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Perceived Social Support as a Protective Factor against Psychological Distress in the context of COVID-19-Related Stress and Sexual Minority Status in Nigeria

Olakunle A. Oginni[a,b]*, Adedotun Ogunbajo[c], Temitope O. Oke[d], Olanrewaju Ibigbami[a,b], Kehinde Okanlawon[e], Ibidunni O. Oloniniyi[a,b], Gamji M'Rabiu Abubakari[f], Boladale M. Mapayi[a,b], Kolawole S. Mosaku[a,b]

[a]Department of Mental Health, Obafemi Awolowo University, Ile-Ife, Nigeria; [b]Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria; [c]Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA, United States of America; [d]University at Buffalo School of Social Work, New York, United States of America; [e]Institute of Social Studies of Erasmus University, The Hague, Netherlands; [f]Yale AIDS Prevention Training Program (Y-APT), Center for Interdisciplinary Research on AIDS (CIRA), Yale University.

*To whom all correspondence should be addressed. Department of Mental Health, Obafemi Awolowo University, Ile-Ife; Email: kaoginni@yahoo.co.uk; +2348061136084.

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Abstract

Sexual minority individuals report higher COVID-19-related stress which may mediate higher psychological distress. However, this relationship and the role of social support have not been investigated in low/middle-income settings like Nigeria. Our study tested independent associations of psychological distress with sexual orientation, COVID-19-related stress and perceived social support and whether perceived social support moderated these relationships. In an online survey, 966 Nigerians (21.7% sexual minority, n=210) were assessed for sexual orientation, COVID-19-related stress and perceived social support and psychological distress. Sexual minority status was associated with higher COVD-19-related stress (r=0.13, 95% CI=0.06, 0.19), perceived social support (r=0.07, 95% CI=0.01, 0.13) and psychological distress (r=0.09, 95% CI=0.02, 0.17). Furthermore, we demonstrated two moderation effects: psychological distress was highest among sexual minority participants with low perceived social support and lowest among heterosexual participants with high perceived social support (β=0.09, 95% CI=0.02, 0.16). Among sexual minorities, the association between COVID-19-related stress and psychological distress was strongest and weakest among those with low and high perceived social support respectively but this effect was absent among heterosexual participants (β=-0.14, 95% CI=-0.21, -0.06). Our finding suggests social support as a protective mechanism against adverse health outcomes among heterosexual and sexual minority individuals in Nigeria.

Keywords: Sexual minority, COVID-19 pandemic, psychological distress, perceived social support, mediation

Second Abstract

This study found that perceived social support was protective against psychological distress from the COVID-19 pandemic and sexuality-related stress among heterosexual and lesbian, gay and bisexual (LGB) Nigerians. Social support can be used by both heterosexual and LGB individuals to protect their mental wellbeing during periods of stress.

Public Significance Statement

We collected data from Nigerian heterosexual and sexual minority (gay, lesbian and bisexual) men and women using an online survey to investigate the associations between sexual orientation, COVID-19-related stress and psychological stress; and how these relationships varied by perceived social support. We found that perceived social support reduced the impact of COVID-19-related stress in the whole sample (including heterosexual and sexual minority participants). Furthermore, higher levels of perceived social support weakened the association between sexual orientation and psychological distress.

Introduction

Globally, the ongoing COVID-19 pandemic has been recognized as a stressor for psychological distress (including anxiety and depressive symptoms) in the general population; especially as it relates to concerns about risk for infection, loss of family and friends, feelings of isolation due to social restrictions and distancing, disruption of daily routines and economic instability (Clemente-Suárez et al., 2020; Cullen et al., 2020; Pfefferbaum & North, 2020; Vindegaard & Benros, 2020).

Sexual minority individuals (i.e., those who identify as lesbian gay and bisexual) who typically experience higher rates of psychological distress (King et al., 2008; Plöderl & Tremblay, 2015) may experience even greater psychological distress during the COVID-19 pandemic. This disparity may be partly attributable to pre-pandemic minority stress (including discrimination and prejudicial events) which sexual minority individuals experience as a consequence of their marginalized sexual identities (Meyer, 2013; Oginni et al., 2018). In addition to this, sexual minority individuals may be disproportionately affected by stresses consequent on the COVID-19 pandemic or experience greater minority stress as a consequence of the pandemic (Oginni et al., 2021a; Salerno et al., 2020). For example, in an online survey of heterosexual and sexual minority individuals in the United States, the latter reported greater psychological distress both before and after the COVID 19 pandemic (Fish et al., 2021). In another online study in Hong Kong, lesbian, gay, bisexual and transgender individuals reported high levels of sexuality-related stress during the COVID-19 pandemic which was independently associated with anxiety and depressive symptoms after adjusting for general COVID-19-related stressors (Suen et al., 2020).

These findings raise the possibility that sexual minority individuals experience greater COVID-19-related stress which is in turn associated with greater psychological distress among them relative to heterosexual individuals. This is especially important considering the

legal sanctions (Mendos et al., 2020), high levels of sexuality-related discrimination (Mapayi et al., 2016; Poushter & Kent, 2020) and disruption due to the COVID-19 pandemic which have been reported in low- and middle-income settings (Oginni et al., 2020a; Oginni et al., 2021b). However, these relationships have not been investigated in such settings including Nigeria.

Given that coping resources are often deployed to mitigate the negative impacts of stress (Zimmerman, 2013) including minority stress (Kwon, 2013; Oginni et al., 2020b), it is also possible that diminished coping resources are an alternative explanation for increased psychological distress among sexual minority relative to heterosexual individuals during the COVID-19 pandemic. Theory and evidence indicate that resources such as adaptive coping strategies and social support are associated with better psychological well-being during the COVID-19 pandemic (e.g., Gurvich et al., 2020; Saltzman et al., 2020). However, very few studies have systematically examined the extent to which these resources differ among sexual minority compared to heterosexual individuals, or to what extents these differences may explain disparities in psychological distress in the context of the COVID-19 pandemic. For example, although Moore et al. (2021) reported higher indices of psychological distress and lower social support among sexual minority relative to heterosexual individuals; they did not investigate the possibility that the diminished social support among sexual minority participants may partly explain the higher anxiety and depressive symptoms among them. In contrast, using a sample of three hundred sexual and gender minority Chinese participants, Wang et al. (2021), demonstrated that family support was associated with decreased depressive symptoms among them. However, the absence of a comparative heterosexual group precluded the investigation of how social support may attenuate mental health disparities in sexual minority relative to heterosexual individuals.

Drawing from resilience theory, one possibility is that social support neutralizes the risk from COVID-19-related stress in a compensatory model (Zimmerman, 2013) whereby a positive association between COVID-19-related stress and psychological distress is partly or completely balanced by a negative relationship between social support and psychological distress. Alternatively, social support may interact with COVID-19-related stress – the protective model (Zimmerman, 2013) whereby the association between COVID-19-related stress and psychological distress becomes stronger when social support is low. However, little research has investigated these relationships in the context of sexual minority status (Meyer, 2015).

The possibility of gender differences in these relationships is suggested by the higher rates of anxiety and depressive symptoms among gay and bisexual men compared to lesbian and bisexual women (King et al., 2008) which contrast with the pattern described in the general population (Bangasser et al., 2014). Similarly, women are more likely to report sexual minority status (Vrangalova & Savin-Williams, 2015) and greater perceived social support (Grey et al., 2020) compared to men. Although the association between perceived social support and psychological distress is stronger in female compared to male students (Zhang et al., 2018), few studies have investigated these relationships among sexual minorities. Furthermore, considering the higher rates of COVID-19-related stress among women compared to men (Yan et al., 2021), in younger adults compared to older adults (Nwachukwu et al., 2020), and in those from lower-income compared to those from higher-income households (Kyprianoudo et al, 2021); all analyses were adjusted for age, gender and educational status as covariates.

Low- and middle-income (LAMI) countries like Nigeria typically report high levels of structural sexuality-related stigma (Mendos et al., 2020) and have been more severely affected by the COVID-19 pandemic compared to higher-income countries (Kaye et al.,

2021; Oginni et al., 2020a). It is, therefore, possible that the minority stress experienced by sexual minorities are exacerbated in the context of the pandemic (Fish et al., 2021) which in turn result in even greater mental health disparities. Understanding the interplays between risk and protective mechanisms for psychological distress among sexual minorities during periods of heightened stress such as the COVID-19 pandemic (Oginni et al., 2021b) in LAMI settings can inform preventive interventions to minimize mental health disparities in both high-stigma LAMI and higher-income settings.

Objectives and Hypotheses

Our objectives were therefore to: i. compare the levels of perceived social support, COVID-19-related stress and psychological distress in a large sample of sexual minority and heterosexual adults in Nigeria; ii. investigate whether sexual orientation, COVID-19-related stress and perceived social support were independently associated with psychological distress; and iii. investigate whether perceived social support moderates the relationships between psychological distress, and sexual orientation and COVID-19-related stress. We also tested gender differences in exploratory analyses.

We hypothesized that: i. COVID-19-related stress and psychological distress will be higher and perceived social support lower among sexual minorities compared to heterosexual individuals; ii. Consistent with the compensatory model of resilience, perceived social support will be further independently associated with psychological distress in addition to sexual minority status and COVID-19-related stress; iii. Consistent with the protective model of resilience, perceived social support will further moderate the associations of psychological distress with sexual orientation and COVID-19-related stress i.e., the associations of psychological distress with sexual minority status and COVID-19-related stress will be stronger (and weaker) at low (and high) levels of perceived social support respectively.

Methods

Materials and Methods

Participants were invited to participate in an online quantitative survey which was advertised on social media including Facebook, Twitter and WhatsApp groups between June 21 2020 to August 6 2020. The proportion of sexual minorities in this study was increased by advertising the survey on sites used by sexual minorities. Inclusion criteria included being at least 18 years old, residence in Nigeria for at least six months prior to the lockdown, fluency in English, ability to use the internet and the absence of severe cognitive or physical impairments. These criteria were specified as single questions in the survey and participants who responded No to any of the questions were excluded from the study. Ethical approval for this study was obtained from the Ethics and Research Committee of the *"masked or blinded for review"*. Online informed consent was obtained from all study participants.

Of the 1013 individuals who met the study criteria, 47 were excluded as follows: 43 had high levels of missing data and 4 identified as gender non-binary which was too small for sub-group analyses while the other participants had complete data. This gave a total of 966 participants which was larger than other similar online surveys in Nigeria during this period (Habib et al., 2021; Reuben et al., 2021).

Measures

Socio-demographic variables were assessed with single questions and these included age of the participants in years, gender and the highest level of education for which the options included 'No qualifications', 'Primary school', 'Vocational training and equivalents', 'Secondary school' and 'University' (rated '0' to '4' respectively); and average monthly income in Naira (₦ – the Nigerian currency).

Sexual orientation was assessed by a single question asking participants to indicate their sexual orientation and the responses were categorized as 'Heterosexual' and 'Sexual

minority' (comprising 'Mostly Heterosexual', 'Bisexual', 'Mostly gay' and 'Completely gay').

COVID-19-related stress was assessed using ten questions which assessed the extents to which the COVID-19 pandemic adversely impacted different domains of life. These were in turn derived from a previous UK survey with approval (R. G. White, personal communication, April 16, 2020). A single stem question was stated as follows: "*On a scale of 1 to 7 please indicate how much the COVID-19 has impacted on the following domains of your life:*" Each of the ten domains were then listed as a separate item as follows: Family (other than marriage or parenting), Marriage/couples/intimate relations, Parenting, Friends/social life, Work, Education/Training, Recreation/fun, Spirituality, Citizenship/community life and Physical self-care (diet, exercise and sleep). The responses for each item ranged from 1 (Not at all) to 7 (Serious disruption) and a total score was computed by summing the individual responses. These sum scores were used in subsequent analyses with higher scores indicating greater disruption. Exploratory factor analyses and principal component analyses indicated unidimensionality of the questionnaire: the overall Kaiser-Meyer-Olkin measure for all ten items was 0.92 indicating that the items are suitable for factor analyses; only the first factor had an eigenvalue greater than 1 (5.11) and the factor loadings were greater than 0.60 (these raged between 0.64-0.77). The Cronbach's alpha in the present study was 0.91.

Perceived social support from family, friends and a significant other was assessed using the 12-item Multidimensional Scale of Perceived Social Support (Zimet et al., 1988). A sample item was: *"I get the emotional help and support I need from my family"*. Each item was rated on a 7-point Likert scale ranging from 1 (Very strongly disagree) to 7 (Very strongly agree). Total scores derived as a sum of responses to the individual items were used in analyses with higher scores indicating higher perceived support. A previous population-

based validation study among South Africans yielded a Cronbach's alpha of 0.83 and satisfactory discriminant validity (Bruwer et al., 2008), the Cronbach's alpha in the present study was 0.97.

Anxiety and depressive symptoms were assessed using the 14-item Hospital and Anxiety Scale (HADS) (Zigmond & Snaith, 1983). It comprised two subscales each made up of 7 items to assess Anxiety and Depressive symptoms respectively. Sample items from the Anxiety and Depression subscales include *"I feel tense or 'wound up"* and *"I still enjoy the things I used to enjoy"* respectively (the latter was reverse scored). Each item was rated on a 4-point Likert scale ranging from 0 (No, not at all) to 3 (Yes, definitely) and total scores derived for the Anxiety and Depression sub-scales by summing the responses. These total scores were used in analyses with higher scores indicating more severe symptoms. A systematic review of validity studies of the HADS indicated good discriminant and concurrent validities and mean Cronbach's alphas of .83 and .82 for the Anxiety and Depression subscales respectively (see Bjelland et al., 2002). This questionnaire has been validated in Nigerian community sample with sensitivity of 87.5 and 90.6, and specificity of 89.5 and 91.1 for the Anxiety and Depression subscales respectively (Abiodun, 1994). Cronbach's alphas for both subscales in the present study were 0.81 and 0.64 respectively.

The following latent factors were specified: Sexual orientation, COVID-19-related stress and perceived social support were indicated by the respective single variables and psychological distress was indicated by anxiety and depressive symptom scores. The factor loadings for the first three factors were fixed to 1 to scale the factors and the residual variances of the indicators were fixed to 0 for identification. The unstandardized loading of the psychological distress factor on anxiety symptoms was fixed to 1 to scale the factor while that on depressive symptoms was freely estimated (the respective standardized factor loadings were 0.83 and 0.72 which are acceptable), and the unstandardized residual variances

of anxiety and depressive symptoms were constrained to be equal for identification (Kline, 2016; the respective standardised residual variances were 0.31 and 0.48 respectively). This latter specification helped us overcome possible measurement error suggested by the lower Cronbach's alpha for the depressive symptoms subscale.

Analyses

Preliminary descriptive, bivariate and multivariable analyses were carried out using STATA software (vs 14) while Lavaan in R (Rosseel, 2014) was used for structural equation modelling. Data were summarized using proportions and means (and standard deviations) as appropriate; and differences by sexual orientation were tested using Chi-squared tests and independent samples t-test respectively. The Pearson correlation coefficients of the study variables were preliminarily inspected (see supplementary materials) before structural equation modelling.

Structural equation modelling was used to test correlations between the latent factors and two structural regression models specified: Model 1: Psychological distress was specified as the outcome, and sexual orientation, COVID-19-related stress and perceived social support were included as predictors; Model 2: In addition to Model 1, we specified three first-order interaction terms between i. sexual orientation perceived social support, ii. sexual orientation and COVID-19-related stress, and iii. COVID-19-related stress and perceived social support; and one second-order interaction term between all three predictors. These respectively tested whether the association between psychological distress and sexual orientation varied by the level of perceived social support (the first interaction term) or COVID-19-related stress (the second interaction term), and whether the association between COVID-19-related stress and psychological distress varied by the level of perceived social support (the third interaction term). The second-order interaction term tested whether the association between COVID-19 stress and psychological distress varied by both sexual orientation and perceived social

support. Both models were adjusted for age, gender and level of education (income was not included due to missing data) and we reported the changes in variance explained. Standardized coefficients and their 95% confidence intervals were reported. We probed the three-way interaction using the simple slope approach (Schoemann & Jorgensen, 2021) and plotted graphs to depict the associations between COVID-19-related stress and psychological distress at varying levels of perceived social support (-2 to 2 standard deviations), sexual orientation (heterosexual vs sexual minority) and COVID-19-related stress (-2 to 2 standard deviations).

The absolute model fit indices (the Comparative Fit Index - CFI, the Standardized Root Mean Square Residual - SRMR and the Root Mean Square Error of Approximation - RMSEA) for each of the structural equation models were inspected to determine how well the models fit the data. Thresholds included CFI≥0.95, SRMR<0.10 and RMSEA<0.10 (Kline, 2016).

Exploratory Analyses of Gender Differences

Considering the higher psychological distress among females compared to male participants (Table 3), we tested bivariate correlations of the latent factors and specified both structural regression models (without and with the interaction terms for perceived social support) in male and female participants separately. We tested for significant gender differences in the structural regression models by comparing heterogeneity models (in which the regression coefficients were allowed to differ for male and female participants) with homogeneity models (in which the regression coefficients were constrained to be equal in males and females) using Chi-squared tests (Oginni et al., 2020c). Where gender differences were significant, we inspected the magnitudes of the regression coefficients in male and female participants and their 95% confidence intervals.

We also specified both multivariable regression models for anxiety and depressive symptoms separately and the results of all exploratory analyses are reported in the supplementary materials (Tables S3-6).

Results

Descriptive Statistics and Differences by Sexual Orientation

The mean age of the sample was 31.3 (±9.89) years (Table 1), with sexual minority participants being significantly younger (t=3.61, $p<0.001$). The gender distribution was nearly equal in the whole sample, and this was comparable among heterosexual and sexual minority participants. Majority of the participants had a university education (78.8%) and this proportion was comparable among heterosexual and sexual minority participants (78.0% and 81.4% respectively; χ^2=1.48, $p<0.1$). The median monthly income ₦60,000 ≈ $144 (IQR = ₦97,000 ≈ $233) and this was comparable across comparable in both groups (Wilcoxon Rank sum test statistic = 0.570, $p = 0.57$). Monthly income was, however, not included in multivariable analyses due to incomplete data (214 participants had no source of income being students, retired or unemployed).

*   *   Table 1   *   *

The mean COVID-19-related stress score in the whole sample was 34.8 (±14.94), and this was significantly higher among sexual minority participants (38.3 [±14.72]) compared to heterosexual participants (33.8 [±14.85], t=-3.96, $p<0.001$). Similarly, the mean scores for perceived social support, and anxiety and depressive symptoms (36.8 [±17.30], 15.8 [±4.50], 14.8 [±3.55] respectively in the whole sample) were higher among sexual minority participants (39.4 [±16.45], 16.4 [±3.91] and 15.3 [±3.35] respectively) compared to heterosexual participants (36.0 [±17.47], 15.7 [±4.64] and 14.7 [±3.60] respectively) and these differences were statistically significant (t=-2.47 [$p<0.001$], -2.12 [$p<0.05$] and -2.16 [$p<0.05$] respectively).

Bivariate Associations

The differences by sexual orientation were consistent with the bivariate correlations (Table 2) whereby sexual minority sexual orientation was associated with higher COVID-19-related stress ($r=0.13$, $p<0.001$), higher perceived social support ($r=0.07$, $p<0.05$) and higher psychological distress ($r=0.09$, $p<0.05$). COVID-19-related stress was associated with higher perceived social support ($r=0.49$, $p<0.001$) which was associated with lower psychological distress ($r=-0.47$; $p<0.001$); however, COVID-19-related stress was not significantly associated with psychological distress. The zero-order correlation matrix for all the variables in the analyses and their variance inflation factors are reported in Supplementary Table S2a. The variance inflation factors (VIFs) were all less than 10 (ranged between 1.04 to 1.38) indicating minimal multicollinearity of the predictor variables (Kline, 2016). However, we do not report the VIFs for the moderation model because they are not informative for moderation models as moderation effects are independent of multicollinearity between the predictors and their interaction terms in moderation models (Disatnik & Sivan, 2016; McClelland et al., 2017).

<center>*   *   Table 2   *   *</center>

Multivariable structural regression analyses

In Model 1 (Table 3), male gender and higher educational qualifications were associated with lower psychological distress ($\beta=-0.14$ for both, $p<0.001$). Sexual minority sexual orientation and COVID-19-related stress were associated with higher psychological distress ($\beta=0.10$ and 0.32; $p<0.01$ and $p<0.001$ respectively) while perceived social support was associated with lower psychological distress ($\beta=-0.64$, $p<0.001$). In Model 2 (interaction terms included), both male gender and higher educational qualifications remained significantly associated with lower psychological distress. Sexual minority status and COVID-19-related stress remained significantly associated with higher psychological distress

(β=0.15 and 0.33 respectively, $p<0.001$ for both). Similarly, perceived social support remained significantly associated with lower psychological distress (β=-0.63, $p<0.001$). The interaction term between sexual orientation and perceived social support was statistically significant (β=0.09, $p<0.05$) but not the separate interaction terms between COVID-19-related stress and sexual orientation and perceived social support. Furthermore, the second-order interaction term between sexual orientation, COVID-19-related stress and perceived social support was significantly associated with psychological distress (β=-0.14, $p<0.001$). Probing these interactions (Figure 1) indicated that the positive association between COVID-19-related stress and psychological distress among sexual minority participants was strongest among those with low (-2SD) perceived social support (slope=0.39) and weakest among those with high (2SD) perceived social support (slope=0.12). However, among heterosexual participants, this association did not vary by perceived social support (slopes ranged between 0.30 to 0.31). The significant first-order interaction between sexual orientation and psychological distress was demonstrated by the intercepts which is highest among sexual minority participants with low perceived social support and highest among heterosexual participants with high perceived social support (Figure 1). In contrast, the interaction term between COVID-19-related stress and perceived social support was not significantly associated with psychological distress. The fit indices of both structural regression models were satisfactory: CFI and RMSEA were less than 0.10 for both models, although the CFI for Model 1 was less than 0.95 while that for Model 2 was greater than 0.95 (Table 3).

<div align="center">*   *   Table 3   *   *</div>

Gender Differences

All the 95% confidence intervals of the coefficients of the correlations between psychological distress and sexual orientation, COVID-19-related stress and perceived social

support overlapped in male and female participants (Supplementary Table S7), indicating that the correlation coefficients were not significantly different by sex.

The homogeneity structural regression model (without interaction terms) was significantly worse than the corresponding heterogeneity model ($\chi^2[7]=318.96$, $p<0.001$; Supplementary Table S9) indicating significant gender differences. These appeared to be based on the larger associations between psychological distress and educational qualifications and perceived social support in male compared to female participants and the larger association between psychological distress and COVID-19-related stress among female compared to male participants (Supplementary Table S8).

Similarly, the homogeneity structural regression model with interaction terms was significantly worse than the corresponding heterogeneity model indicating significant gender differences ($\chi^2[9]=20.75$, $p=0.014$; Supplementary Table S9) viz: in addition to differences in the previous (unmoderated) model, the interaction term between sexual orientation and perceived social support, and the second order interaction term between sexual orientation, COVID-19-related stress and perceived social support in males (beta=0.12 and -0.16; $p<0.05$ and $p<0.01$ respectively) were larger compared to female participants (beta=0.06 and -0.10; $p>0.10$ and $p<0.05$ respectively; Supplementary Table S6). Specifically, the stronger association between COVID-19-related stress and psychological distress at low (-2SD) perceived social support was more manifest among female sexual minority participants (slope=0.68, Figure 2) while the protective effect of high perceived social support was more manifest among sexual minority male participants (slope at 2SD of perceived social support=-0.03)

Discussion

The present study found higher levels of COVID-19-related stress and psychological distress among sexual minority individuals in Nigeria as was hypothesized; however,

paradoxically, sexual minority individuals reported higher perceived social support compared to heterosexual participants. Consistent with our second hypothesis, perceived social support was significantly associated with lower psychological distress in addition to COVID-19-related stress and sexual minority sexual orientation which were each independently associated with higher psychological distress. In line with our third hypothesis, we demonstrated a first-order interaction whereby psychological distress was highest among sexual minority participants with low perceived social support and lowest among heterosexual participants with high perceived social support. A significant second-order interaction term indicated that among sexual minority participants, the association between COVID-19-related stress and psychological distress was weakest at high levels of perceived social support and strongest at low levels of perceived social support. However, this effect was not observed among heterosexual participants. The protective effect of high perceived social support appeared more prominent among sexual minority men while the adverse effect of low perceived social support appeared more prominent among sexual minority women.

The higher levels of psychological distress among sexual minority participants are consistent with findings from other studies – both in Nigeria (Mapayi et al., 2015; Oginni et al., 2018; Ogunbajo et al., 2020) and other countries (King et al., 2008; Plöderl & Tremblay, 2015) which have been attributed to minority stress (Meyer, 2013). Similarly, the higher levels of COVID-19-related stress are consistent with reports of sexual minority individuals experiencing higher levels of stress during the COVID-19 pandemic (Fish et al., 2021; Kneale & Bécares, 2021; Peterson et al., 2020). As the COVID-19-related stress questionnaire used in the present study investigated disruptions in friendships, intimate relationships, and recreation; higher COVID-19-related stress among sexual minority individuals may involve reduced access to physical sources of support when institutions were shut down and social distancing measures instituted (Oginni et al., 2021a; Suen et al., 2020).

The increased COVID-19-related stress may also reflect increased interactions with homophobic family members during this period (Salerno et al., 2020).

A paradoxical finding was the higher levels of perceived social support among sexual minority compared to heterosexual participants in this study which contrasts with previous findings (e.g., Suen et al., 2020; Wang et al., 2021). A possible explanation is that prior to the COVID-19 pandemic, sexual minority individuals in Nigeria utilize relatively protected virtual spaces for interactions (Onanuga, 2020) and may find it easier to use for accessing support compared to heterosexual individuals in times of stress. Furthermore, several LGBT (lesbian, gay, bisexual and transgender)-rights organizations provided online and physical support for Nigerian sexual minorities at the height of the COVID-19 pandemic (Oginni et al., 2021a) which may have enhanced feelings of social support. Another unexpected finding was the positive association between COVID-19-related stress and perceived social support in the total sample. While this contrasts with a previous finding (Fluharty & Fancourt, 2021), it is possible that those who experienced stress in Nigeria during the pandemic sought social support to cope with this stress as is typical among Nigerians (Osundina et al., 2017). However, an alternative explanation for both findings is that the online nature of the present study may select participants who are able to use virtual media to seek support to cope with COVID-19-related distress. Although this suggests the need for a more representative sample, it may also indicate the potentially positive role of the virtual space in seeking support, however, this needs to be specifically tested.

Consistent with previous research among sexual minority men in Nigeria (Oginni et al., 2020b), we demonstrated that protective factors can attenuate the association between stressful experiences and adverse health outcomes. Specifically, the initial null bivariate association between COVID-19-related stress and psychological distress appears to have been masked by the positive association between the former and perceived social support.

This suppressor effect (e.g., Wheaton, 1985) was demonstrated in multivariable analyses whereby COVID-19-related stress became significantly associated with increased psychological distress when perceived social support was included in the unmoderated multivariable model. In contrast, the magnitude of the independent association between sexual orientation and psychological distress (in the unmoderated model) was comparable to the magnitude of their bivariate (unadjusted) association. Thus, while perceived social support may specifically have a compensatory effect on the association between COVID-19-related stress and psychological distress, its effect on the relationship between sexual orientation and psychological distress may be less specific (Wheaton, 1985) or via an alternative mechanism.

In further moderation analyses, there was a significant first-order interaction between sexual orientation and perceived social support whereby the association between sexual minority participants with low perceived social support and heterosexual participants with high perceived social support had the highest and lowest levels of psychological distress respectively which is consistent with previous research (Freitas et al., 2017). However, while the first-order interaction between COVID-19-related stress and perceived social support was not statistically significant, the second-order interaction between sexual orientation, COVID-19-related stress and perceived social support was statistically significant. This interaction indicated that perceived social support was differentially protective against the association between COVID-19-related stress and psychological distress among sexual minority but not heterosexual participants. These findings indicate a protective effect of perceived social support on the psychopathogenic impact of sexuality-related stress, and a differential protective effect against COVID-19-related stress among sexual minority participants.

Our findings, thus, suggest that social support is an important resource for coping with pandemic-related stress in the general population via compensatory processes.

Furthermore, it had protective effects against possible sexuality-related stress in the total sample and against COVID-19-related stress among sexual minority but not heterosexual participants. We note that although sexuality-related stress was not specifically measured in the present study, sexual minority status may be considered as a proxy for sexuality-related stress (Schwartz & Meyer, 2010). This is based on the observations that not all sexuality-related disadvantages can be measured, nor can they always be compared across sexual-minority and heterosexual categories. However, associations with specific sexual minority-stress factors can be investigated in future research. Furthermore, considering that our assessment of social support was subjective i.e., the participants' perception of their level of social support; our findings suggest that the individual's subjective perception of the availability of support is also important.

Gender Differences

Consistent with previous research, psychological distress was higher among female compared to male participants (Kessler et al., 2012); however, the independent associations between sexual minority status and psychological distress were comparable in male and female participants. This latter finding contrasts with previous research whereby gender differences in internalizing problems are more prominent among sexual minority men compared to women (King et al., 2008) and may reflect the inclusion of other risk and protective factors in the analytic model.

The confidence intervals of the regression coefficients in the structural regression models overlapped in male and female participants, suggesting that these estimates did not significantly vary by sex. However, when constrained to be equal in male and female participants at the same time, the loss of model fit was statistically significant. This suggests that though individually small, these differences were significant when considered simultaneously. Specifically, the association of psychological distress with COVID-19-

related stress was larger among female participants while that with perceived social support was larger among male participants. The former finding is consistent with an increased biological vulnerability of women to the adverse impacts of stress (Altemus, 2006) and may also reflect a higher burden of caregiving among women in Nigeria during stressful periods like the COVID-19 pandemic (Oginni et al., 2021b). The larger coefficients of the interactions of perceived social support (with sexual orientation and COVID-19-related stress) among male compared to female participants further suggest that the protective effects of perceived social support are stronger among sexual minority men which may diminish and help cope with the psychopathogenic impacts of pandemic-related- and sexuality-related stress respectively. The stronger protective effect of perceived social support among sexual minority men may also reflect the greater visibility of sexual minority men compared to women in Nigeria which may facilitate their access to support. For example, most of the studies of sexual minority individuals in Nigeria have focused almost exclusively on men (e.g., Oginni et al., 2020b; Oginni et al., 2018; Ogunbajo et al., 2020).

Implications

Our findings suggest that social support can be targeted as a protective resource against pandemic-related stress in the general Nigerian population, and for sexual minority individuals in Nigeria against general stress such as that due to the COVID-19 pandemic and stress related to sexual minority status – especially among men. More research is needed to investigate how women including those who are sexual minorities cope with general and sexuality-related stress in Nigeria.

Strengths and Limitations

The present study is the largest to investigate the mental health of sexual minorities in the context of the COVID-19 pandemic in Nigeria. It is further strengthened by incorporating a comparison heterosexual group, the investigation of gender differences and the protective

effects of a coping resource. However, in interpreting our findings, the following limitations need to be considered. The study sample comprised participants with high levels of education which may reflect the inclusion criteria (to ensure valid responses) and this may limit the generalizability of our study findings to the wider Nigerian population. Though the number of sexual minority participants was larger than that of previous studies in Nigeria (Oginni et al., 2020b; Oginni et al., 2018; Ogunbajo et al., 2020), we could not analyse by sexual minority subgroups as the small number in each subcategory would not allow meaningful inferences. Related to this, gender minority participants were not included in the present analyses. Only four individuals indicated being gender non-binary and were excluded to facilitate homogeneity and interpretability of the study findings. Furthermore, the cross-sectional nature of the study precludes the inference of causality. Relatedly, though we have specified sexual minority status as an index of sexuality-related social disadvantage (Schwartz & Meyer, 2010; Meyer, 2010), specific minority stress processes were not assessed.

Conclusion

The current study compared the levels of COVID-19-related stress, psychological distress, and perceived social support among heterosexual and sexual minority adults in Nigeria. To our knowledge, this is the first published study on the associations between COVID-19-related stress and the mental health of sexual minority individuals in Nigeria. The findings revealed higher levels of COVID-19-related stress and psychological distress among sexual minorities compared to heterosexuals. Furthermore, we demonstrated compensatory and protective effects of perceived social support against pandemic- and probable sexuality-related stress both in the whole sample and among sexual minority participants respectively. These findings suggest a differentially higher impact of COVID-19-related stress on the mental wellbeing of sexual minority Nigerians and the potential role of social support as an important protective mechanism among sexual minority individuals in Nigeria.

Future Directions

Future longitudinal research should investigate the causal associations between stress (including pandemic- and sexuality-related), psychological distress, and protective factors among heterosexual and sexual minority adults in Nigeria using larger and more representative samples. Gender minority participants should also be specifically recruited to facilitate the investigation and comparison of the mental health needs of sexual and gender minorities in Nigeria. Importantly, structural changes including inclusive and anti-discriminatory policies are crucial to mitigating the impact of persistent psychological distress on the mental health of the sexual minority community in Nigeria. Lastly, timely, appropriate, and effective interventions that strengthen social support are needed to address the mental health disparities among sexual minority individuals in Nigeria during and after the COVID-19 pandemic.

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The authors have no conflicts of interest.

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Table 1

Sociodemographic and study variables by sexual orientation in the total sample

VARIABLES	Total sample		Heterosexual		Sexual minority		Statistic
	n = 966	%	n = 756	%	n = 210	%	χ^2/t
SOCIO-DEMOGRAPHIC VARIABLES							
Age (Mean and SD)	31.3	9.89	31.9	10.32	29.1	7.79	3.61***
Gender							
Female	479	49.6	376	49.7	103	49.1	0.03
Male	487	50.4	380	50.3	107	51.0	
Level of education							
No Qualifications	20	2.1	16	2.1	4	1.9	1.48
Primary School	21	2.2	16	2.1	5	2.4	
Vocational and Apprenticeship	54	5.6	44	5.8	10	4.8	
Secondary School	110	11.4	90	11.9	20	9.5	
University	761	78.8	590	78.0	171	81.4	
Monthly income (₦,000)ª (n=752) (Median and IQR)	60	97	60	120	60	60	0.57
COVID 19-related stress (Mean and SD)	34.8	14.94	33.8	14.85	38.3	14.72	-3.96***
Perceived Social support (Mean and SD)	36.8	17.30	36.0	17.47	39.4	16.45	-2.47***
Anxiety symptoms (Mean and SD)	15.8	4.50	15.7	4.64	16.4	3.91	-2.12*
Depressive symptoms (Mean and SD)	14.8	3.55	14.7	3.60	15.3	3.35	-2.16*

ªMedian and Interquartile range reported due to skewness of data and Mann-Whitney U test used to compare distributions in both groups

†p <0.1; *p <0.05; **p <0.01; ***p <0.001

Table 2

Correlations between the factors in the study sample

	SO[a]	COVID	PSS	PD
	1.	2.	3.	4.
1.	1			
2.	0.13***	1		
	(0.06, 0.19)			
3.	0.07*	0.49***	1	
	(0.01, 0.13)	(0.42, 0.56)		
4.	0.09*	0.02	-0.47***	1
	(0.02, 0.17)	(-0.05, 0.10)	(-0.55, -0.39)	

Note. SO = Sexual orientation; COVID = COVID-19-related stress; PSS = Perceived social support; PD = Psychological Distress

[a]Sexual orientation coded as 0 – Heterosexual and 1 – Sexual minority.

†$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Table 3

Multivariable regression models with and without moderation terms (Models 1 and 2 respectively) with

psychological distress as outcome in total sample

		Model 1			Model 2		
	VIF	Beta	95% CI		Beta	95% CI	
Age	1.08	-0.04	-0.11	0.02	-0.06†	-0.12	0.00
Sex	1.09	-0.14***	-0.20	-0.08	-0.16***	-0.22	-0.09
Educational qualification	1.04	-0.14***	-0.21	-0.08	-0.13***	-0.19	-0.07
Sexual orientation	1.04	0.10**	0.03	0.16	0.15***	0.08	0.22
COVID-19-related stress	1.35	0.32***	0.24	0.39	0.33***	0.25	0.40
Perceived social support	1.38	-0.64***	-0.71	-0.56	-0.63***	-0.72	-0.55
SO*PSS					0.09*	0.02	0.16
COVID*PSS					0.01	-0.06	0.08
SO*COVID					-0.02	-0.10	0.05
SO*COVID*PSS					-0.14***	-0.21	-0.06
CFI		0.936			0.952		
SRMR		0.053			0.043		
RMSEA		0.069			0.055		
R^2		0.352			0.402		
ΔR^2		-			0.050		

Note. VIF = Variance inflation factor, Beta = standardized coefficient, SO*PSS = Interaction term

between sexual orientation (SO) and perceived social support (PSS), COVID*PSS = Interaction term

between COVID-19-related stress and perceived social support

Model 1: Structural regression model without interaction terms.

Model 2: Structural regression model including interaction terms of Perceived social support with sexual

orientation and COVID-19-related stress.

†$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Figure 1

Graphical plot of the interactions between sexual orientation, COVID-19-related stress and perceived social support with psychological distress as the outcome.
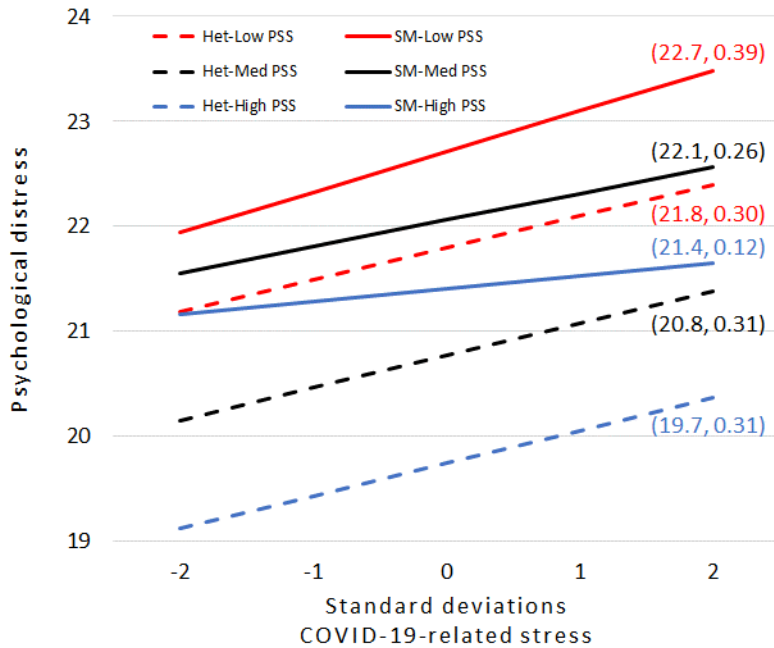
Note. Sexual minority status and low perceived stigma were associated with higher psychological distress. Within each category of perceived social support (i.e., low, medium or high), sexual minorities had higher psychological distress compared to the corresponding heterosexual group. Among sexual minorities, the association between COVID-related stress and psychological distress was differentially stronger among those with low perceived social support compared to those with higher perceived social support. Among heterosexual participants, this association was uniform across the different categories of perceived social support. Het-Low PSS=Heterosexual with low perceived social support, Het-Med PSS=Heterosexual with medium perceived social support, Het-High PSS=Heterosexual with high perceived social support, SM-Low PSS=Sexual minority with low perceived social support, SM-Med PSS=Sexual minority with medium perceived social support and SM-Low PSS=Sexual minority with low perceived social support. Numbers in parentheses correspond to intercepts and slopes respectively.
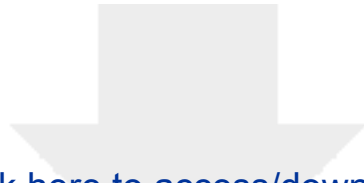
Figure 2

Graphical plot of the interactions between sexual orientation, COVID-19-related stress and perceived social support with psychological distress as the outcome with gender differences.
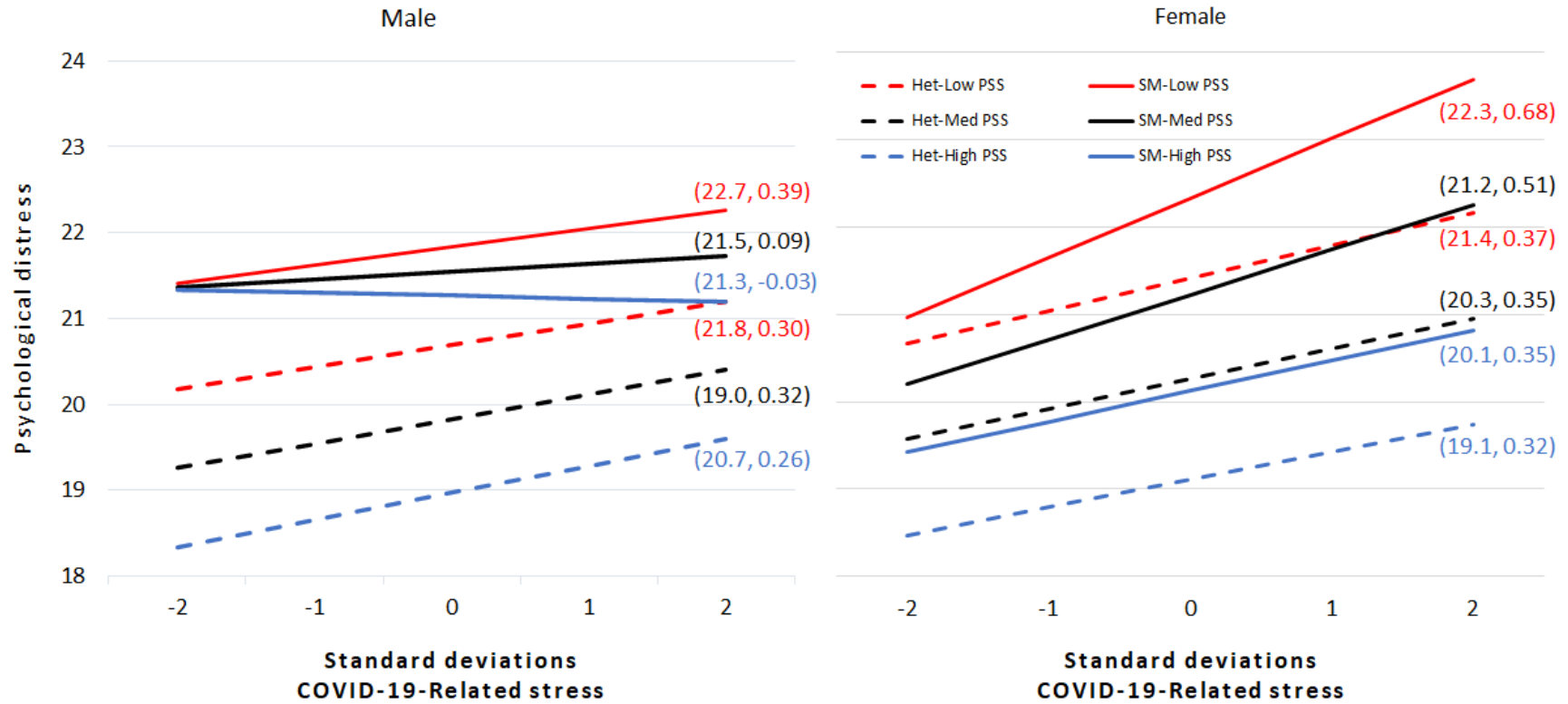
Note. As in the total sample, sexual minority status and low perceived stigma were associated with higher psychological distress. Specifically, within each category of perceived social support (i.e., low, medium or high), sexual minorities had higher psychological distress compared to the

corresponding heterosexual group and this difference was greater in males appeared to females. Among sexual minorities, the association between COVID-19-related stress and psychological distress was strongest among those with low perceived social support compared to those with higher perceived social support and this was more so among male compared to female participants. Het-Low PSS=Heterosexual with low perceived social support, Het-Med PSS=Heterosexual with medium perceived social support, Het-High PSS=Heterosexual with high perceived social support, SM-Low PSS=Sexual minority with low perceived social support, SM-Med PSS=Sexual minority with medium perceived social support and SM-Low PSS=Sexual minority with low perceived social support. Numbers in parentheses correspond to intercepts and slopes respectively.

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