challenging. Future research should compare self-reported income to perceived financial strain. Data on income linked to health records can help identify health inequities and can help target anti-poverty interventions.

Keywords: inequalities, social determinants of health, income, socioeconomic factors, surveys and questionnaires, primary health care

How this fits in:

The relationship between income and health is well known but data on income is rarely collected. From 14,247 patients who completed at least one question on a routinely offered sociodemographic survey, 73% responded to the income question, and were most comfortable answering if they understood the income-health relationship and believed data would be used to improve care. Data on income can support the identification of health inequities and to directly address social needs, including through emerging anti-poverty interventions.

Introduction

Income has long been recognized as one of the most important social determinants of health, as it determines access to basic necessities and is a key part of social status.(1,2) A large body of research demonstrates the strong connection between poverty and poor health outcomes.(3–5) Even in countries with universal health insurance, income is often associated with access to health services, with poorer patients experiencing worse access to health services and worse outcomes.(6–8)

Routine collection of data on income is an important step to identifying inequities in access and outcomes. Clinicians may not be able to accurately identify which patients are living in poverty, particularly in mixed income neighbourhoods. (9,10) Other studies have found that physicians frequently overestimate patients' income.(11,12) Data on income can be used to pinpoint health inequities that could be amenable to quality improvement initiatives, such as focusing more time and attention to engage low income patients, providing supports to help these patients engage in care (e.g. transportation vouchers), and considering issues such as food insecurity when developing care plans.(13,14) Data on income can also be used to target clinic-based interventions to address financial strain as a key social determinant of health.(15,16) A small but growing number of interventions exist to improve a patient's income.(17) In the United Kingdom, general practices have hosted charities that help patients access financial benefits.(18–21) In one Canadian primary care organization, patients can be referred to a specialized income security health promotion program.(22) Medical-Financial Partnerships that help patients access financial benefits and complete their taxes are beginning in several US cities.(23,24)

There is little research on how patients respond to being directly asked about their income. Our primary care organization has routinely asked about income in the context of a routinely administered sociodemographic survey.(25) Our objective was to evaluate non-response bias, compare answers provided to other data available on income, and examine how patients reacted to being asked about their income.

Method

Setting and context

In Canada, permanent residents have access to publicly funded health insurance that covers the cost of most medically necessary services. This study took place at the St. Michael's Family Health Team, a large primary care organization with approximately 70 staff physicians, 40 resident physicians and more than 60 other health professionals, serving approximately 45,000 patients at six clinics in downtown Toronto, Canada. The Family Health Team has a specific mandate to serve marginalized populations but serves a diverse cross-section of the community.

A sociodemographic survey was developed with the support of the regional health authority.(26) A two-part question asked about income (**Figure 1**). Pilot testing occurred in 2012 in four sites.(25,26) The St. Michael's Family Health Team began routinely administering the survey in December 2013. Clerical staff were oriented to the survey's purpose and offered it to patients when they arrived for an appointment. Surveys were completed in the waiting room on an electronic tablet. Patients who were unable to complete the survey could have another person complete it on their behalf. In some circumstances, paper surveys were used and then the data

were later manually entered by staff. The survey was only offered in English. Answers were uploaded into the patient's electronic medical record (EMR) in a format that allowed the data to be extracted.

Study Design

We conducted a mixed-methods study. Our work was supported by an advisory committee that included patients and representatives from other hospitals, the regional health authority, and the provincial health quality agency.

Quantitative data and analysis

Our study population was any patient who answered at least one question on the sociodemographic survey between December 1, 2013 and March 31, 2016. We used data from our EMR to compare patients who completed both parts of the income question on the survey (responders) to those who selected "prefer not to answer", "don't know" or who skipped either or both parts of the income question (non-responders). We compared self-reported gender identity, preferred language, immigration status, housing type, ethnicity, and sexual orientation using responses to the other survey questions. Neighbourhood income quintiles were assigned using the patient's postal code and information from the 2006 Canadian Census, a commonly used approach.(8,27,28) Insurance claims were used to determine if a patient had a visit for a severe mental illness (schizophrenia or bipolar disorder).(29) We compared responders and non-responders using a chi-squared test, with the exception of age, which was analyzed as a continuous variable using Mann-Whitney U-test. We used logistic regression modeling to estimate adjusted odds ratios (AOR), and prespecified a P-value of <0.001 as our threshold for

significance. Variables were included in the regression model if they were significantly different in the univariate analysis. Because we anticipated that language preference, immigration status and ethnicity would be highly correlated, we planned to include only ethnicity in our logistic regression analysis.

We categorized participants who answered both parts of the income question into those with a household income above or below the before-tax Low Income Cut Off (LICO), as described elsewhere. (30) This is a common poverty measure in Canada, developed by Statistics Canada to identify households that likely spend a minimum of 20% more of their income on basic necessities than the average household.(30,31) We compared these results to average neighbourhood income and specific billing codes submitted when patients receive government financial assistance, which provide incomes far below Canada's LICO.

Qualitative data and analysis

We conducted structured interviews focused on cognitive processes and asked about any discomfort or difficulty answering the questions (See **Appendix 1** for the interview guide). We recruited and interviewed patients in clinic waiting rooms, shortly after they had completed the survey, between May 2016 and July 2016. Patients recruited to be interviewed represent a convenience sample, but we collected demographic data and reviewed it iteratively to ensure maximum variability in terms of gender identity and age (See **Appendix 2** for participant demographic information). The average length of the interviews was 29 minutes. All interviews were audio-recorded and transcribed verbatim. A team of five coders analyzed the transcripts using NVivo 11 (QSR International), and each transcript was analyzed by two or more coders.

We employed qualitative description approach to analyze the transcripts.(32) Initial codes were developed from the interview guides . A subset of transcripts was analyzed and new codes arose. A codebook was developed, the remaining transcripts were analyzed. Results were discussed with the entire study team to further refine the themes. The final themes were determined by consensus by the entire study team.

Results

Quantitative findings

During the study period, 15,221 patients were offered the survey and 14,247 (93.6%) answered at least one question. The median age was 44 years old (IQR: 33 - 58 years). 55% were female, 40% were male, 1% were other (transgender, intersex, those who selected multiple gender terms or “other”), and 4% did not provide their gender. 55% were born in Canada, 39% were minorities, and 92% reported that English was their preferred language to speak with health providers. 3% reported living with severe mental illness.

10,441 (73%) patients responded to both parts of the income question (**Figure 2**). In our univariate analysis, responders and non-responders differed significantly by gender, age category and median age, preferred spoken language, immigration status, housing status, ethnicity, sexual orientation and neighbourhood income quintile (**Table 1**). There was no difference between the responders and non-responders with regards to a history of serious mental illness.

Our regression analysis identified that females were less likely to respond to the income question when compared to males (AOR: 0.79, 95% CI (0.72-0.87), $p<0.001$). There were a small number of participants aged less than 19 years old, but both those younger than 29 years old and those aged 70 years or older were less likely to respond than those aged 30-39 years. Non-white individuals were less likely to respond than white individuals (AOR: 0.62, 95% CI (0.56-0.68), $p<0.001$). LGBTQ+ individuals were more likely to respond than heterosexual individuals (AOR 1.42, 95% CI (1.23-1.65), $p<0.001$) (**Table 2**).

3,425 (33%) patients who responded to both parts of the income question were determined to be living below the LICO (**Appendix 3**). We could determine the average neighbourhood income quintile for 2,920 (85.3%) of these individuals living below the LICO. We found that 1,291 (44.2%) patients with self-reported income below the LICO were living in the lowest neighbourhood income quintile and 390 (13.4%) were living in highest neighbourhood income quintile. 177 (20.1%) of the 882 individuals on government financial assistance were not identified as living below the LICO based on their responses to the income question.

Qualitative findings

Our analysis of interviews with 27 patients identified three major themes: 1) comfort level with disclosing income, 2) knowledge of link between income and health, and 3) concerns about inaccurate representation of income. First, we found a range of perspectives on comfort level with disclosing income. Most patients did not express discomfort with answering a question about their income, when asked in the context of the primary care organization. One patient noted, “...*I didn't see it as intrusive or anything at all. I didn't feel like I was giving out*

information that I was concerned about giving out” (Participant 4, Male, age 50-64). A small number of patients reported concerns that the data could lead to discrimination or a loss of services in the future. One patient reported, “My fear is that maybe I would lose some services or that it would affect my quality of care in one way or another” (Participant 5, Female, age 35-49).

Second, we found patients talked about their knowledge of the link between income and health. If patients understood the link between income and health they were more comfortable. One patient noted, *“I think your income is important ... you make a hundred and fifty grand a year or more, you’re obviously going to be in better health than me” (Participant 23, Female, age 50-64). Some expressed that income data could be used to better characterize the clinic’s population and its needs. Other patients offered ideas as to how the data might be used by physicians, such as understanding patients’ stress, recognizing food insecurity, and knowing which medications a patient can afford. However, in some cases, patients did not make the link between income and health and did not understand why the question was being asked. One patient stated, “... I wasn’t sure why you were asking that. ...when I retire, my income will go - drop dramatically. But I don’t change. So, I am not sure how that question really is valid in terms of what you’re doing” (Participant 4, Male, age 50-64).*

Third, we found patients talked about concerns about the inaccurate representation of income. A number of patients found it difficult to calculate their income or did not feel that their answer truly represented their financial situation accurately. Some patients did not know their family’s income, particularly young adults living with their parents. Such patients selected “don’t know” and others attempted to guess their family’s income. Other patients thought the question did not

capture a true picture of their financial situation. One patient stated that after-tax income would be more relevant than before-tax, as that is what they have available to spend. Several patients noted that their income fluctuates significantly. *“I had a really strange year last year where I got laid off and I got a year’s severance pay. [...] So they gave me a really good package and so I felt like if I said [my income was] like over 100,000 dollars it would be very misleading”*

(Participant 16, Female, Age 35-49). Some patients reported that they were unsure whose incomes should be included in a household income and there was confusion as to who should be included in the number of people supported by this income. This was particularly confusing for patients with less traditional family structures, for example a parent paying child support, young adults partially supported by parents, or those sending remittances overseas. Some were not sure if non-relatives could be counted. Most patients understood the word “support”, and thought it encompassed living costs like housing, food, clothing, and education.

Discussion

Summary

This study analyzed data from a routinely administered survey that included a two-part question on income. Approximately three-quarters of patients answered both parts of the income question, and most patients interviewed did not express discomfort. Comfort level was related to whether patients understood why the data was being collected. Neighbourhood income quintile, a commonly used proxy for an individual’s income, was not associated with responding. Patients faced difficulty in estimating their household income before taxes, particularly if incomes fluctuated significantly.

Strengths and limitations

The strengths of this study include the pragmatic application of the sociodemographic survey into the workflow of several clinics, the large number of patients surveyed, and the use of mixed-methods. There were several limitations to this study. As the study took place in a large urban centre in Canada, results are only transferrable to similar settings in the country. A limitation of the quantitative analysis is that no gold standard for income was available (e.g. income tax returns), and hence we could not evaluate whether patients answered the income question truthfully. A limitation of the qualitative component of the study is that patients were recruited in a convenience sample, when attending the clinic, and could be biased toward those who were willing to discuss their experience. A small number of the surveys were likely completed by caregivers or family members on behalf of the patient (e.g., children), but we were not able to capture data on this population. Our interviews did not explore why certain patients – females, minorities and the very young and the elderly – were less likely to respond to the income question. Also, survey non-responders were not approached for interviews so we were unable to gain the perspective of response bias. Finally, surveys and interviews were only offered in English, and the experience of non-English speakers could certainly be different.

Comparison with existing literature

It was surprising that more than one-fifth of patients on government financial assistance reported an income above the LICO, although this may include people who were only temporarily on social assistance or who had income from other sources. Using responses on the survey as the gold standard, we found that average neighbourhood income quintile is not an adequate proxy. This confirms other research(33–35) and suggests that individual-level data is preferred, particularly in mixed-income urban settings. Surveys that ask about income report non-response

rates ranging from 10-30%, depending on the setting and how the question is asked.(36,37) In a study of 1,427 hospitalized patients that used a similar sociodemographic survey, the response rate was only 54%. (38) Other work has also found that patients find it difficult to recall their income when asked to provide a dollar value. (36,39)

Implications for research and practice

Data on individuals' social circumstances will be increasingly important for quality improvement efforts(13,40) work to reduce health inequities(41,42) and research on health disparities.(9,43) We found that some patients were uncomfortable answering the question on income because of a fear of discrimination. Indeed, low-income people face discrimination in healthcare, even in the context of universal health insurance.(44) Rather than asking patients directly to report their individual or household income, some health organizations ask about financial strain or financial need.(45–49) A question on financial strain may also be more actionable for healthcare providers.(10) Future research should examine the response rate and utility of asking patients about income compared to asking about financial strain, and explore how wealth, assets and debt, and other aspects of socioeconomic status modify responses. Research is also required on linking data on income or financial strain to clinic-based interventions to address poverty. At the point-of-care, this information could direct physicians to refer to social services, choose lower-cost treatments(41,42,50,51) or link to tools that identify financial benefits that improve the income of patients and families.(23)

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Ethical approval

The qualitative component was approved by the St. Michael's Hospital Research Ethics Board, while the quantitative component was formally reviewed and deemed to not require ethics approval in the context of ongoing quality improvement.

Competing interests

Dr. Andrew Pinto, Ms. Erica Shenfeld, Dr. Tatiana Aratangy, Mr. Ri Wang, Dr. Rosane Nisenbaum, Dr. Aisha Lofters, and Dr. Gary Bloch declare no conflicts of interest. At the time of

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Table 2: Adjusted odds of responding to a two-part question on income

Covariate		AOR (CI)	P-Value
Gender	Female	0.79 (0.72 - 0.87)	<0.001
	Other (Intersex/Transgender/Other)	0.92 (0.54 - 1.56)	0.762
	Prefer Not to Answer/Do Not Know/Missing	0.51 (0.39 - 0.66)	<0.001
	Male (reference)	1.0	n/a
Age	< 10 years old vs. 30-39 years old	0.51 (0.36 - 0.74)	<0.001
	10-19 years vs. 30-39 years old	0.22 (0.15 - 0.31)	<0.001
	20-29 years vs. 30-39 years old	0.53 (0.46 - 0.62)	<0.001
	40-49 years vs. 30-39 years old	0.97 (0.84 - 1.12)	0.659
	50-59 years vs. 30-39 years old	0.84 (0.73 - 0.98)	0.022
	60-69 years vs. 30-39 years old	0.78 (0.67 - 0.92)	0.003
	70+ years vs. 30-39 years old	0.66 (0.56 - 0.79)	<0.001
Housing Status	Renting vs. Own home	1.15 (1.03 - 1.28)	0.013
	Other vs. Own home	0.86 (0.73 - 1.01)	0.067
	Prefer Not to Answer/Do Not Know/Missing vs. Own home	0.18 (0.15 - 0.21)	<0.001
Ethnicity	Non-White vs. White	0.62 (0.56 - 0.68)	<0.001
	Prefer Not to Answer/Do Not Know/Missing vs. White	0.29 (0.25 - 0.34)	<0.001
Sexual Orientation	Gay/Bisexual /Lesbian /Queer /Two-Spirit /Other vs. Heterosexual	1.42 (1.23 - 1.65)	<0.001
	Prefer Not to Answer/Do Not Know/Missing vs. Heterosexual	0.37 (0.32 - 0.43)	<0.001
Income Quintile	Q2 vs. Q1	1.06 (0.92 - 1.22)	0.392
	Q3 vs. Q1	1.04 (0.91 - 1.2)	0.554
	Q4 vs. Q1	1.14 (0.98 - 1.32)	0.091
	Q5 vs. Q1	0.98 (0.86 - 1.12)	0.752

Figure 2: Responses to income questions

Figure 1: Questions about income

What was your total family income before taxes last year? Choose **ONE**.

- ☐ \$0 to \$29,999
- ☐ \$30,000 to \$59,000
- ☐ \$60,000 to \$89,000
- ☐ \$90,000 to \$119,999
- ☐ \$120,000 to \$149,999
- ☐ \$150,000 or more
- ☐ Prefer not to answer
- ☐ Do not know

How many people does your income support? Choose **ONE**.

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10+
- ☐ Prefer not to answer
- ☐ Do not know