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Reciprocal association between social support and psychological distress in chronic physical health conditions: A random intercept cross-lagged panel model

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Abstract

The onset of a chronic physical health condition (CHC) can highly impact individuals' well-being and mental health. Social support has been shown to help people rebound after the onset of a CHC. Nonetheless, little is known about the longitudinal pattern of social support and its reciprocal association with mental health in CHC. This study aimed to illustrate the longitudinal pattern of perceived social support and to examine the reciprocal association between perceived social support and psychological distress across 6 years. Two random intercept cross-lagged panel models were conducted, one for emotional and one for practical support, using yearly assessments of 582 Swiss Household Panel's participants reporting a CHC. A reciprocal association was found, with psychological distress 1 year after the onset being linked to less emotional support in the following year and vice versa, more emotional support being

linked to less psychological distress the following year. A unidirectional association was found for practical support, with more psychological distress 1 year before the CHC onset being linked to more practical support at the onset year. This study underlines the importance of involving the social environment of individuals living with a CHC, especially around the first year after the onset.

KEYWORDS

chronic disease, psychological adaptation, psychological distress, random intercept cross-lagged panel model, social support

INTRODUCTION

Chronic physical health condition (CHC) are long-lasting diseases, which may deteriorate, fluctuate, or be characterized by remissions. Common CHCs are diabetes, heart disease, lung disease, and cancer (World Health Organization, 2019). The onset of such conditions can severely affect an individual's life and may negatively impact mental health. The impairment caused by a CHC implies an ongoing psychological adaptation that is defined as a temporal process fostering mental and emotional balance in response to an adverse life event, leading to more or less well-adapted outcomes (Biesecker & Erby, 2008). Many factors can predict the pattern and outcome of the psychological adaptation process. Among them, social support has been often cited as a protective factor during the psychological adaptation process. Individuals who have higher levels of social support experience better overall health, encompassing both physical and mental health, compared to those with lower social support (Barrera, 1986; Uchino et al., 2012). Social support can be classified into two types: received and perceived social support. Received social support refers to the actual assistance received during adverse life events, such as when a partner helps during sickness (Antonucci & Akiyama, 1987; Barrera, 1986). On the other hand, perceived social support is the belief that support would be available if a stressor arises, such as the belief that a partner would help during sickness. The present study focuses on perceived support as there is a strong link to individuals' mental health and positive health outcomes (e.g., Barrera, 1986; Uchino et al., 2012).

Furthermore, studies have identified a positive correlation between perceived support and received support within social relationships and their impact on health (Barrera, 1986; Bolger et al., 2000; Melrose et al., 2015). Although perceived support is a more prospective and stable concept, and conceptually distinct from the more retrospective measure of received support, a substantial body of research indicated a positive correlation between these two aspects (Barrera, 1986; Bolger et al., 2000). Thus, even if perceived support is measured in the present paper, it is an indirect indication of received support, and changes in received support are likely to influence perceived support. Another important aspect relating to the definition of social support is the distinction between emotional and practical support. Emotional support involves actions that make a person feel understood, valued, and accepted by others in times of

adversity. Practical support includes valuable advice, information, and tangible assistance like financial aid, cleaning, or cooking when needed (Cohen & Wills, 1985).

Several theoretical models, such as the stress-buffering hypothesis (Hawkley et al., 2008) or the optimal matching theory of social support (Kaniasty & Norris, 2009), describe how perceived social support lowers the psychological and physical burden of stress and adverse life events on individuals. For instance, the stress-buffering hypothesis posits that the impact of stress on physical and mental health is weaker among individuals with high levels of social support. It is thought that social support provides resources that aid the affected individual to appraise their situation as less stressful but also aids in alleviating the burden of disease and facilitating healthy behavior (Hawkley et al., 2008). Further, the optimal matching theory of social support (Benka et al., 2012) postulates that the effects of social support are enhanced when its provision is matched with need for support. The social support type's effectiveness depends on how well it addresses the specifications of the adverse life event. The manageability of the adverse life event is important in determining the type of social support that will be most beneficial. Particularly, Benka et al. (2012) suggested that in the context of manageable events, supporting acts directed at eliminating the source of stress or decreasing its severity (i.e., practical support) are most useful, whereas in the context of unmanageable events, support types that reduce the severity of aversive emotions are most beneficial (i.e., emotional support). Several studies have confirmed theoretical assumptions of the stress-buffering hypothesis showing, a strong association between high social support and better mental health (Daugherty et al., 2002; Riegel & Carlson, 2004; Santini et al., 2015) as well as a negative association of low social support on mental health (Mancini et al., 2021) in various CHCs. However, these studies were mostly cross-sectional, and even the longitudinal studies of psychological adaptation following adverse life events tend to treat social support as a time-invariant construct measured at one time point (Mancini et al., 2021).

However, according to the social support dynamic model (SSDM), social support is a complex, dynamic, and transactional process that can vary over time in response to an adverse life event. Initially, the recipient of social support may experience a surge in emotional and practical support from family and friends. Over time, the availability and willingness of support providers may change as they return to their daily routines and responsibilities. Recipients may also experience changing needs over time, seeking different types of support as they adjust to their new circumstances and perceive some support as more helpful than others (Cutrona & Russell, 1990). These assumptions of the SSDM were confirmed by a review on social relationships and mental health in physical disability, reporting that perceived social support was higher at the early stages of the CHC, followed by a decrease at later stages (Tough et al., 2017). Among the studies reviewed, one longitudinal study focusing on persons with spinal cord injury showed that everyday social support and support in problem situations was higher around the onset of the spinal cord injury (van Leeuwen et al., 2011). Two other studies examined rheumatoid arthritis patients yearly. They showed that social companionship decreased over time (Demange et al., 2004) and that perceived emotional support decreased between 3 and 4 years following the diagnosis. Indeed, in the early phase following the diagnosis of a CHC, a higher level of social support is expected as a reaction of the social network to this adverse event. Then, the person's social network may consider that their help is less needed over time and might progressively decrease the support they provide (Strating et al., 2006).

Alternatively, the person with a CHC might decrease his or her support demands by fear of being too much of a burden, or because they adapted to their new situation and found the resources, which made them need less help from their social network (Tough et al., 2017).

Apart from these studies described in the review, there is little research on how and when social support changes throughout a CHC. Therefore, it is critical to study social support as a time-variant construct and explore its longitudinal pattern to identify key stages when individuals with CHC are at risk of experiencing lower social support. However, there is a wealth of literature on the time-variant course of mental health around the onset of a CHC (Galatzer-Levy & Bonanno, 2014). Studies using a yearly measurement demonstrated that the onset of a CHC is a long-term adverse life event in which fluctuations in mental health are ongoing for several years. More precisely, the studies explored heterogenous psychological distress trajectories, subjective well-being profiles, and profile transition across 6 years. Especially at 1 and 4 years after the CHC onset change in mental health was identified (Debnar et al., 2020, 2021).

However, a main shortcoming in the CHC literature is the unidirectional analysis of social support's association to mental health (Mancini et al., 2021). Indeed, it seems crucial to explore the reciprocal association between social support and mental health because they may predict each other over time. A wealth of literature reported that the onset of a CHC can have a negative impact on mental health (Gariepy et al., 2016; Rottenberg et al., 2005). A review by Rottenberg et al. (2005) indicates that mental health issues such as depression are associated with social withdrawal and reduced social interactions. Individuals with CHC have indeed been shown to reduce their social activities and thereby lose social resources, which, in turn, aggravates their mental health (Compare et al., 2013; Gariepy et al., 2016; Tough et al., 2017). However, so far, such reciprocal association were only studied outside the CHC context (e.g., in adolescents; Needham, 2008; Ren et al., 2018; Stice et al., 2011) and peer victimization (Burke et al., 2017). Moreover, many of the past studies were limited by the absence of pre-event data (Bonanno & Diminich, 2013). Studies that used pre-event data showed that some persons living with a CHC suffer from higher psychological distress already years before the actual diagnosis of the CHC (Debnar et al., 2020, 2021).

The positive impact of social support may depend on the kind of support that is provided and the specific situation a person is in (Kaniasty & Norris, 1995). For instance, following divorce, receiving emotional support was shown to be the most consistent predictor of adjustment, compared to practical support (Smerglia et al., 1999). Conversely, following spousal loss, practical support, such as assistance with transportation, food, and household tasks, was the most consistent predictor of adjustment, in comparison with emotional support (Sullivan & Infurna, 2020). In the field of CHC, mixed findings have been reported concerning the respective impact of emotional and practical support. On the one hand, significant positive associations between perceived emotional support and well-being have been found, whereas no associations have been found with perceived practical support in a study among adults with rare CHC (Bryson & Bogart, 2020) and in a study among rheumatoid arthritis patients (Benka et al., 2012). On the other hand, other studies also operationalizing multiple kinds of support have singled out perceived practical support as particularly beneficial among patients with heart disease (Woloshin et al., 1997) and elderly individuals (Minkler, 1985). Thus, social support needs to be investigated as a multidimensional construct.

The objective of the present study was to describe the longitudinal pattern of perceived social support and its reciprocal association with psychological distress following the onset of a physical CHC with the inclusion of pre-event data in a nonclinical population presenting different types of CHCs. The first specific aim was to explore the longitudinal pattern of perceived emotional and practical support from 1 year before to 4 years after the onset of a

physical non-congenital CHC (Cutrona & Russell, 1990). Theories and previous studies in the field suggest a greater level of social support in the year following the CHC onset, followed by a lower level in the later years (Tough et al., 2017). The second specific aim of this study was to examine the reciprocal association between perceived social support and psychological distress, that is, whether perceived social support at one time point is associated with psychological distress reported at a later time point or vice versa. Consistent with past literature, perceived social support and psychological distress were expected to show some reciprocal associations, with higher psychological distress due to the CHC onset (Keles et al., 2007) being associated with reduce perceived social support (Compare et al., 2013). In contrast, more perceived social support was expected to be related to less psychological distress in a subsequent year (Tough et al., 2017).

METHOD

Design and participants

This longitudinal study examined perceived social support and psychological distress across six measurement time points: 1 year before the physical CHC onset (T − 1), onset year (T0), 1 year after the onset (T + 1), 2 years after the onset (T + 2), 3 years after the onset (T + 3), and 4 years after the onset (T + 4). This is a secondary analysis of Swiss Household Panel (SHP) data. The SHP is a nationally representative panel study that includes Swiss private households and their inhabitants aged 14 years or older. Since 1999, data have been collected annually (for further information concerning the panel and its sampling procedures, see Voorpostel et al., 2018). Participants of the SHP waves 2007–2013 who indicated the presence of a chronic (long-standing) illness or condition (health problem) having started between 2001 and 2006 were considered for the present study. Individuals who reported psychological or congenital causes of the chronic condition were excluded (see Figure S1 for a flow chart). The exact items and response options are available as Supporting Information (Table S1). Furthermore, in order to ensure that the time frame around the CHC onset is appropriately represented by the data, participants who did not complete a minimum of three measurement time points, including the time point 1 year before the onset (T − 1) or the time point at the onset year (T0), were excluded. The final sample consisted of 582 participants.

MEASURES

Social support indicators

The social support items of the SHP were adapted from the "Social Support Questionnaire" (Schaefer et al., 1981). For perceived *emotional support*, participants were asked to indicate, "To what extent can your [support source] be available in case of need and show understanding, by talking with you, for example" (0 = *not at all*, 10 = *a great deal*). The item was asked separately for partner, relatives, and friends as support sources, and a mean score of emotional support was computed across these three sources. For perceived *practical support*, participants were asked to report, "If necessary, in your opinion, to what extent can your [support source] provide you with practical help, this means concrete help or useful advice" (0 = *not at all*, 10 = *a great*

deal). This item was also asked separately for partner, relatives, and friends as support sources, and a practical support mean score was also computed. In case the participant chose the response options "inapplicable" (e.g., if they do not have a partner) or "no help wanted," the mean was built based on the other sources of social support.

Psychological adaptation indicator

Psychological distress was assessed with a single item of the World Health Organization Quality of Life Survey (WHOQOL Group, 1998): "Do you often have negative feelings such as blue mood, despair, anxiety, depression?" (0 = *never*, 10 = *always*). This item has been shown to have good responsiveness and good content validity (Yao et al., 2008). As shown by Morselli (2017), this psychological distress item is a good indication of mental health because it correlates well with the number of admissions to psychiatric hospitals in Switzerland (Spearman correlation $\rho \leq .75$).

Analysis

As a first step, Stata version 16 (StataCorp, 2019) was used for data preparation and descriptive statistics. Two-way random effect intra-class correlations (ICC) were calculated for emotional support, practical support, and psychological distress to determine whether or not a multilevel model was reasonable. A multilevel model takes the hierarchical data structure into consideration (i.e., the non-independence of data). When the hierarchical structure of the data is not considered and ordinary least squares methods (e.g., linear regressions) are performed, the type I error rate is seriously inflated. ICC takes values from 0 to 1 with higher values indicating hierarchical data structure and thus the need for a multilevel analysis (e.g., random intercept modeling) to avoid type I errors (Musca et al., 2011).

Second, under the assumption of missing at random, two missing data handling strategies were implemented. Full information maximum likelihood was implemented whenever possible, because it has been shown to be one of the best ways to handle missing data (Graham, 2009). However, it was necessary to compute mean scores for the partner, relatives, and friends' items of the social support variables because they include an answer category "no help wanted" that neither indicated a missing response nor provided information on perceived support. When participants selected "no help wanted," we calculated the mean score using their responses to the other social support variables. This procedure made FIML difficult to apply and thus item-level imputation was applied to estimate the missing data in these variables before computing the mean scores. For those variables, multiple imputations (20 imputed datasets) with chained equations (MICE, mice package in R; Van Buuren & Groothuis-Oudshoorn, 2011) were conducted. For psychological distress, incomplete data were handled using full information maximum likelihood. The fit of the MICE imputation data was checked by comparing the distributional properties of the imputed and observed data and showed no remarkable distributional differences, indicating a good fit of the imputation dataset. Furthermore, no sizeable discrepancies in parameter estimates were detected when the main analyses were rerun with complete cases only ($n = 363$).

Third, to achieve the study aims, two separate cross-lagged panel models were conducted: one for emotional support and one for practical support. These analyses were performed with

Mplus version 8 (Muthén & Muthén, 2010). Random intercept cross-lagged panel models (RI-CLPM) extends the traditional cross-lagged panel model (CLPM) by including random intercepts that enable to account for unobserved heterogeneity in longitudinal data. The RI-CLPM takes into account that there are individual differences in the constructs of interest that endure over time. Thus, it divides the variance of the scores into variance between persons (differences between individuals) and variance within persons (fluctuations over time; Hamaker et al., 2015; Mulder & Hamaker, 2020). The model tested in the present study is presented in Figure 1. The autoregressive parameters indicate the longitudinal fluctuation patterns from 1 year before to 4 years after the onset for both social support (α) and psychological distress (δ). The cross-lagged regression parameter γ measures the extent to which change in social support is associated with the previous year's psychological distress level. Vice versa, the cross-lagged regression parameter β measures the extent to which change in psychological distress is linked with the previous year's level of social support. The autoregressive parameters together with the cross-lagged regression parameter reflect the within-person dynamics. On the other hand, the random intercepts part of the model (i.e., emotional support between-person and psychological distress between-person) represents the social support and psychological distress
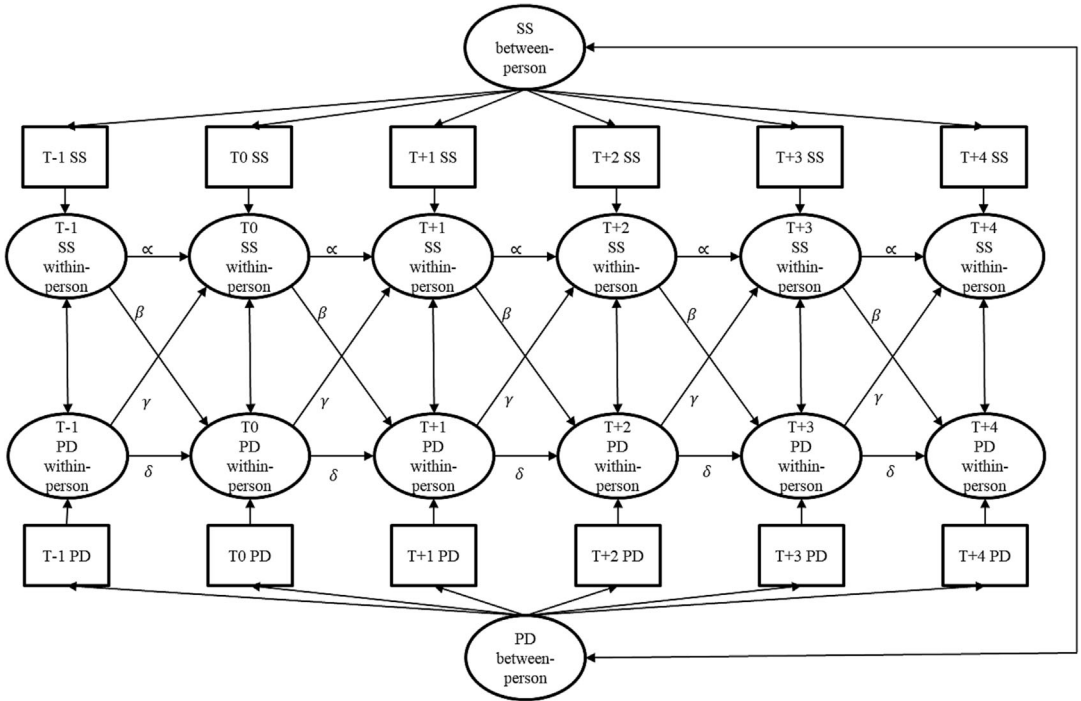

FIGURE 1 Six-wave random intercept cross-lagged panel model of perceived social support and psychological distress. *Notes*: Observed mean scores of social support and psychological distress were regressed on their own "within-person" latent factor (each loading constrained at one). The derived 12 latent factors were used to identify cross-sectional associations as well as their autoregressive (α, δ) and cross-lagged paths (β, γ). The residual variances of the observed variables were constrained to be zero in order to allow the latent factor structure to capture the within- and between-person variance. The factor loadings were freely estimated for the random intercept of social support and the random intercept of psychological distress. $T - 1 = 1$ year before the onset of a physical CHC, T0 = onset year, $T + 1 = 1$ year after the onset, $T + 2 = 2$ years after the onset, $T + 3 = 3$ years after the onset, $T + 4 = 4$ years after the onset. PD, psychological distress; SS, social support.

between-person differences. The correlation between the two random intercepts reflects how between-person differences in social support are associated with between-person differences in psychological distress. In other words, it indicates whether and how a person's average level (across the 6 years) of social support is related to their average level (across the 6 years) of psychological distress. Using data from 1year before to 4 years after the onset implies the assumption that there is some change in social support and psychological distress over time. This means that the social support and psychological distress random intercepts may vary across the six measurement time points, reflecting the occasion-specific effect of the CHC onset. Therefore, the random intercepts' influence on the observed variables across time should be freely estimated from the data instead of being constrained to be equal over time as it is usually done (a more detailed description of RI-CLPM's applications and recent developments has been published elsewhere) (Hamaker et al., 2015; Mulder & Hamaker, 2020). Thus, in total, three types of cross lagged models were estimated, with decreasing constraints applied to the model parameters: (1) the traditional CLPM, (2) RI-CLPM that accounts for random intercepts, but with the usual constraint of random intercepts' factor loadings to be equal over time, and (3) freeRI-CLPM in which random intercepts are freely estimated. The best-fitting model between those was then identified using the most frequently reported goodness-of-fit index: Akaike Information Criterion (AIC; smaller number is preferable), root mean square error of approximation (RMSEA; <.06 indicate an acceptable model-data fit), comparative fit index (CFI; >.95 indicate an acceptable model-data fit), Tucker–Lewis Index (TLI; >.95 indicate an acceptable model-data fit), and standardized root mean squared residual (SRMR; <.05 indicate an acceptable) (Marsh et al., 2004). The syntax is available as Supporting Information (Mplus syntax S2).

RESULTS

Descriptive statistics

In total, 582 (56.70% female, 43.30% male) participants of the SHP, indicating the presence of a physical non-congenital CHC having started between 2001 and 2006, were included in the present study. At the reported year of onset, participants' mean age was 53.2 years ($SD = 16.22$). Further descriptive statistics are provided in Table 1. The number of individuals with missing values varied between 0.3% and 12.7% among the different time points (see Table 1). Skewness indices of emotional support, practical support, and psychological distress indicators ranged between −1.32 and 1.24, whereas kurtosis indices ranged between −0.14 and 3.32. Intercorrelations between the variables of interest are available as Supporting Information (Table S3). Though the emotional support, practical support, and psychological distress variables were correlated (*rs* between −0.02 and 0.61), the mean variance inflation factor was 2.65 (not correlated ≤1; moderately correlated ≤5; highly correlated >5), indicating no multicollinearity issue (StataCorp, 2019). The ICC were 0.50 for emotional support, 0.51 for practical support, and 0.47 for psychological distress, suggesting that 50%, 51%, and 47% of the variance is explained by between-person differences, while the remaining variances come from within-person fluctuations (50%, 59%, and 53%, respectively). These high ICC values indicate that multilevel modeling such as RI-CLPM is recommended to avoid type I errors (Musca et al., 2011).

TABLE 1 Descriptive statistics.

	M	SD	% missing	Skewness	Kurtosis
Social support indicators					
Emotional support T − 1	8.00	1.49	0.52	−1.12	2.26
Emotional support T0	8.12	1.46	0.34	−1.16	2.85
Emotional support T + 1	8.00	1.43	10.48	−1.14	2.57
Emotional support T + 2	7.98	1.56	12.71	−1.32	3.32
Emotional support T + 3	7.94	1.42	0.52	−1.23	3.17
Emotional support T + 4	7.97	1.43	0.52	−0.94	1.64
Practical support T − 1	7.21	1.84	0.52	−0.97	1.31
Practical support T0	7.32	1.92	8.08	−1.07	1.46
Practical support T + 1	7.28	1.82	7.04	−0.98	1.44
Practical support T + 2	7.31	1.88	7.56	−1.13	1.88
Practical support T + 3	7.38	1.76	0.34	−1.08	1.81
Practical support T + 4	7.33	1.81	0.52	−1.19	2.45
Psychological adaptation indicator					
Psychological distress T − 1	1.97	2.07	8.08	1.24	1.37
Psychological distress T0	2.00	2.06	3.09	1.23	1.32
Psychological distress T + 1	1.99	1.92	3.44	1.15	1.40
Psychological distress T + 2	2.09	2.00	3.09	0.98	0.36
Psychological distress T + 3	2.01	1.95	4.47	1.15	1.21
Psychological distress T + 4	2.07	1.85	4.47	0.74	−0.14
Sociodemographic factors					
Years of education at onset year	13.22	2.95	3.26	0.56	2.63
Having a partner at onset year [n (%)]	450	79.51%	2.75		
Female gender at onset year [n (%)]	330	56.70%	0.00		
Age at onset year	53.19	16.22	0.00		

Note: T − 1 = 1 year before the onset of a physical chronic health condition, T0 = onset year, T + 1 = 1 year after the onset, T + 2 = 2 years after the onset, T + 3 = 3 years after the onset, T + 4 = 4 years after the onset; sociodemographic factors at onset year: years of education (based on International Standard Classification of Education); having a partner or not (partnership status); gender (male or female); age.

Perceived social support and psychological distress model

The emotional support and psychological distress model with freely estimated factor loadings of the random intercepts (freeRI-CLPM) best fit the data (AIC = 23945.32, RMSEA = 0.05, CFI = 0.98, TLI = 0.96, SRMR = 0.02). The fit indices of the CLPM and RI-CLPM are available as online supporting information (Table S4). The variance of both emotional support and psychological distress's random intercepts were significantly different from zero (1.76 and 0.83, respectively, $p \leq .001$), providing further evidence in favor of the RI-CLPM over the CLPM. The significant between-person correlations between the random intercepts of emotional support and psychological distress ($r = -0.23$, $SE = 0.06$, $p \leq .001$) indicated that individuals who

reported more emotional support reported significantly less psychological distress and vice versa. Results of the freeRI-CLPM are graphically displayed in Figure 2a and reported in Table 2. For emotional support, autoregressive paths indicated a significant rise in emotional support between T − 1 and T0, followed by a significant decrease between T + 1 and T + 2 and a significant rise between T + 3 and T + 4. For psychological distress, autoregressive paths indicated a significant rise in psychological distress between T − 1 and T0 and a significant rise between T + 3 and T + 4. Cross-lagged paths showed that higher emotional support at time T + 1 was significantly related to lower psychological distress at time T + 2, and conversely, higher psychological distress at time T + 1 was associated with lower emotional support at time
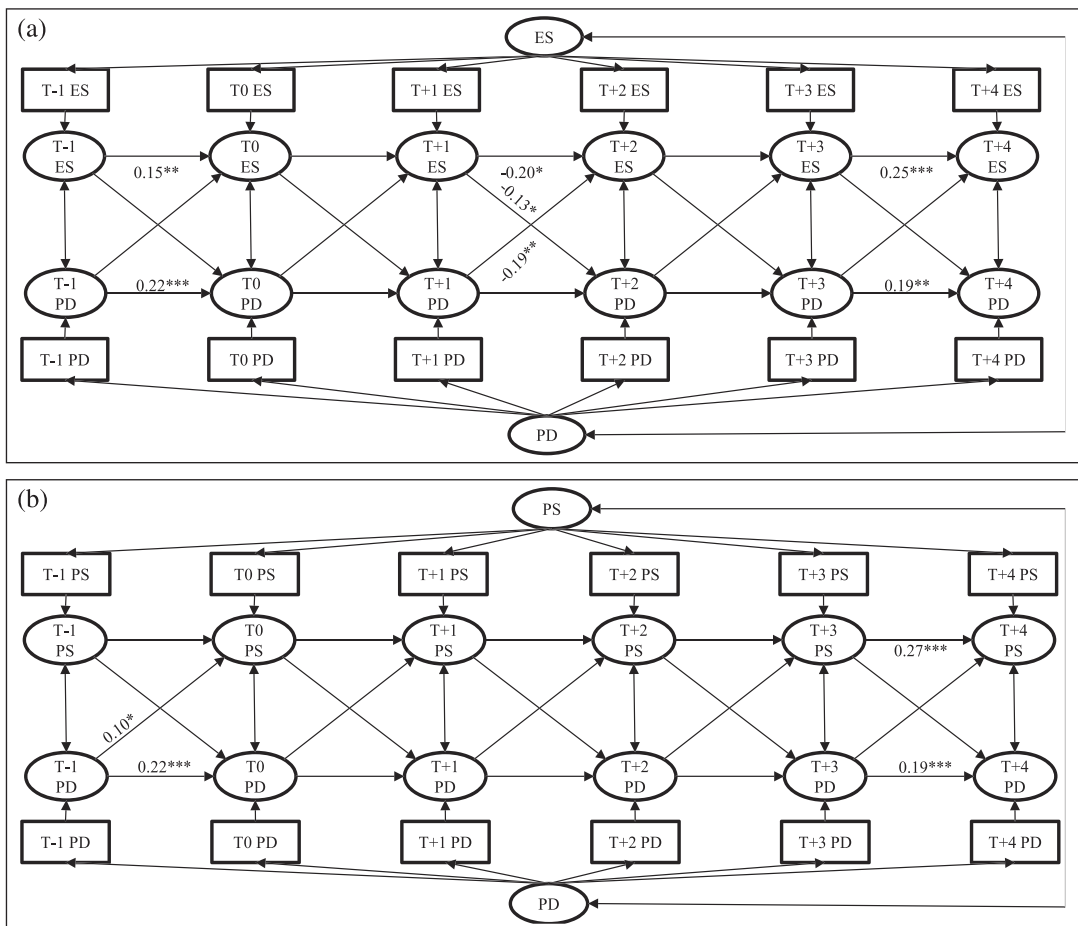

FIGURE 2 Significant standardized results of the free random intercept cross-lagged panel. *Notes*: This provides only the significant standardized results of the freeRI-CLPM. The autoregressive effects are represented as single-headed arrows running from a given variable at one time point to the same variable at the next time point. The cross-lagged effects are illustrated by diagonal single-headed arrows representing social support's abilities to predict psychological distress prospectively and for psychological distress to prospectively predict social support over a 1-year interval; T − 1 = 1 year before the onset of a physical CHC, T0 = onset year, T + 1 = 1 year after the onset, T + 2 = 2 years after the onset, T + 3 = 3 years after the onset, T + 4 = 4 years after the onset. ES, emotional support; PD, psychological distress; PS, practical support; *p ≤ .05; **p ≤ .01; ***p ≤ .001.

TABLE 2 Results of the free random intercept cross-lagged panel model.

	β	SE	p
Autoregressive paths			
Emotional support			
T − 1 → T0	0.15	0.05	0.005
T0 → T + 1	0.05	0.07	0.433
T + 1 → T + 2	−0.20	0.10	0.038
T + 2 → T + 3	0.05	0.07	0.475
T + 3 → T + 4	0.25	0.05	0.000
Practical support			
T − 1 → T0	0.07	0.06	0.189
T0 → T + 1	−0.09	0.08	0.288
T + 1 → T + 2	−0.08	0.08	0.327
T + 2 → T + 3	0.08	0.07	0.262
T + 3 → T + 4	0.27	0.05	0.000
Psychological distress			
T − 1 → T0	0.22	0.06	0.000
T0 → T + 1	−0.01	0.08	0.867
T + 1 → T + 2	0.07	0.08	0.544
T + 2 → T + 3	0.03	0.09	0.916
T + 3 → T + 4	0.19	0.06	0.001
Cross-lagged regression paths			
Emotional support → psychological distress			
T − 1 → T0	−0.04	0.05	0.459
T0 → T + 1	0.04	0.06	0.441
T + 1 → T + 2	−0.13	0.06	0.041
T + 2 → T + 3	0.00	0.06	0.986
T + 3 → T + 4	−0.02	0.05	0.624
Psychological distress → emotional support			
T − 1 → T0	0.05	0.05	0.323
T0 → T + 1	−0.07	0.06	0.215
T + 1 → T + 2	−0.19	0.07	0.004
T + 2 → T + 3	−0.00	0.06	0.975
T + 3 → T + 4	−0.04	0.05	0.055
Practical support → psychological distress			
T − 1 → T0	0.06	0.05	0.214
T0 → T + 1	0.06	0.06	0.269
T + 1 → T + 2	−0.02	0.06	0.753
T + 2 → T + 3	0.07	0.06	0.211
T + 3 → T + 4	−0.02	0.05	0.693

(Continues)

TABLE 2 (Continued)

	β	SE	p
Psychological distress → practical support			
T − 1 → T0	0.10	0.05	0.049
T0 → T + 1	0.03	0.06	0.581
T + 1 → T + 2	−0.02	0.06	0.746
T + 2 → T + 3	0.04	0.06	0.542
T + 3 → T + 4	−0.01	0.05	0.795

Note: T − 1 = 1 year before the onset of a physical chronic health condition, T0 = onset year, T + 1 = 1year after the onset, T + 2 = 2 years after the onset, T + 3 = 3 years after the onset, T + 4 = 4 years after the onset.

T + 2 relative to the previous time point. The practical support and psychological distress model with freely estimated factor loadings of the random intercepts (freeRI-CLPM) also best fitted the data (AIC = 25442.43, RMSEA = 0.04, CFI = 0.99, TLI = 0.97, SRMR = 0.03) fit indices of the CLPM and RI-CLPM are available as Supporting Information (Table S4). The variance of both random intercepts was again significantly different from zero (1.24 and 1.75 for practical support and psychological distress, respectively, $p < 0.001$), providing additional evidence in favor of the RI-CLPM over the CLPM. The between-person correlations between the random intercepts of practical support and psychological distress ($r = -0.22$, $SE = 0.78$, $p \leq .01$) indicated that individuals who received more practical support reported significantly less psychological distress and vice versa. Results of the freeRI-CLPM are graphically displayed in Figure 2b and reported in Table 2. For practical support, autoregressive paths indicated a significant rise in practical support between T + 3 and T + 4. For psychological distress, autoregressive paths indicated a significant rise in psychological distress between T − 1 and T0 and a significant rise between T + 3 and T + 4. Cross-lagged paths showed that a unidirectional association with higher psychological distress at T − 1 was significantly associated with higher practical support at T0 compared with the previous time point.

DISCUSSION

The present study explored the pattern of perceived social support and its reciprocal association with psychological distress from 1 year before to 4 years after the onset of a CHC. Results showed that the longitudinal pattern of emotional support is curvilinear, with a first rise before the CHC onset followed by a decrease and a final rise between 3 and 4 years following the onset. The longitudinal pattern of practical support was more stable and only rise between 3 and 4 years after the onset. Regarding the reciprocal association, this study indicated that more perceived emotional support at 1 year following the onset was linked to less psychological distress in the following year.

Conversely, more psychological distress at 1 year following the onset was linked to less emotional support in the following year. Results of the practical support model showed only a unidirectional association, indicating that individuals reporting more psychological distress before the CHC onset benefit from more practical support at the onset year.

Longitudinal pattern of social support

The pattern of emotional support observed in the current study is in line with theories (Cutrona & Russell, 1990) and past literature underlining a rise in social support around the onset followed by a decrease in the subsequent year (Tough et al., 2017). Nevertheless, the increase in emotional support observed between 3 and 4 years after the onset was not documented in prior literature, as the majority of longitudinal studies have centered their attention on the initial 3 years following onset (Tough et al., 2017). This result nevertheless confirms the SSDM assumption that individuals may experience changing needs over time, seeking different types of support as they adjust to their new circumstances (Cutrona & Russell, 1990). Importantly, the curvilinear tendency confirms that the extent to which individuals receive emotional support varies across time and that social support needs to be conceptualized and operationalized as a time-variant factor. Over extended durations, a factor like perceived social support, which is usually characterized as relatively stable, can undergo alterations due to the day-to-day experiences associated with seeking and receiving support. Contradictory to the pattern of emotional support, the results of the practical support model revealed a tendency for stability across time. A rise in practical support was solely detected between 3 and 4 years after the onset. The SSDM and previous literature suggested that the positive impact of social support may depend on the kind of support provided and the specific situation the individual is in (Cutrona & Russell, 1990; Kaniasty & Norris, 1995). For individuals with an acute CHC, practical support may not match the particular needs of this adverse life event. Over time, the individual learns to adapt to the CHC, and practical support may become more relevant again (Cutrona & Russell, 1990). Unfortunately, this assumption cannot be tested in the present study. Thus, more investigations of the longitudinal pattern of practical support in individuals facing the onset of a CHC are needed to understand its evolution better.

Reciprocal association between social support and psychological distress

The present study confirms past results indicating a reciprocal association between perceived social support and psychological distress as an indicator of mental health (Burke et al., 2017; Needham, 2008; Ren et al., 2018). We indeed found that, between 1 and 2 years following the onset of a physical CHC, more emotional support is linked to less psychological distress in the following year and vice versa, more psychological distress is linked to less emotional support in the following year. These results align with past research showing that a rise in psychological distress can lead to social withdrawal (Rottenberg et al., 2005) and that lack of social support may rise psychological distress (Santini et al., 2015). Our findings further indicate that emotional support is not linked to psychological distress at every time point, underlining the temporality of the reciprocal association between social support and psychological distress. This reciprocal association and the simultaneous significant rise in emotional support indicate that the time span between 1 and 2 years following the onset of a CHC seems particularly critical for intervention. Indeed, at this particular time point, individuals with CHC seems generally more sensitive to change, and thus, intervention might be more likely to have an impact. Also, our results suggest that it is the time point where a change in emotional support is more likely to have a significant impact on psychological distress. This could be since, in the first year around the onset of CHC, much of the focus is on treating

the physical symptoms. Adding other treatment approaches such as social support intervention at this time could be overwhelming for the patient. Thus, starting the intervention at the appropriate time point could higher its effectiveness. To the best of our knowledge, the present study is the first to underline the appropriate time point to implement this kind of intervention. Nevertheless, further studies are needed to confirm its implication for the well-being of individuals living with CHC.

A review of social support interventions (Verbrugge & Jette, 1994) highlighted average effectiveness across different application areas (including CHCs). For instance, peer mentor support programs have been shown to effectively improve and enhance the quality of social support of CHC patients (Daugherty et al., 2002; Riegel & Carlson, 2004). Furthermore, psychological education for relatives and friends of CHC patients has been shown to effectively expand the patients' social network size and support-seeking behaviors (Li et al., 2018). Such education could be implemented by local policies and should be recommended by health professionals treating patients with CHC in order to foster more social support and in turn rise the well-being of individuals with CHC. Given that our results showed that more psychological distress is correlated with less emotional support in the following year, another strategy to promote mental health and indirectly social support are psychological programs such as systemic therapies. This includes, inter alia, enhancement of social skills, emotional support among family members, development of coping skills, and problem-solving strategies concerning various adverse life events (Varghese et al., 2020).

Results regarding the association between practical support and psychological distress showed a single unidirectional link indicating that individuals with more psychological distress before the onset benefit from more practical support at the CHC onset year. The potential presence of health symptoms months before the actual diagnosis of the CHC might lead to higher psychological distress pre-onset (Costanzo et al., 2009; Verbrugge & Jette, 1994). An individual who struggles with symptoms before the actual diagnosis of a CHC might mobilize more practical support from their partner, relatives, and friends. This could explain that individuals with higher psychological distress before the onset year experience a rise in practical support. Past research reported inconsistent findings regarding the association of emotional and practical support with psychological distress (Bryson & Bogart, 2020; Minkler, 1985; Woloshin et al., 1997). Therefore, both kinds of supportive behaviors were considered to be relevant in the present project, and results revealed more complex pattern and reciprocal association to psychological distress for emotional support compared to practical support. Surprisingly, practical support was not otherwise associated with the level of psychological distress. One explanation could be that individuals with an acute CHC may experience this situation as hard to manage. The optimal matching model of social support argues that the manageability of the adverse life event is essential in determining the type of social support that will be most beneficial. In unmanageable events, emotional support is the most helpful support type as it helps to reduce the severity of aversive emotions (i.e., psychological distress). A study on palliative care patients (Buis, 2008) showed that these patients predominantly benefit from emotional rather than practical support. In this line, Buis (2008) explained that emotional support makes the most sense, considering that terminal chronic conditions are highly unmanageable. Future qualitative research is needed to develop a better understanding of the perceived manageability of a CHC and to explore the perception of practical support in the face of a CHC onset. Importantly, this might indicate that emotional support has a great impact on the psychological adaptation process among individuals living with a physical CHC (Benka et al., 2012; Bryson & Bogart, 2020). Moreover, given that the present study was conducted on a sample presenting diverse CHC

diagnosis, the findings indicate emotional support as a common protective factor across different types of CHCs, which might be more suited for intervention than practical support during the psychological adaption process.

Strengths and limitations

The main strengths of this project are its prospective study design, advanced statistical techniques, and population-based approach. It provides valuable insights into the longitudinal pattern of perceived social support, its timely relationship with psychological distress, and the exploration of pre-diagnosis status through pre-event data. Nevertheless, some limitations should be noted. First, single-item measures are a common choice in large surveys because they reduce survey length and participant burden. Nevertheless, single-item measures might present lower reliability (Postmes et al., 2013). Moreover, the psychometrics of the social support items used have not been formally tested to this day. Hence, the present study's findings need to be interpreted with caution, and further replications are advisable. Second, the longitudinal data used provide only yearly measurements. Thus, the pattern of social support in the early phase after CHC onset (months following onset) could not be observed. Future longitudinal investigations incorporating more frequent assessments could better detect acute fluctuations in social support and psychological distress. Third, some kinds of social support or social support sources might be more appreciated or effective for certain conditions (e.g., blind persons might need more practical help, whereas individuals with rare CHC might need more emotional help). The SHP does not provide diagnostic information regarding CHC. Hence, it was impossible to test whether certain types of CHC would show a different association between social support and psychological distress. Fourth, Switzerland is a developed country with a particular health system, which includes mandatory health insurance. Replication in other countries is thus needed to confirm the generalizability of the study results. Fifth, due to the complexity of models like CLPM or RI-CLPM, pre-analysis power estimation is virtually impossible. Therefore, a post hoc power study was conducted using Monte Carlo simulation (Muthén & Muthén, 2010). Results indicated no significant bias in coefficient and standard error estimation when comparing population data with simulated data. However, due to the relatively small sample size, the Monte Carlo simulation revealed lower power for certain regression paths. To address this, it is recommended to use a larger sample in future studies. Additionally, the present study's sample size was insufficient to formally test gender and age differences in the association between social support and psychological distress (as reported in Antonucci & Akiyama, 1987). Further research is needed to explore these potential group differences.

CONCLUSION

Past research indicated that nearly half of the individuals living with a physical CHC experience elevated psychological distress levels at least over 2 years following CHC onset (Debnar et al., 2020, 2021). The present study showed that a physical CHC still affected individuals' psychological adaptation process and perceived availability of social support several years after the onset. This highlights the importance of the longitudinal design and the limitation of the time-invariant conceptualization of the psychological adaptation determinants. The findings revealed

significant fluctuations of perceived emotional support around the onset of a CHC with a post-onset drop that could lead to more vulnerability of individuals living with a CHC. Furthermore, this study underlines the timely reciprocal link between different social support and psychological adaptation to a CHC onset, indicating that emotional support might be more suited for intervention than practical support as it is more associated with individuals' psychological distress. It also indicates the first year post CHC onset as a critical time frame for the efficiency of social support interventions and psychological programs.

CONFLICT OF INTEREST STATEMENT

None applicable.

DATA AVAILABILITY STATEMENT

The datasets used during the current study will be available via DOI from SWISSUbase.

ETHICS STATEMENT

None applicable.

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