The relationship between relative deprivation and self-rated health among Palestinian women in refugee camps in Lebanon

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**ABSTRACT**

**Background:** Relative deprivation (RD) has been advanced as a theory to explain the relationship between income inequality and health in high-income countries. In this study, we tested the theory in a low-income protracted refugee setting in a middle-income country.

**Methods:** Using data from the 2010 Socioeconomic Survey of Palestine Refugees in Lebanon, we examined the relationship between RD and health among a representative sample of Palestinian refugee women (N = 1047). Data were gathered utilizing a household questionnaire with information on socio-demographics and an individual-level questionnaire with information on the health of each respondent. We examined self-rated health (SRH) as the main health measure but also checked the sensitivity of our results using self-reported chronic conditions. We used two measures for absolute SES: total household monthly expenditures on non-food goods and services and total household monthly expenditures on non-health goods and services. With refugee camp as a reference group, we measured a household’s RD as a household’s rank of absolute SES within the reference group, multiplied by the distance between its absolute SES and the average absolute SES of all households ranked above it. We investigated the robustness of the RD–SRH relationship using these two alternative measures of absolute SES.

**Results:** Our findings show that, controlling for absolute SES and other possible confounders, women report significantly poorer health when they live in households with a higher score on our RD measure (because of either lower relative rank or lower relative SES compared to households better off in the reference group which we take to be the refugee camp). While RD is always significant as a determinant of SRH under a variety of specifications, absolute SES is not consistently significant. These findings persist when we use self-reported chronic conditions as our measure of health instead of SRH, suggesting that the relationship between health and RD may be operating through a psychosocial mechanism.

**Discussion:** Our findings underscore the importance of examining RD under conditions of poverty and in diverse socio-cultural contexts. They also highlight that public health approaches should be concerned with reducing social inequalities in low-income settings in addition to alleviating poverty.

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Epidemiological studies have shown a consistent and strong association between absolute socioeconomic status (SES), measured by occupation, education, expenditures, or income, and health. Furthermore, considerable evidence has shown that health is also determined by the distribution of socioeconomic resources in an individual’s context (Wilkinson & Pickett, 2006, 2007). In high-income settings, where basic material needs are satisfied and absolute income is above a certain threshold, health is associated with inequality as well as poverty (Deaton, 2003; Kawachi & Kennedy, 1999; Lynch & Kaplan, 1997).

Income inequality links with health through a number of macro- and micro-level pathways. At the macro-level, income inequality is purported to lead to under-investments in public goods and services (Kawachi & Kennedy, 1999; Lynch & Kaplan, 1997). With increasing inequality, the interests of the more powerful and well-off classes – i.e., lowering taxes and reducing social spending – translate into under-investments in public goods and services and lower opportunities for the poor. Income inequality may also affect health negatively through the erosion of social cohesion and trust in a society. Kawachi and Kennedy found that states in the United States (U.S.) with higher income inequality
exhibit lower trust and voluntarism, and lower self-reported health status (Kawachi & Kennedy, 1997).

Income inequality also exerts an effect on health through an individual-level psychosocial mechanism, of which relative deprivation (RD) is one explanatory variable (Kawachi & Kennedy, 1999, 2006). When individuals compare themselves to those positioned higher on the social hierarchy, feelings of RD ensue and activate stress mechanisms that negatively affect health. Thus, RD belongs to the family of psychosocial theories and advances that inequalities cause repeated exposures to stress that exerts wear and tear on metabolic, cardiovascular, and immune systems, thereby increasing susceptibility to illness (Deaton, 2001; Krieger, 2001; Marmot & Wilkinson, 2001). Supporting evidence for RD comes from research on primates that has shown an association between rank, stress, and mortality (Deaton, 2001). Early epidemiological evidence on the RD psychosocial pathway is based primarily on studies in high-income settings (Runciman, 1967; Townsend, 1979; Walker & Smith, 2002).

Empirically, RD is operationalized as a function of both absolute SES and a measure of the distribution of SES in the reference group (Wagstaff & van Doorslaer, 2000). There is no consensus, however, on what constitutes a reference and researchers have generally used the average SES in a demographic or geographic group as a reference (Yngwe, Fritzell, Lundberg, Diderichsen, & Burström, 2003). In some cases, researchers conduct a set of analyses using different reference groups and test which one provides the strongest association with poor health (Kondo, Kawachi, Subramanian, Takeda, & Yamagata, 2008).

Studies examining the link between income inequality and health, for which RD is one explanatory pathway, have shown mixed results. Whereas U.S.-based studies utilizing self-rated health (SRH) as the outcome provided supportive evidence (Kennedy, Kawachi, Glass, & Prothrow-Stith, 1998; Subramanyam, Kawachi, Berkman, & Subramanian, 2009), initial findings from European studies focusing on other health measures (i.e., mortality) did not (Mackenbach, 2002; Osler et al., 2002). On the one hand, the null findings in Europe suggest that the relationship between income inequality and mortality may be specific to the highly unequal context in the U.S., purportedly because European welfare benefits buffer the negative effects of income inequality on health. On the other hand, the divergent findings may be due to the nature of the health outcome itself, as subjective health may be more sensitive to inequality than an objective health measure such as mortality. In more recent cross-country analyses of European data, income inequality was found to weakly predict poor SRH in general, though the association was relatively strong in Eastern European countries due to causes of death related to smoking and alcohol use (Mackenbach et al., 2008). In Western Europe (i.e., the United Kingdom), absolute income remained more strongly predictive of SRH even after the inclusion of measures of RD (Jones & Wildman, 2008).

Only a handful of studies examined the RD-health association outside the U.S. and Europe; all revealed strong evidence that, above and beyond absolute income, RD is an important predictor. In research using a large probability sample of Japanese men and women, RD measured by the Yitzhaki Index was found to associate with poor SRH independently of absolute income (Kondo et al., 2008). Further, a study based on a nationally representative cohort of Costa Rican individuals aged 30 and over found a positive association between RD, measured by area-level Gini Coefficients, and mortality. Modrek, Dow, and Rosero-Bixby (2012) in South Africa, research linking income and mortality data between 1993 and 1998 has shown that multiple measures of RD significantly predicted mortality after adjustment for absolute income (Salti, 2010). Finally, research linking RD to adult nutritional status in rural Zambia found that a lower subjective perception of SES is associated with a significantly lower body mass index (Cole, 2012). The results of these studies combined suggest that RD is an important predictor of health, sometimes independent of absolute income, outside the context of the U.S. and Europe.

RD presumably operates in societies where material living standards are adequate but where social inequalities exist. The theory has rarely been tested in low-income contexts despite accumulating evidence that income inequality is widening globally and threatening to block efforts to reduce poverty. As the detrimental effects of RD on health co-exist with the effects of poverty, it no longer suffices to promote poverty reduction alone as a policy to improve health. Reducing income inequality then is an important social policy approach to population health.

In this paper, we investigated RD as a pathway between income inequality and health in the low-income setting of Palestinian refugee camps in Lebanon. We examined self-rated health (SRH) as the main health measure but also checked the sensitivity of our results using self-reported chronic conditions. With the exception of a few studies investigating the pathways between social inequalities and health among Palestinians in Israel (Daoud, Soklone, & Manor, 2009a, 2009b), very few have specifically examined social inequalities within Palestinian refugee communities. Though the World Bank classifies Lebanon as an upper middle-income country, Palestinian refugee camps on Lebanese territory constitute pockets of poverty (Ramadan, 2013). Palestinians arrived to Lebanon as refugees in 1948 after the creation of the State of Israel; they currently number 450,000 according to the records of the United Nations Relief and Works Agency, UNRWA (UNRWA, 2013). For more than six decades, they have faced exclusionary policies that restrict their employment, property ownership, and other civil rights (Abdulrahim & Khawaja, 2011; Chaaban et al., 2010). More than 50 percent of Palestinians in Lebanon reside in twelve recognized refugee camps under conditions of poverty and overcrowding; the rest reside in “unofficial gatherings”, some of which have worse infrastructure than official camps.

UNRWA’s mandate is the provision of education, health care services, and relief to Palestinian refugees, but not legal protections, which are usually provided by the United Nations High Commissioner for Refugees (Knudsen, 2009). Palestinian refugees in Lebanon exhibit a low rate of secondary school completion and are banned from participating in syndicated professions such as engineering, law, and nursing. As such, most Palestinians are economically and spatially segregated from the rest of Lebanese society; those who work do so in the informal labor sector and half earn less than the Lebanese minimum wage (Garry, Somes, & Marx, 1978). Palestinian women experience more disadvantage than Palestinian men due to the intersection of gender and ethnic exclusion; women who work are primarily segregated in jobs inside the camp and earn lower wages compared to men (Abdulrahim & Khawaja, 2011).

In this context of segregation, RD deserves examination as a potential explanation for health inequalities within the Palestinian refugee community in Lebanon. Moreover, as Palestinian refugees have universal access to primary health care through UNRWA’s clinics, they present a unique case for testing the RD theory, which proposes that the social inequality-health relationship cannot be explained by differential access to health care. Utilizing data gathered in 2010, we examined the relationship between the health of Palestinian women residing in refugee camps and two alternative measures of RD, each calculated using a different proxy measure of absolute SES (household non-health expenditures per capita, and household non-food expenditures per capita), with camp of residence as the reference group. To investigate the contribution of RD as a determinant of health, we added a measure of RD to standard determinants of health, which include age, chronic conditions (Garry et al., 1978), household size (Wu & Li, 2012),
education (Lleras-Muney & Cutler, 2008), and absolute SES (Lleras-
Muney, Cutler, & Vogl, 2011). Whereas our main measure of health is SRH, we also examined the robustness of our findings on the relationship between RD and health by examining self-reported chronic conditions as another health outcome.

**Methods**

**Data**

We used data from the UNRWA-American University of Beirut (UNRWA-AUB) Socioeconomic Survey of Palestine Refugees in Lebanon (2010). The survey was based on a nationally representative sample of all Palestinian refugee households registered with UNRWA, both in refugee camps and in settlements outside the camps. Data were gathered using two questionnaires: (1) a household-level questionnaire, with information on the socioeconomic status, the demographic composition, the area of residence of the household and the physical condition of the dwelling and (2) an individual-level questionnaire, with information on the respondent’s demographic and labor market profile, in addition to their SRH and any chronic conditions they suffer from.

Because most of the respondents to the individual-level questionnaire were women, and because health outcomes, including SRH and chronic conditions, may be different across genders, we restricted our study to women. We also restricted our sample to those better off than they are.

In the case at hand, our RD measure is based on the distribution of the SES of households in the camp of residence. So if \( F(y) \) is the cumulative probability density function of household SES in a given refugee camp, and \( x^* \) is the highest SES, for an individual in a household with SES \( x \), the measure of RD is the relative weight of all households with SES above \( x \):

\[
Y(x) = \int_x^{x^*} (1 - F(y))dy/n
\]

The measure of RD we adopt is based on Deaton’s variation of the Yitzhaki index (Krieger, 2001). One of the limitations of the RD index in (1) is that it is not sensitive to increases in deprivation that would result from an increase in the SES of people above an individual’s standing. In order to remedy that, we scale the index in (1) to the average SES \( \mu \) within the reference group, as Deaton does. We do this for two reasons:

i. the measure of RD becomes unit free:

\[
R_{dep}(x) = \int_x^{x^*} (1 - F(y))dy/\mu
\]

ii. the scaling allows a useful reformulation of Deaton’s RD index:

\[
R_{dep}(x) = (1 - F(x))\frac{\mu^+(x) - x}{\mu}
\]

where \( \mu^+(x) \) is the average SES above \( x \). This reformulation shows that RD of a household depends on the fraction of households above the household in question in the distribution of spending (so households with higher SES, \( 1 - F(x) \)), but also on the average size of the difference in SES between these households and the household in question \( \mu^+(x) - x \).

**Measures**

**Independent variables**

While the survey includes a question on household income, there is both a very high non-response rate on this question as there is a general reluctance to answer income-related questions in low-income settings (Lleras-Muney and Cutler, 2008). There is also good reason to believe that, in low-income settings, income data may exhibit a great deal of error (Lleras-Muney et al., 2011). Consumption data as calculated by the sum of household monthly expenditures tends to be recorded with less measurement error than income, because of lower recall error, and lower rates of refusal to answer. Further, in the absence of reliable income data, it has been standard practice to use consumption data as indicative of a household’s SES (Wilks et al., 2007). There is consensus among development economists on consumption expenditures being a more reliable measure of SES than income in lower- and middle-income settings (Howe et al., 2012; Deaton, 1992; Deaton & Zaidi, 1998). In the case of refugee populations, a study on Iraqi refugees in Syria and Jordan showed that income and consumption expenditures can be used interchangeably as measures of SES (Cole, Doocy, Frattaroli, & McGready, 2012).

In multivariate analyses, we used two alternative measures of SES based on expenditures: household non-health expenditures per capita, and household non-food expenditures per capita. In the first measure of SES, we excluded health expenditures as out-of-pocket payments on health affect household expenditures as a measure of SES: health expenditures could drive up total household expenditures while eroding SES. Our second measure is

| Measures | Mean | Standard deviation | Number of observations |
|----------|------|--------------------|------------------------|
| Self-rated health* (1: very good–5: very bad) | 2.91 | 0.95 | 1047 |
| Chronic conditionsa | 0.51 | 0.50 | 1047 |
| Ageb | 51.72 | 15.43 | 1049 |
| Educationc | 3.56 | 2.16 | 1049 |
| Household sizec | 4.47 | 2.14 | 1049 |
| Asset indexc | 2.06 | 0.60 | 1041 |
| Household exp/capd | 234.92 | 153.96 | 1049 |
| Non-health exp/capd | 213.17 | 134.72 | 1049 |
| Non-food exp/capd | 172.82 | 153.96 | 1025 |
| Relative deprivationa (non-health exp) | 0.35 | 0.24 | 1040 |
| Relative deprivationa (non-food exp) | 0.41 | 0.29 | 1040 |

* Respondent-level variable.

* Household-level variable.
commonly used in the literature and focuses on non-food consumption as the measure more closely indicative of a household’s SES. We calculated relative deprivation according to (3) above for each of these SES measures, with camp of residence as the reference group. In order to identify whether the association measured between RD and SRH is explained away through physical health, we included in some of the multivariate analyses chronic conditions as a covariate to control for its possible confounding effect and check whether the association between RD and SRH persists even when chronic conditions are held constant.

Dependent variables

Our main health outcome measure is SRH. SRH is a widely used subjective summary of an individual’s physical, social, and psychological health, and has been shown to predict future morbidity and mortality (Idler & Benyamini, 1997). It was assessed through a one-item measure in the questionnaire in which participants were asked: “How do you describe your current health status?” and provided five response options that ranged from “very good” to “not good at all.” SRH was included in the analysis as a linear measure in one of the regressions, thus preserving all the information contained in the variable.

In some of the regressions, SRH was also recoded as a dichotomous variable in regressions with different functional forms, with “very good,” “good,” and “fair” coded as “good health” versus “not good,” and “not good at all” as coded bad health. This recoding may help to reduce some of the measurement error inherent in a 5-point subjective scale.

In one specification in our sensitivity analysis, we used chronic conditions as the measure of health instead of SRH. Chronic conditions is self-reported and dichotomous, taking the value 1 if the respondent reports having any chronic condition. This alternative measure of health is used to check whether the significance and direction of the findings obtained with SRH change when health is measured differently.

Covariates

We controlled for covariates at the individual (age and education); household (household size, household SES as measured by total household non-health expenditures per capita and household non-food expenditures per capita, and a household index of asset ownership) and camp levels (camp of residence).

Analysis

Using the RD measure described above, we ran a series of regressions to test the association between RD and SRH, adjusting for age, education, household size, and household SES. Our baseline regressions take the form:

\[ SRH = g(RD, \text{nonhealth exp, } Z) + \varepsilon \]  

(4)

where \( Z \) is a vector of control variables including age, age squared, education, household size, and camp fixed effects and \( \varepsilon \) is a random disturbance term. We run a set of linear regressions using Ordinary Least Squares (OLS), with SRH measured as a scale going from 1 (“very bad”) to 5 (“very good”) on our sample of 1049 female respondents residing in camps. These basic controls are included in every regression that we run as they are determinants of health. We also include these variables to make sure they are not confounding our measure of the marginal associations between health and SES and relative deprivation as some of these variables are likely correlated to SES.

Results

Main findings

Table 2 reports the results from running regressions of health on absolute SES and relative deprivation and other socio-demographic determinants of health.

A linear version of the baseline regression in Eq. (4) is run using OLS in columns (1) through (4) of Table 2 with SRH as the measure of the health outcome. Column (1) includes the control variables listed in Eq. (4). RD shows a significant negative association with SRH: holding fixed the household’s absolute SES (as measured by non-health expenditures), a larger RD index for the household is associated with a significantly lower SRH for the respondent. An increase in the RD index by 0.5 is associated with a score on the SRH scale on average 0.27 (95% CI: [0.01–0.5]) points lower.

The remainder of the regressions reported in Table 2 are extensions and variations of the baseline regression in column (1) that attempt to rule out alternative hypotheses and to ascertain the pathway through which inequality may affect health.

Column (2) adds to the control variables in column (1) an indicator of the respondent’s report of having one or more chronic conditions. Chronic conditions is added to the model in order to try to determine whether there is a psychosocial aspect to the relationship between relative deprivation and health: when chronic conditions are included as a control variable, the resulting coefficient on relative deprivation shows the association between relative deprivation and SRH holding chronic conditions fixed. Such variation in SRH is capturing differences in self-assessed health status beyond what is warranted by differences in SRH due to chronic conditions. While the chronic conditions variable turns out to be a significant and negative determinant of SRH, it does not affect the results on the basic relation between RD and SRH. RD still has a significant and negative coefficient, of only slightly lower magnitude than in column (1): now a 0.5 increase in the relative deprivation index is associated with a score on SRH that is 0.23 (95% CI: [0.02–0.49]) lower.

To address the concern that household non-health expenditures are variable over time, and fluctuate more than the household’s actual SES, we added an index of asset ownership in the household to control for SES, since the ownership of durables is less variable over time. Column (3) shows that the assets ownership index appears to be a highly significant determinant of SRH, but it does not affect the relationship between RD and SRH: RD is still a significant health hazard with a 0.5 increase in RD associated with SRH that is lower by 0.27 (95% CI: [0.01–0.5]).

Because expenditures on health compared across households may also contribute to a sense of deprivation, we also calculated the RD index over total household non-food expenditures per capita (including health expenditures). In column (4), we show the regression in column (2) with the RD index calculated over non-food expenditures. The results are qualitatively similar to the main findings described in the previous columns. They show that RD remains detrimental to SRH (a 0.5 increase in the RD index is associated with a score 0.12 (95% CI: [0.03–0.21]) lower on SRH), and significantly so.

In the next two columns of Table 2, we investigated the relationships we found in columns (3) and (4), but using a binary measure of SRH (fair, good and very good versus poor and very poor). This pair of regressions is included in order to avoid some of the measurement problems with a 5-point scale measure of SRH, as well as to make sure the results obtained in the first (4) columns are not driven by our choice of functional form (OLS). We ran a logistic regression of a binary measure of SRH in column (5), using the same regressors as in column (3); the results in the column (5) show that RD (over non-health expenditures) is a significant
Logistic regressions in columns (5), (6) and (11) report all regressions control for age and age squared, education, household size and the camp of residence. All expenditures variables are scaled by household size.

### Robustness checks

Note: chronic condition rather than SRH.

Health outcome measure and use self-reported presence of a chronic condition as the health outcome instead of SRH: when controlling for non-food expenditures by 0.5 is associated with a 0.36 (95% CI: [0.08–0.61]) lower log odds of reporting good or fair health.

In column (6), we ran a similar regression with our 5-scale SRH variable as a dependent variable was also run as an ordered-probit regression rather than a linear regression. We did not report these results by individual regression here, but in every case, the sign and significance of the coefficient on the relative deprivation index was unchanged by the change in the estimation procedure.

Finally, the specifications in Table 2 were repeated using multi-level analysis with camp as the level of aggregation. Whether maximum likelihood or restricted estimation maximum likelihood was used, the estimation did not converge. Using expected maximization, the results obtained consistently failed the likelihood ratio test comparing them to the fixed-coefficient linear models reported in Table 2. This was true whether the mixed effect analysis allowed for stochastic intercepts or stochastic slope coefficients.

### Discussion

To date, most empirical studies on income inequality and health have been carried out in high- and middle-income countries. In these countries, the health hazard: an increase in the RD index by 0.5 is associated with a 0.75 (95% CI: [0.01–1.5]) lower log odds of reporting good or fair health. In column (6), we ran a similar regression with our 5-scale SRH variable as a dependent variable was also run as an ordered-probit regression rather than a linear regression. We did not report these results by individual regression here, but in every case, the sign and significance of the coefficient on the relative deprivation index was unchanged by the change in the estimation procedure.

Finally, the specifications in Table 2 were repeated using multi-level analysis with camp as the level of aggregation. Whether maximum likelihood or restricted estimation maximum likelihood was used, the estimation did not converge. Using expected maximization, the results obtained consistently failed the likelihood ratio test comparing them to the fixed-coefficient linear models reported in Table 2. This was true whether the mixed effect analysis allowed for stochastic intercepts or stochastic slope coefficients.

### Table 2

Regressions of health on relative deprivation and controls.

| Dependent variable: | SRH | chronic cond |
|---------------------|-----|--------------|
|                      | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|                      | OLS | OLS | OLS | OLS | Logistic<sup>a</sup> | Logistic<sup>a</sup> | OLS | OLS | OLS | OLS | Logistic<sup>b</sup> |
| Relative deprivation | – 0 | – 0 | – 0 | – 1.5 | – 0.7 | – 0 | – 0 | 1.18 |
| (non-health)         | 55  | 47  | 54  | 9    | 74   | (0.26) | (0.26) | (0.75) | (0.19) | (0.20) | (0.56) |
| Relative deprivation | – 0.24 | – 0.71 | – 0.23 | – 0.23 |
| (non-food)           | (0.09) | (0.28) | (0.09) | (0.09) |
| Non-health           | – 8 x 10<sup>-4</sup> | – 7 x 10<sup>-4</sup> | – 2 x 10<sup>-4</sup> | 4 x 10<sup>-4</sup> |
| expenditures         | (5 x 10<sup>-4</sup>) | (3 x 10<sup>-4</sup>) | (1.5 x 10<sup>-4</sup>) | (7 x 10<sup>-4</sup>) |
| Total expenditures   | – 1 x 10<sup>-4</sup> | – 2 x 10<sup>-4</sup> |
| (3 x 10<sup>-4</sup>) | (2 x 10<sup>-4</sup>) |
| Non-food             | – 1 x 10<sup>-3</sup> | – 4 x 10<sup>-4</sup> | – 4 x 10<sup>-4</sup> |
| expenditures         | (4 x 10<sup>-4</sup>) | (2 x 10<sup>-4</sup>) | (1 x 10<sup>-4</sup>) |
| Assets index<sup>c</sup> | 0.13<sup>**</sup> | 0.39<sup>**</sup> | 0.33<sup>**</sup> | 0.14<sup>**</sup> | 0.11<sup>**</sup> | 0.14<sup>**</sup> | 0.12<sup>**</sup> | 0.02<sup>**</sup> |
| Chronic condition<sup>d</sup> | – 0.54<sup>**</sup> | – 0.54<sup>**</sup> | – 1.03<sup>**</sup> | – 1.06<sup>**</sup> | – 0.52<sup>**</sup> | – 0.55<sup>**</sup> | – 0.54<sup>**</sup> | – 0.57<sup>**</sup> |
| R²                   | 0.18 | 0.24 | 0.25 | 0.25 | 0.25 | 0.25 | 0.26 | 0.25 |
| n                   | 1038 | 1036 | 1029 | 1036 | 1031 | 1031 | 1029 | 1029 | 1006 | 1006 | 1008 |

Note: “*” significant at the 10% level, Logistic regressions in columns (5), (6) and (11) report β (logistic coefficients).

All regressions control for age and age squared, education, household size and the camp of residence. All expenditures variables are scaled by household size.

<sup>a</sup> Significant at the 5% level.
<sup>b</sup> Significant at the 1% level. Standard errors in parentheses.
<sup>c</sup> Binary dependent variable = 1 for good self-rated health, 0 for poor self rated health.
<sup>d</sup> Binary dependent variable = 1 for the presence of chronic conditions, 0 for the absence of chronic conditions.
<sup>e</sup> Excluded category: respondent reports no chronic conditions.
countries. The present study contributes to the growing literature examining the RD hypothesis in poor settings, and indicates that RD is associated with poor health even in the context of a refugee camp. With refugee camp of residence as the reference group, RD is associated with poor health even in the context of a refugee country and the structural causes of both poverty and inequality. In a context where half of Palestinian workers earn less than the Lebanese minimum wage, the equivalent of $500 per month (ILO, 2012), RD ought to be understood as one of the pathways operating within a broader context of deprivation. As Lynch and colleagues have warned (Lynch et al., 2000), a decontextualized focus on the psychosocial consequences of income inequality on health may lead to advocating for “community therapy” or other regressive policies that entail victim-blaming and sway the attention away from the need for structural change. As such, we strongly caution against interpretations of our study findings on Palestinian women that focus solely on the psychosocial consequences of inequality on health. Instead, RD as a psychosocial pathway has to be couched within an understanding of long-standing and persistent structural conditions that serve to maintain both poverty and inequality in Palestinian refugee communities in Lebanon.

Our study has limitations that are worth mentioning. First, our findings are constrained by the cross-sectional nature of the data utilized, which restricts us from making any conclusions about causality. Another limitation of the study is our inability to use the income variable for SES due to missing data. This means that, in attempting to place our findings within the broader literature, it should be noted that most studies on the relationship between RD and health use income in calculating the Yitzhaki index. The comparison of our results to the general literature is therefore qualitative and only valid to the extent that we believe that income and expenditures are both proxies for SES. Finally, the use of secondary data that does not include a measure of distress or other psychological measures means that our conclusion about RD as a psychosocial pathway remains speculative. Despite these limitations, the present study contributes to the broad literature in revealing that the independent association between RD and health is not limited to high income settings, but equally holds in a context of poverty and exclusion.

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Appendix tables

|                          | Mean | Standard deviation |
|--------------------------|------|--------------------|
| Self-rated health (1: very good–5: very bad) | 2.94 | 0.97               |
| Chronic conditions       | 0.63 | 0.48               |
| Household exp/cap        | 305.16 | 182.61             |
| Non-health exp/cap       | 276.88 | 165.12             |
| Non-food exp/cap         | 240.14 | 144.80             |
| Wealth (asset) index (0–4)| 2.03 | 0.81               |
| Relative deprivation (non-health exp) | 0.52 | 0.32               |
| Variable                                | Mean  | Standard deviation |
|-----------------------------------------|-------|--------------------|
| Relative deprivation (non-food)         | 0.43  | 0.32               |
| Age                                     | 54.83 | 16.04              |
| Education                               | 3.69  | 2.42               |
| Household size                          | 4.46  | 2.18               |

### Bourj el Shamali.

| Variable                                | Mean  | Standard deviation |
|-----------------------------------------|-------|--------------------|
| Self-rated health (1: very good–5: very bad) | 3.17  | 0.83               |
| Chronic conditions                      | 0.51  | 0.51               |
| Household exp/cap                       | 225.19| 119.03             |
| Non-health exp/cap                      | 196.65| 111.35             |
| Non-food exp/cap                        | 172.52| 99.89              |
| Wealth (asset) index (0–4)              | 2.10  | 0.38               |
| Relative deprivation (non-health exp)   | 0.37  | 0.26               |
| Relative deprivation (non-food)         | 0.32  | 0.26               |
| Age                                     | 58.02 | 15.69              |
| Education                               | 4     | 2.43               |
| Household size                          | 5.05  | 2.11               |

### Rashidiyeh.

| Variable                                | Mean  | Standard deviation |
|-----------------------------------------|-------|--------------------|
| Self-rated health (1: very good–5: very bad) | 2.87  | 0.86               |
| Chronic conditions                      | 0.51  | 0.49               |
| Household exp/cap                       | 216.92| 105.68             |
| Non-health exp/cap                      | 197.48| 92.78              |
| Non-food exp/cap                        | 159.12| 87.49              |
| Wealth (asset) index (0–4)              | 1.99  | 0.37               |
| Relative deprivation (non-health exp)   | 0.31  | 0.25               |
| Relative deprivation (non-food)         | 0.37  | 0.25               |
| Age                                     | 52.50 | 15.85              |
| Education                               | 3.42  | 2.09               |
| Household size                          | 4.61  | 2.21               |

### Ein el Helweh.

| Variable                                | Mean  | Standard deviation |
|-----------------------------------------|-------|--------------------|
| Self-rated health (1: very good–5: very bad) | 2.90  | 0.87               |
| Chronic conditions                      | 0.54  | 0.44               |
| Household exp/cap                       | 209.28| 144.58             |
| Non-health exp/cap                      | 184.02| 109.64             |
|                    | Mean   | Standard deviation |
|--------------------|--------|--------------------|
| Non-food exp/cap   | 144.40 | 112.84             |
| Wealth (asset) index (0–4) | 2.13   | 0.58               |
| Relative deprivation (non-health exp) | 0.35   | 0.29               |
| Relative deprivation (non-food)       | 0.41   | 0.29               |
| Age                              | 53.23  | 14.85              |
| Education                       | 3.56   | 2.18               |
| Household size                | 4.38   | 2.18               |

**Miyeh Miyeh.**

|                    | Mean   | Standard deviation |
|--------------------|--------|--------------------|
| Self-rated health (1: very good–5: very bad) | 3.29   | 1.11               |
| Chronic conditions                        | 0.29   | 0.45               |
| Household exp/cap                           | 202.83 | 159.36             |
| Non-health exp/cap                          | 162.54 | 86.63              |
| Non-food exp/cap                            | 134.65 | 93.64              |
| Wealth (asset) index (0–4)                  | 2.18   | 0.74               |
| Relative deprivation (non-health exp)       | 0.32   | 0.25               |
| Relative deprivation (non-food)             | 0.40   | 0.25               |
| Age                                            | 51.06  | 15.05              |
| Education                                  | 4.29   | 2.84               |
| Household size                              | 4.53   | 2.14               |

**Bourj el Barajneh.**

|                    | Mean   | Standard deviation |
|--------------------|--------|--------------------|
| Self-rated health (1: very good–5: very bad) | 2.99   | 0.89               |
| Chronic conditions                        | 0.58   | 0.44               |
| Household exp/cap                           | 243.80 | 126.48             |
| Non-health exp/cap                          | 221.79 | 112.97             |
| Non-food exp/cap                            | 177.20 | 103.64             |
| Wealth (asset) index (0–4)                  | 2.33   | 0.63               |
| Relative deprivation (non-health exp)       | 0.38   | 0.26               |
| Relative deprivation (non-food)             | 0.40   | 0.26               |
| Age                                            | 51.06  | 13.51              |
| Education                                  | 3.83   | 2.49               |
| Household size                              | 3.31   | 21.42              |

**Shatila.**

|                    | Mean   | Standard deviation |
|--------------------|--------|--------------------|
| Self-rated health (1: very good–5: very bad) | 2.81   | 1.06               |
| Chronic conditions                        | 0.52   | 0.50               |
| Household exp/cap                           | 230.81 | 108.24             |
| Non-health exp/cap                          | 217.47 | 105.23             |
| Non-food exp/cap                            | 172.38 | 82.68              |
| Wealth (asset) index (0–4)                  | 2.19   | 0.56               |
| Relative deprivation (non-health exp)       | 0.34   | 0.17               |
| Relative deprivation (non-food)             | 0.41   | 0.22               |
| Age                                            | 48.68  | 16.09              |
| Education                                  | 3.16   | 1.39               |
| Household size                              | 4.74   | 2.00               |

**Mar Elias.**

|                    | Mean   | Standard deviation |
|--------------------|--------|--------------------|
| Self-rated health (1: very good–5: very bad) | 3.14   | 1.06               |
|                          | Mean   | Standard deviation |
|--------------------------|--------|--------------------|
| Self-rated health (1: very good–5: very bad) | 2.61   | 0.87               |
| Chronic conditions       | 0.92   | 0.29               |
| Household exp/cap        | 351.68 | 139.14             |
| Non-health exp/cap       | 311.24 | 131.85             |
| Non-food exp/cap         | 270.15 | 111.12             |
| Wealth (asset) index (0–4) | 2.38   | 0.50               |
| Relative deprivation (non-health exp) | 0.58   | 0.32               |
| Relative deprivation (non-food) | 0.43   | 0.26               |
| Age                      | 62.77  | 13.42              |
| Education                | 2.46   | 1.27               |
| Household size           | 3.46   | 1.77               |

**Dbayeh.**

|                          | Mean   | Standard deviation |
|--------------------------|--------|--------------------|
| Self-rated health (1: very good–5: very bad) | 3.09   | 1.05               |
| Chronic conditions       | 0.40   | 0.52               |
| Household exp/cap        | 226.89 | 114.73             |
| Non-health exp/cap       | 214.87 | 105.78             |
| Non-food exp/cap         | 163.06 | 90.29              |
| Wealth (asset) index (0–4) | 1.70   | 0.52               |
| Relative deprivation (non-health exp) | 0.34   | 0.21               |
| Relative deprivation (non-food) | 0.45   | 0.32               |
| Age                      | 47.02  | 16.43              |
| Education                | 3.89   | 19.17              |
| Household size           | 4.49   | 2.22               |

**Nahr el Bared.**

|                          | Mean   | Standard deviation |
|--------------------------|--------|--------------------|
| Self-rated health (1: very good–5: very bad) | 3.11   | 1.03               |
| Chronic conditions       | 0.37   | 0.46               |
| Household exp/cap        | 200.97 | 140.44             |
| Non-health exp/cap       | 186.22 | 113.54             |
| Non-food exp/cap         | 141.58 | 121.66             |
| Wealth (asset) index (0–4) | 2.07   | 0.57               |
| Relative deprivation (non-health exp) | 0.32   | 0.23               |
| Relative deprivation (non-food) | 0.42   | 0.23               |
| Age                      | 47.4   | 14.54              |
| Education                | 3.59   | 2.06               |
| Household size           | 4.65   | 1.14               |

**Beddawi.**

|                          | Mean   | Standard deviation |
|--------------------------|--------|--------------------|
| Self-rated health (1: very good–5: very bad) | 3.11   | 1.03               |
| Chronic conditions       | 0.37   | 0.46               |
| Household exp/cap        | 200.97 | 140.44             |
| Non-health exp/cap       | 186.22 | 113.54             |
| Non-food exp/cap         | 141.58 | 121.66             |
| Wealth (asset) index (0–4) | 2.07   | 0.57               |
| Relative deprivation (non-health exp) | 0.32   | 0.23               |
| Relative deprivation (non-food) | 0.42   | 0.23               |
| Age                      | 47.4   | 14.54              |
| Education                | 3.59   | 2.06               |
| Household size           | 4.65   | 1.14               |
Correlation matrix between measures of absolute SES and RD.

|     | reldep | reldepnfd | reldeppth | nonhealthexp | nonfoodexp | assets |
|-----|--------|-----------|-----------|--------------|------------|--------|
| reldep | 1.0000 |           |           |               |            |        |
| reldepnfd | 0.0062 | 1.0000 |           |               |            |        |
| reldeppth | -0.0368 | 0.0592 | 1.0000 |               |            |        |
| nonhealthexp | -0.7995 | -0.0046 | -0.0029 | 1.0000 |            |        |
| nonfoodexp | -0.6902 | -0.0088 | 0.0097 | 0.9076 | 1.0000 |        |
| assets | -0.0475 | -0.0265 | -0.0333 | 0.0683 | 0.0740 | 1.0000 |

References

Abdulrahim, S., & Khawaja, M. (2011). The cost of being Palestinian in Lebanon. Journal of Ethnic and Migration Studies, 37(1), 151–166.

Cole, S. M. (2012). The relationship between relative deprivation and adult nutritional status in rural Zambia. American Journal of Human Biology, 24, 800–805.

Chaaban, J., Ghatts, H., Habib, R. R., Hanafi, S., Sayhoun, N., Salti N., & Naamani, N. (2010). Socioeconomic survey of Palestinian refugees in Lebanon. Report published by the American University of Beirut (AUB) and the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA). (http://www.ceep-b.org/public/uploads/files/4402_3.pdf).

Cole, J. R., Doocy, S., Frattaroli, S., & McGready, J. (2012). Household expenditures as assets. Non-food exp

Deaton, A. (2001). Understanding consumption. Oxford: Clarendon.

Deaton, A., & Zaidi, S. (1998). Guidelines for constructing consumption aggregates for welfare analysis. Washington, DC: The World Bank.

Garrity, T. F., Sones, G. W., & Marx, M. B. (1978). Factors influencing self-assessment of health. Social Science Medicine, 12, 77–81.

Howe, L., Galobardes, B., Matijasevich, A., Gordon, D., Johnston, D., Onwujekwe, O., Knudsen, A. (2009). Widening the protection gap: The politics of citizenship for Palestinian Refugees in Lebanon, 1948–2008. Journal of Refugee Studies, 22(1), 51–73.

Lleras-Muney, A., & Cutler, D. (2008). Education and health: Evaluating theories and evidence in making Americans healthier: Social and economic policy as health policy In: R. Schoeni (Ed.), New York: Russel Sage Foundation.

Deaton, A. (2003). Policy implications of the gradient of health and wealth. International Journal of Health Services, 33(3), 673–700.

Kondo, N., Kawachi, I., Subramanian, S. V., Takeda, Y., & Yamagata, Z. (2008). Do social comparisons explain the association between income inequality and health? Annual Review of Public Health, 29, 243–266.

Kennedy, B. P., Kawachi, I., Glass, R., & Prothrow-Stith, D. (1998). Income distribution of income affects health. Journal of Health Psychology, 3, 297–314.

Krieger, N. (2001). Theories for social epidemiology in the 21st century: An ecological perspective. International Journal of Epidemiology, 30, 668–677.

Kondo, N., Kawachi, I., Subramanian, S. V., Takeda, Y., & Yamagata, Z. (2008). Do social comparisons explain the association between income inequality and health? Relative deprivation and perceived health among male and female Japanese individuals. Social Science Medicine, 67, 982–987.

Kennedy, B. P., Kawachi, I., Glass, R., & Prothrow-Stith, D. (1998). Income distribution, socioeconomic status, and self-rated health in the United States: Multi-level analysis. British Medical Journal, 317, 917–921.

Kundsen, A. (2009). Widening the protection gap: The politics of citizenship for Palestinian Refugees in Lebanon, 1948–2008. Journal of Refugee Studies, 22(1), 51–73.

Lynch, J. W., & Kaplan, G. A. (1997). Understanding how inequality in the distribution of income affects health. Journal of Health Psychology, 2, 297–314.

Marmot, M., & Wilkinson, R. G. (2001). Psychosocial and material pathways in the relation between income and health: A response to Lynch et al. British Medical Journal, 322, 1215–1216.

Salti, N. (2010). Relative deprivation and mortality in South Africa. Social Science Medicine, 70, 729–736.

Salti, N., Prescott, E., Gronbaeck, M., Christensen, U., Due, P., & Engholm, G. (2002). Income inequality, individual income and mortality in Danish adults: Analysis of pooled data from two cohort studies. British Medical Journal, 324, 13–16.

Runciman, W. G. (1967). Relative deprivation and social justice: A study of attitudes to social inequality in twentieth century England. Routledge.

Ramadan, A. (2013). Spatializing the refugee camp. Transactions of the Institute of British Geographers, 38, 65–77.

Subramaniam, M., Kawachi, I., Berkman, L. D., & Subramanian, S. V. (2009). Relative deprivation in income and self-rated health in the United States. Social Science Medicine, 69, 327–334.

Salti, N. (2010). Relative deprivation and mortality in South Africa. Social Science Medicine, 70, 729–736.

Townsend, P. (1979). Poverty in the United Kingdom: A survey of household resources and standards of living. Berkeley: University of California Press.

UNRWA (2013). Where We Work. (http://www.unrwa.org/where-we-work/lebanon).