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RESEARCH ARTICLE

Main socio-psychological effects of pandemic on individuals' well-being and life satisfaction

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ABSTRACT

In this era of uncertainty, the adverse impact of social ill-being brings forth dissatisfaction and discontentment in our life. Social peace gives us the required nourishment to yield a quality life. In this study, we made a modest attempt to assess to what extend the individuals' life gets affected in these hours of post COVID-19 crisis. To understand the mental frame of individuals, we have adjudged the recourse to two key factors, i.e., digital illiteracy, communication crisis and social isolation, which might lead to dissatisfaction of life. Moreover, the present research assessed the degree of impact of social ill-being on the individuals' life dissatisfaction. It gives us the provision to explore the mediating effect of higher stress on the association between social ill-being and life dissatisfaction. This honest attempt may help citizens and policymakers to get channelized, well-digitally equipped and prepared to come up with innovative solutions that serve to manage the curse of the COVID-19.

Keywords: pandemic; social ill-being; stress; life dissatisfaction; digital illiteracy and communication crisis; social isolation

1. Introduction

In this era, the outbreak of coronavirus has registered an unprecedented impact across the globe. This fatal disease was first detected in Wuhan, China in December 2019 and was initially referred to as severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2)[1]. The fear of death has shaken the entire world and the high mortality rate has shattered the world business. This highly contagious disease has an immense impact not only on individuals, but also on their families both mentally and financially. It even had created panic in the family of the first-line workers, especially among healthcare workers[2–5]. During the first waves of the coronavirus crisis, the constant fear of contagion and exposure to infection had affected daily life of individuals wherever they live. That is why, the World Health Organization (hereafter WHO) urged governments to adopt several lockdown measures and to apply some sanitary regulations in the majority of countries, in order to prevent the spread of the virus worldwide. Such regulations were partly successful, but invariably evoked psychological distress in the broader population[2–4], leading to social distancing, social isolation, and lack of human physical interaction and face-to-face communication between individuals.

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Accordingly, many persons have found themselves suffering from a disequilibrium in life due to their loneliness and/or financial instability, which enhanced the rate of depression and suicidality[6–8].

Organizations have also been enforced to restrict themselves indoors, to reconsider their activities outside traditional offices and across companies' borders, and therefore to work remotely thanks to digital tools and advanced technologies. Teleworking practice has then offered the opportunity for managers and employees as well to work from their homes. Statistical surveys undertaken worldwide during the pandemic highlighted that the evaluation of teleworking during the sanitary crisis varies from one country to another, and from one region to another, even if it was admitted that remote work mostly help to reduce logistical/transport costs and to boost workers' productivity and concentration. Indeed, in digitalized areas and IT infrastructure-based cities, individuals can easily connect and work from their place of residence, and then gain a certain degree of satisfaction deriving from their increasing capability to conciliate between work and private/family life. However, in some rural and disadvantaged regions with low connectivity, persons could not afford the possibility to work from their houses. Besides, it should be mentioned that there are numerous technically unteleworkable jobs (such as nurses, agriculture, construction, retail, or outside entertainment), for whom entrepreneurs and employees, viewed as vulnerable persons, were obliged to interrupt their activities, or even to lose their jobs[9]. Therefore, vulnerable populations living in disadvantaged areas, or rural regions, have been widely and negatively affected by the coronavirus crisis.

On the other hand, switching to remote work requires the implementation of adaptive digital equipments and advanced information and communication technologies (ICT), which implies that appropriate investment and funds are more than necessary to cope with teleworking[10]. In the same orientation, Saladino et al.[11] highlighted the role of smart devices in decreasing the negative effects of the crisis on the mental and psychological health of people. The same scholars have even stressed the role of telepsychology in assisting vulnerable persons who might be exposed to risks of anxiety and depression, derived from their high sensitivity to stress. Meanwhile, IT skills and managerial abilities are considered as essential prerequisites for telecommuting[12]. It implies that citizens who are living in digitalized and smart cities are more likely to adapt easily to the coronavirus crisis; whereas those who are located in marginalized areas are less accustomed with the usage of smart technologies, and would then hardly manage all the aspects of the COVID-19 turmoil.

On another perspective, the COVID-19 pandemic has also significant effects on psychological and social well-being of the most exposed groups (i.e., health workers, children, students, etc.) who are more reluctant to develop post-traumatic stress, anxiety, depression, and other symptoms of stress[11].

Prior research had also shown that social ill-being have an unfavorable influence on mental health creating dissatisfaction in life. It creates hindrance in the path of learning, creativity and productivity, more pro-social behavior and positive social relationships, and adversely impact physical health and life expectancy. Satisfaction in life undoubtedly helps to generate cohesive environments around us where we can thrive and excel our potentiality to optimum level to reach the pinnacle of our life[13].

The COVID-19 has emerged as a menace in our life starting from our digital illiteracy and communication crisis to social crisis. This communication crisis along with social isolation create imbalance in life resulting in dissatisfaction. This imbalance in every aspect creates unprecedented disruptions to social life[14]. Thus, we manage to gauge a definite correlation between loneliness and well-being[15]. At this juncture, it is important to understand the mental frame of the individuals to reinstate satisfaction in life. This study would highlight how far the life of individuals gets affected in these hours of crisis. So, by understanding the true effects of lockdown on the social ill-being of individuals, this study will help us to

find out how it leads to dissatisfaction in life. Thus, it is our modest attempt to assess the situation in reality and restore the peace in life.

2. Theoretical framework

The outbreak of the novel coronavirus has created pandemonium in our life. It has altogether distorted the balance of life. Life gets a jolt owing to social ill-being and thus puts our life at stake. The major depressive syndrome has increased and thus individuals are gradually getting diverted from the main track of life. This study pays attention to this matter to channelize individuals to restore the balance of life. This research also focuses on the main factors affecting the satisfaction of life and how to reinstate mental peace to find out the true means of life.

2.1. Effects of social isolation on social ill-being

Numerous researches undertaken on pandemics, including SARS, Ebola, and COVID-19, had demonstrated that such epidemics generate many negative consequences[16,17]. Such effects encompass not only the fear of contracting the virus, but also the worries about the advancement of the disease, the loss of freedom, the separation from loved relatives, especially in the most affected areas[18]. Indeed, as mentioned earlier, since the beginning of the outbreak in December 2019, health measures and social distancing regulations, communicated by the WHO, and including self-isolation, distance working, quarantine…, had been applied all over the world[17]. Meanwhile, many governments urged citizens to cut-off gatherings and physical interaction with family members, colleagues, classmates, for long periods, especially whenever the situation is alarming in the most contagious regions.

Consequently, during the coronavirus crisis, people's emotions and thoughts about their own lives, health, jobs, and future were affected[19]. Such a constant fear expressed by citizens influenced their daily lives as well as their social habits, leading them to isolate themselves at home and cut-off face-to-face meetings, gatherings, celebrations, and any other form of social interaction with peers, and then to social-isolation[17,20].

According to Zavaleta et al.[21], social isolation refers to an "inadequate quality and quantity of social relations with other people at the individual, group, community, and larger social environment levels where human interaction takes place". It affects mental health immensely as everyone looks for affiliation and relatedness[12,22]. It also acts as a catalyst for higher levels of delusions[23], lack of insight[24], and high hospital usage[25] among the people who are suffering from severe mental illnesses. Due to loneliness recognized as the subjective experience of social isolation, individuals feel themselves detached from their social networks. Such feelings of loneliness might affect the mental health of persons[26–29], leading them to depression[30], suicidal behaviors[31], personality disorders[32], and psychoses[33].

For those above considerations, the previous existing works undertaken in social and health sciences or other related research fields, have largely underlined that social relations play an influential role in mental health and psychological well-being[34]. Indeed, social relations provide social support that improve adaptive behavioral responses of persons to stressors (like crises, quarantine, etc.) and might in turn moderate their effects on well-being. Besides, social connection helps people to come out of stress and gives them the courage to face the pandemic[35]. On the contrary, social isolation, deriving from lack of social connectedness, reinforce social ill-being[20].

H1: Social isolation has a significant effect on social ill-being of individuals during the COVID-19 crisis.

2.2. Effects of digital illiteracy and communication crisis on social ill-being

The term "digital literacy" was first popularized by Gilster[36] in 1997. According to this scholar, the present era may be regarded as the "Literacy of Digital Age". Sen[37] in his research work established the fact that digital literacy is a set of competencies required to excel in a knowledge society. To be digitally literate, individuals need to be accustomed to devices, such as smartphones, tablets, laptops, and desktop PCs, to respond to their needs of communication, collaboration and advocacy). Greene et al.[38] considered that it is even a dire need of the hour to be digitally literate not only to search and manage, but also to scrutinize and make proper utilization of digital information. For instance, in today's world, students need to be familiar with digital technologies and should have a detailed knowledge of accessing and sharing information with these smart devices diligently[39]. Especially in the days of the pandemic, it has been proved that digital literacy is the main medium that had been employed to be socially connected. It even shows up the way to survive professionally and in daily life. In this orientation, Dahlberg[40] argued that, during the COVID-19 lockdown periods, "older adults could compensate for the loss of physical contacts via technology". Wang et al.[41] added that, during such periods, people with higher levels of missing out (reflecting their fear that their interpersonal interactions get missed, or that others have fun without them), had been more likely to present themselves online and to manifest a high need of social media connection with their peers or relatives. In such situations, those advanced devices could then be regarded as substitutes for human face-to-face interaction[42].

Accordingly, social media and smart devices have been so helpful and useful for individuals who seek to decrease their perceived social isolation and social loneliness during the pandemic. Tesch-Romer and Huxhold[43] have asserted that individuals' access to online support dedicated to them via technology might directly reduce their social ill-being by exerting an influence on their social relations and activities. For instance, Park et al.[44] stressed that the number of children and teenagers playing online games has registered an important increase during the COVID-19 crisis, demonstrating that active and creative media users are more reluctant to adapt their social needs and switch their leisure activities to the digital world. In a nutshell, it seems that digital devices and tools have allowed people to face the odds of life boldly and courageously to reap rich dividends from nowhere. On the contrary, digital illiterate persons or those who registered digital communication problems due to their location (in some rural and marginalized areas), were unable to adapt easily to the crisis.

In our trivial attempt, we have seen that adequate research work has not been done concerning the psychological impact of lockdown on individuals. Uncertainties loom large over the career of the individuals devoid of digital literacy and social connection. It is then of utmost interest to understand currently the impact of social ill-being of individuals' life, based on digital illiteracy and communication crisis and social isolation.

Taking into account the considerations above, it can be hypothesized that:

H2: Digital illiteracy and communication crisis have a significant effect on social ill-being of individuals during the COVID-19 crisis.

2.3. Effects of social ill-being on life dissatisfaction

The term 'social ill-being' is synonymous with social problems or social issues. It has an immense adverse impact on our life since it makes us feel isolated from the mainstream of life. It enforces us to think indifferently as if we have lost the momentum of life. The distraction always makes us segregated to such an extent that we feel that the balance of life gets distorted. This distortion invites frustration and irritation and thereby, makes us dissatisfied in every aspect of our life. The feelings of belongingness and social connection

are correlated to life satisfaction and it is even applicable to older adults[45–49]. As social isolation affects and ruins the social well-being of our life, it can be deduced that social ill-being has a significant influence not only on life dissatisfaction, but also on levels severe anxiety and depression[39,43,50–53]. Hence, it enforces individuals to adopt a self-protective thinking and to consider life in a negative way leading them to life dissatisfaction[50].

Based on the above observations, the following hypothesis can be proposed as follows:

H3: There is a significant relationship between social ill-being and life dissatisfaction of individuals during the COVID-19 crisis.

2.4. Effects of social ill-being on work stress

The term social affiliation reflects how closely we are related to our own family, friends, and our near and dear ones. These close acquaintances act as a stress buffer in our life. If this balance gets a jolt, then it would invariably bring negative consequences in our life. This disorder in our life leads to bringing work stress, emotional distress, and depression leading to dissatisfaction in our life[41,54,55]. According to Cacioppo and Cacioppo[50], loneliness can produce a negative loop of social interactions, generating negative attributions to others, leading to a decrease in belonging and security. On the contrary, social connection helps to overcome stress and reinstate the peace of our life[35].

In the same perspective, many studies carried out during the pandemic have pointed out the increase in social isolation and loneliness since the beginning of the coronavirus outbreak, not only among younger people, but also among adults[40].

Indeed, self-reinforcing loneliness during the pandemic was likely to be accompanied by feelings of stress and anxiety[20], leading to psychosocial troubles and dissatisfaction in life.

In order to find out the means to eradicate social ill-being from human life, to be stress-free and restore the peace in life, the present research seeks to gauge the impact of higher stress on the dissatisfaction of life. By doing so, individuals would be able to formulate a plan dedicated to help them to come out of the odds and to see the light at the end of the tunnel by devouring the demon of the pandemic.

Considering these above premises, the consecutive two hypotheses are:

H4: The impact of social ill-being has a significant influence on stress of individuals during the COVID-19 crisis.

2.5. The mediating role of higher stress

In the current study, the mediating role of higher stress between social ill-being and life dissatisfaction is examined. Stress is a term that is associated with us in our everyday life. It was widely argued that any transition or big change, transformation in life induces higher stress and distorts the balance of our life[56]. Change or transition often creates hazards for us, disturbs our comfort zone, and thus dissatisfaction entangles our life. Research, conducted by Park et al.[44], Blackmore et al.[57], Niedhammer et al.[58], has largely supported that there is a definite correlation between mental health and work stress and that such a correlation is confirmed for all the individuals of the general population[44,57,58]. The pandemic has brought a certain transition in our life. It points out how social association has an impact on mental well-being and generates stress in our life, which in long run drawbacks on our life dissatisfaction[15,25,34]. Based on the above-mentioned points, it can be expected that higher stress mediates the association between social ill-being and life dissatisfaction, leading to the last hypothesis of our study:

H5: Higher stress plays a mediating role between social ill-being and life dissatisfaction of individuals

during the COVID-19 crisis.

The present study would be incomplete without unfolding the fact that it is based on the general population at large since the pandemic has brought about a big change in our life. From the existing prior literature, it has been revealed there is a correlation between social association and dissatisfaction of our life. Based on the above observations, the proposed research model would be presented, as depicted in **Figure 1** shown below.

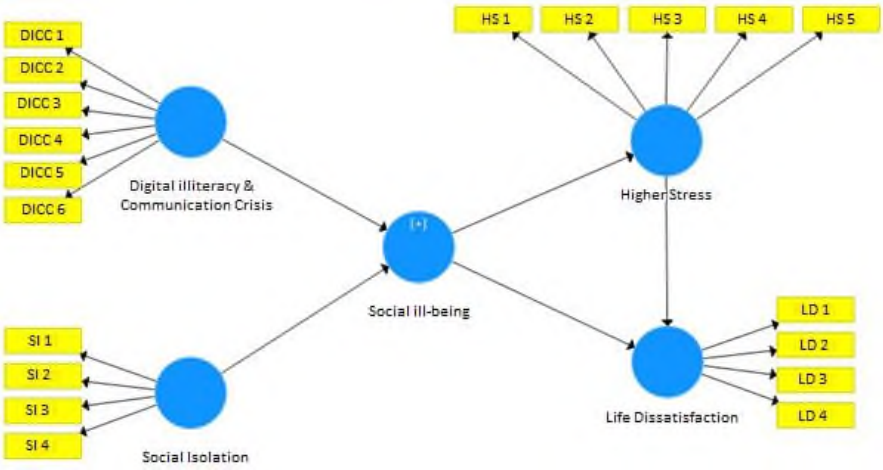

Figure 1. Proposed research model.

3. Research methodology

3.1. Context, sample, and data collection procedure

For the present study, empirical date were gathered through cross-sectional and exploratory research design from West Bengal, one of the promising cities of India that do not yet belong to the top ten Indian states. Indeed, even if there is an absolute increase of urbanization by 4% in West Bengal in the last decade, it appears that 72% of its population reside in rural areas and could not easily get access to digital devices and interact virtually via technological tools. That is why, during the pandemic, rural Bengali people faced a severe communication problem related to their digital illiteracy. Their social isolation and digital illiteracy added fuel to the situation, leading them to disequilibrium in life.

To address our research questions, a semi-structured questionnaire was prepared in compliance with the objectives of the study. The questionnaire was framed via a diligent usage of 7-point Likert measurement scales (ranging from "1 = strongly dissatisfied" to "7 = strongly satisfied"), adapted from the literature. To constitute a representative and a reliable sample, a non-probability purposive sampling method was employed and the questionnaire was finally administrated to 410 respondents, including those who willingly shared their opinions and views regarding the main socio-psychological effects of the coronavirus crisis, leading to life dissatisfaction.

Initially, a pilot study was undertaken to select 10 items for the questionnaire. Therefore, the statistical sample was considered for final data analysis. Besides, to estimate the minimum sample size required for our investigation, the G* Power[59,60] test was calculated at a 5% level of significance and it was found that 139 samples were sufficient to ensure the authenticity of the obtained results.

Table 1, as shown below, represents the demographic profiles of respondents. From the table, it appears that among the respondents to the questionnaire, only 45.85% (188 persons) were women and 54.15% (222 persons) were men. According to their occupation, it appears that 18.78% of interviewees

were unemployed, whereas 10.24% of them were retired. The rest of respondents were rather self-employed or service holders.

Moreover, 29.51% of interviewees (83 persons) were aged between 31 and 40 years; whereas 26.34% of them were aged between 41 and 50 years; and the lowest age frequencies were respectively related to those under 30 years, who represent 23.66% of the respondents, then those above 50 years, representing 20.49 of the sample.

The demographic profiles of interviewees are presented in **Table 1** as follows.

Therefore, the primary collected data collected through the questionnaire was analyzed via the statistical Smart PLS (partial least squares) software (in its 3.3.2 version) and the structural equation modeling (SEM) technique has been used to test our research hypotheses and to assess the degree of influence of digital illiteracy, communication crisis and social isolation on social ill-being, and there on life dissatisfaction. Such a multivariate analytical technique enables us to bring up a better flexibility to the study[16,61–67]. Moreover, the partial least squares modeling was employed, as a variance based and a prediction oriented technique, devoted to estimate the relationships of causality among the latent variables in a systematic analysis. For this purpose, the PLS-SEM approach recommends the execution of two models: an inner/measurement model, then an outer/structural model.

Table 1. Sample demographics (N = 410).

Demographic variables	Items	Frequency	Percentage %
Age	Below 30 years	97	23.66
	31–40 years	121	29.51
	41–50 years	108	26.34
	Above 50 years	84	20.49
Gender	Male	222	54.15
	Female	188	45.85
Family income (per month)	Less than 50,000	174	42.44
	50,000–100,000	112	27.31
	100,000–200,000	84	20.49
	More than 200,000	40	9.76
Occupation	Unemployed	77	18.78
	Self-employed	133	32.44
	Service holder	158	38.54
	Retired	42	10.24

3.2. Measurement scales

As mentioned above, to substract sufficient information about the latent variables of our proposed research model, a questionnaire was developed, including two categories of questions, i.e., general and specific ones. For general questions, we started with demographic information on the main profiles of respondents, incorporating their gender, age, family income, and occupation. For the specific questions, their choice was based on the constituent components of our research questions, so that we can assess the measures related to our latent variables, encompassing (1), digital illiteracy, communication crisis, (2) social isolation, (3) social ill-being, and (4) life dissatisfaction.

To be more precise, specific questions were selected on the basis of the measurement scales that had

been recommended by prior researchers and extracted from previous studies which framed this present research, as shown in Appendix (in last pages of the paper). Those scales have been considered and then adapted in order to measure our corresponding constructs. For this purpose, minor amends were undertaken to better fit the research content and certain indicators were slightly altered to become more precise and clear for our target respondents.

The 6 item-scale of digital illiteracy and communication crisis was established on the basis of the indicators adapted from the prior scales proposed respectively by Norman and Skinner[68], for digital illiteracy), then those of Marston et al.[14], Freeman et al.[69], as well as Ayman et al.[70] (for communication crisis).

Social isolation was measured via three indicators, with reference to the UCLA Loneliness Scale (in its third Version 3) suggested by Russell[15], then adapted by Hughes et al.[71] who reported that the three selected items showed good psychometric validity and reliability for the construct of Loneliness.

Finally, the three items selected to assess Higher Work Stress were adapted from Lait and Wallace[72]; whereas the four indicators related to life dissatisfaction were taken from Diener[73]; Cited in Samman[74]; Fisher et al.[75].

4. Results' analysis

4.1. Measurement model assessment

To predict the outer model of the present study, the internal reliability and convergent validity should be examined to make sense of whether to carry out the research work with the existing dataset or not. For more precision, the values of Cronbach's Alpha, Dijkstra, Henseler's rho, and the Composite Reliability should be calculated to assess the reliability for the constructs. The threshold value of Cronbach's Alpha and Rho of Joreskog should be above the threshold value of 0.70[61,62]; whereas the Composite Reliability is proved to be worthy whenever its related values range from 0.70 to 0.90[76]. Besides, to ascertain the convergent validity, the values of the Average Variance Explained should be estimated to check whether they exceed the cutoff value of 0.50 to be accepted[16,77].

In partial least square structural equation modeling, researchers should apply the confirmatory method to add value to their study[63,78]. A Composite Analysis (CA) should then be diligently applied to assess the construct related to social ill-being via a reflective-formative measurement[79]. For this purpose, the score of this latent variable should be initially calculated to retain the main factors that might affect it by using reflective-formative assessments. Then, the scores of the first-order construct should be taken into account for the second-order constructs related to our formative model. Once done, we can therefore shed some light on the degree of influence of social ill-being on higher work stress and life dissatisfaction from a second-order corresponding analysis.

In our study, the findings reflected in **Table 2** shown below reveal that all the Cronbach's Alpha values that evolved out were greater than 0.70. The corresponding values of the composite reliability were varying between 0.80 and 0.90; which is also acceptable in social and management sciences. Moreover, all the values of the Average Variance Explained were above 0.50, foreshowing a valuable convergent validity. Hence, the internal reliability and the convergent validity were well established, and the measurement model of the present study is so considered as satisfactory.

Table 2. Quality criterion for reflective model assessment and composite model.

Constructs	Items	Types	Loading/weights	Cronbach's Alpha	Rho A	CR	AVE
Digital illiteracy and communication crisis	DICC 1	Reflective	0.786	0.833	0.837	0.879	0.549
	DICC 2		0.606	-	-	-	-
	DICC 3		0.796	-	-	-	-
	DICC 4		0.778	-	-	-	-
	DICC 5		0.688	-	-	-	-
	DICC 6		0.770	-	-	-	-
Social isolation	SI 1	Reflective	0.755	0.722	0.731	0.827	0.545
	SI 2		0.736	-	-	-	-
	SI 3		0.797	-	-	-	-
	SI 4		0.658	-	-	-	-
Higher stress	HS 1	Reflective	0.795	0.841	0.841	0.887	0.612
	HS 2		0.833	-	-	-	-
	HS 3		0.765	-	-	-	-
	HS 4		0.805	-	-	-	-
	HS 5		0.709	-	-	-	-
Lifedissatisfaction	LD 1	Reflective	0.827	0.796	0.858	0.869	0.629
	LD 2		0.703	-	-	-	-
	LD 3		0.642	-	-	-	-
	LD 4		0.962	-	-	-	-

As mentioned by Fornell and Larcker[77], to assess the discriminant validity, two testing stages should be carried out by estimating: (1) 'Heterotrait-Monotrait Ratio (HTMT)' and (2) 'Fornell-Larcker Criterion'.

As suggested by Henseler et al.[80], the HTMT ratio for all the correlation values should not exceed the threshold value of 0.85. Conversely, Gold et al.[81] were enough flexible and considered that the accepted value might be 0.9. In the current research, the findings indicate that the values of all the constructs were not greater than 0.85, ensuring the uniqueness of each construct, as shown in **Table 3** below.

Apart from checking the Heterotrait-Monotrait ratio of correlations (HTMT), the discriminant validity should be assessed via the Fornell-Larcker criterion.

The Fornell-Larcker criterion might be applied by ensuring that the square root of the AVE of each latent construct exceeds the construct's maximum correlation with any other different construct[77]. As depicted below, **Table 4** illustrates that all correlation values were lower than the square root of AVE, reflecting the uniqueness of each construct. Accordingly, the discriminant validity could be established for all the constructs of the current research.

Table 3. HTMT ratios of correlation for discriminant validity assessment.

HTMT criterion	Life dissatisfaction	Higher stress	Digital illiteracy and communication crisis	Social isolation
Life dissatisfaction		-	-	-
Higher stress	0.797 CI.900 [0.691; 0.886]		-	-
Digital illiteracy and communication crisis	0.740 CI.900 [0.614; 0.837]	0.753 CI.900 [0.595; 0.844]		-
Social isolation	0.637 CI.900 [0.462; 0.774]	0.706 CI.900 [0.548; 0.823]	0.739 CI.900 [0.604; 0.839]	

Table 4. Fornell-Larcker ratios for discriminant validity assessment.

Constructs	Life dissatisfaction	Higher stress	Digital illiteracy and communication crisis	Social isolation
Life dissatisfaction	**0.793**	-	-	-
Higher stress	0.680	**0.741**	-	-
Digital illiteracy and communication crisis	0.609	0.630	**0.783**	-
Social isolation	0.499	0.558	0.578	**0.738**

4.2. Structural model assessment

The structural model should be examined to investigate the relationships that exist between the endogenous latent variables as well as the predictive relevance and the explanatory power of the proposed model[62]. The bootstrapping process was employed with recommended 5000 bootstraps to extract the *p*-values, which are necessary to test the proposed hypotheses of the study[61]. At the outset, each set of the predictor constructs of the structural inner model is assessed as part of formative measurement models[82]. Collinearity issues were firstly investigated by checking the tolerance and inflation factor (VIF). For Diamantopoulos et al.[76], the threshold value for VIF should be below the cutoff value of 3.33. In our research, results reveal that VIF values related to 'life dissatisfaction' and 'higher stress' were respectively equal to 1.864 and 1. It could then be inferred that there is no collinearity issues in the present study. In the next step, it is wise to shift our focus towards the importance and significance of path coefficients. In compliance with the rules of the PLS approach, those coefficients are expected to range between (−1) and (+1) after administrating the bootstrapping procedure with 5000 subsamples. As stated earlier, in the current research, social ill-being is considered as a second-order composite construct; whereas the other latent variables are pursued as reflective constructs whose scores should be estimated through formative assessments. From **Figure 2** depicting the structural model assessment as shown below, it could be deduced that the outer weights of all constructs were noteworthy at 1 percent level and unlike zero. Moreover, the findings support that the values of the coefficient of determination (R^2), that measure the variance explained for each endogenous latent variable of the model, were respectively 0.508 for 'life dissatisfaction', and 0.464 for 'higher stress'. As recommended by Raithel et al.[83] and Rasoolimanesh et al.[84], each R^2 value that is greater than 0.20 could be predicted as high in Social Sciences. Thus, such R^2 values could be considered as worthy[62]; which imply that social ill-being plays an important role in explaining higher stress and life dissatisfaction among the respondents.

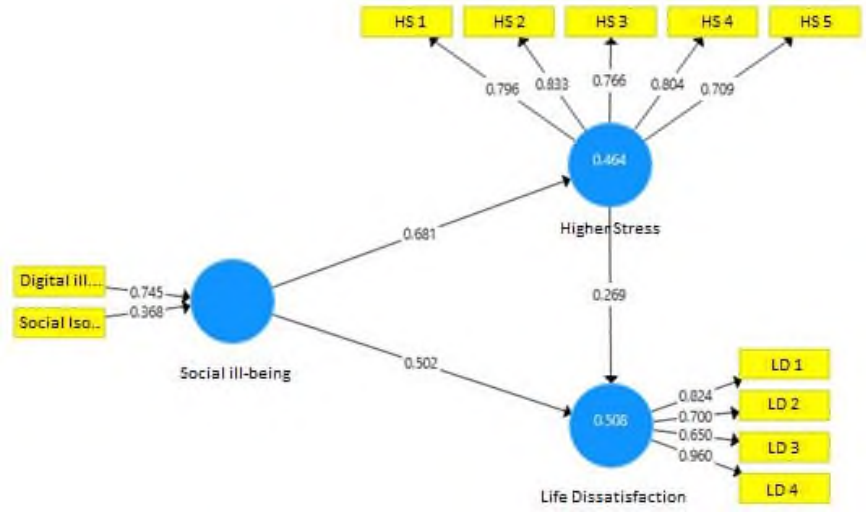

Figure 2. Structural model assessment with control variables.

Furthermore, to appraise the goodness of fit model by measuring the mean absolute value of the covariance residuals, the standardized root means square residual (SRMR) based on transforming the sample covariance matrix and the predicted covariance matrix into correlation matrices, should be computed. As per Henseler et al.[85] as well as Hu and Bentler[86], in PLS-SEM path modeling, the SRMR threshold value is 0.08. Hereby, results indicate that the SRMR value was 0.079; reflecting that there is a good fit between the observed and the data expected under the model, without any model misspecification.

As outlined in **Table 5** shown below, the findings reveal that 'Social Ill-being' has a significant impact on 'higher stress' and 'life dissatisfaction' as well. In our study, we examined the F^2 and the Q^2 values to evaluate the predictive importance and relevance. As recommended by Cohen[87], if the F^2 value, estimated to evaluate the degree of impact of each exogenous construct on endogenous constructs, is equal to 0.02, the effect is small; whereas if its value is 0.15, the effect is moderate. Finally, if the F^2 calculated value is 0.35, its effect is considered as high. In our study, the findings support the evidence that F^2 value related to 'life dissatisfaction' for social ill-being is 0.275 and that it is equal to 0.864 for 'higher stress'. It implies that 'Social ill-being' has a significant impact on 'Stress' and a moderate effect on 'life dissatisfaction'. For the Stone-Geisser's Q^2 values, Richter[64] stated that any Q^2 value above 0.02 indicates that the model has a significant predictive power. In the present investigation, the Q^2 obtained values for 'higher stress' and 'life dissatisfaction' were respectively 0.276 and 0.296; which figure out the fact that those two latent variables play a determining role in our study.

Table 5. Structural model assessment.

Hypotheses	Path relationships	Std. Beta	Sample mean (M)	*t*-Values	CI 2.5%	CI 97.5%	Supported/not supported
H1	Higher stress >lifedissatisfaction	0.288	0.289	4.227	0.158	0.416	Supported
H2	Social ill-being >lifedissatisfaction	0.472	0.471	7.186	0.347	0.598	Supported
H3	Social ill-being >higher stress	0.684	0.68	13.868	0.579	0.766	Supported
H4	Social ill-being > higher stress > lifedissatisfaction	0.179	0.181	3.624	0.082	0.277	Supported

4.3. Mediation effect testing

The mediation effect was estimated on the basis of the Variation Inflation Factor (VIF). According to Hair et al.[62], if the obtained VIF value is less than the cutoff value of 0.2, the mediator has no effect. However, if the VIF value varies between 0.2 and 0.8, the mediator has a partial effect. Finally, for values that exceed 0.8, the effect could be considered as full. In the current study, the VIF was identified as 0.267 considering direct, indirect, and total effects (**Table 6**). Accordingly, higher stress has a partial mediating effect. To be more precise, since the direct effect gets reduced after mediation, 'higher stress" interfers plays the role of a mediator, corresponding for a competitive partial effect.

Table 6. Direct, indirect & total effects.

Predecessor constructs	Direct effects on life dissatisfaction	Indirect effects on life dissatisfaction	Total effects on life dissatisfaction	Significance of total effects
Social ill-being	0.681	0.269	0.685	Yes
Higher stress	0.502	-	0.267	Yes

4.4. Importance performance map analysis

The total effects related to 'social ill-being' and 'higher stress' on life dissatisfaction were estimated. The corresponding performance related to 'life dissatisfaction' was calculated and estimated as 77.469. For more details, the results of the Importance performance Map Analysis (hereafter mentioned as IMPA) are outlined in **Table 7** and depicted in **Figure 3** below.

Table 7. Importance-performance map (construct wise unstandardized effects).

Constructs	Importance	Performances
Higher stress	0.274	75.921
Social ill-being	0.730	79.466
Mean value	0.502	77.693

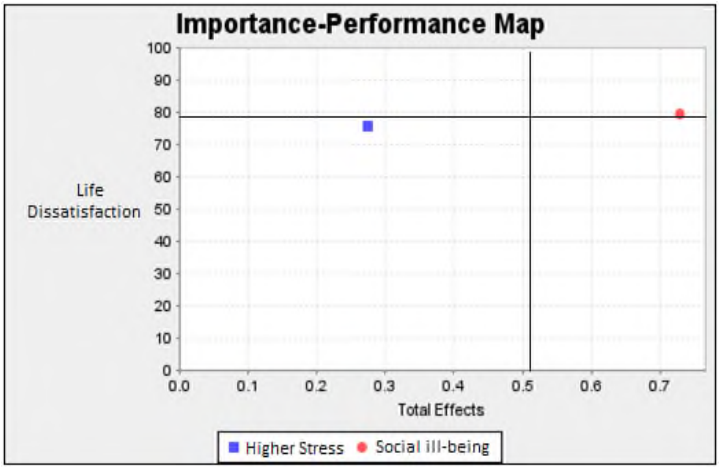

Figure 3. Adjusted importance performance matrix for life dissatisfaction.

From **Figure 3**, it can be deduced that: if there is an increase in one unit of higher stress from 75.921 to 76.921, the life dissatisfaction would increase to 77.743 with a total effect of 0.274. Similarly, if 'Social ill-Being' gets affected by one unit from 79.466 to 80.466, 'life dissatisfaction' would rise to 78.199 with a total effect of 0.73. Thus, it can be stated that life dissatisfaction of an individual is dependent on his level of stress as well as of his social ill-being.

5. Conclusions

The present research sought to explore the main factors that could affect the psycho-sociological human life during the COVID-19 crisis. It was of central importance to understand to what extend digital tools as well as social interaction and communication with others could enable persons to cope easily with the new normal coronavirus situation, in order to preserve mental, social well-being, and life equilibrium as well. Deducing the appropriate communication and interaction life styles in a post-pandemic era is also of utmost interest, since a pandemic can repeatedly lead to further lockdowns, as happened in many countries by the end of 2020 in Europe, India, and elsewhere, and even in China during the first quarter of 2022.

In line with past findings[14,20,40,43], results of the current research pointed out that social isolation and digital illiteracy and communication crisis lead to social ill-being during the COVID-19 outbreak. Indeed, as underlined by Meier et al.[42], in such critical situations, advanced technologies and devices are usually pursued as substitutes for human face-to-face interaction.

Corroborating precedent findings[39,43,50–53], it has been also demonstrated through our investigation that individuals who are subject to social ill-being by adopting a self-protective thinking and introvert attitudes, as well as those who consider life in a negative way, are more likely to manifest life dissatisfaction, especially during crises such as the coronavirus turmoil.

On the other hand, the current study explores and tests the mediating effect of higher stress between social ill-being and life dissatisfaction. Indeed, results highlighted how much stress could affect the human holistic development, leading to irritation, disgust, and frustration. Meanwhile, findings supported then existence of a partial mediating impact of stress, underlining the role of socialization, interpersonal communication and digitalization in tackling crises by maintaining a certain well-being and equilibrium in life. Such statements were partly emphasize by some researchers such as Fisher et al.[75], Lait and Wallace[72].

To conclude, the present research demonstrated that it is of most interest to take care of our human social well-being of individuals during crises, by maintaining their social relationships and interactions with others to reinstate balance in life. Moreover, affording an appropriate infrastructure that enable easy access to communication technologies and digital tools seems important in this digital era characterized by a higher-focus on clientele experiences, new value-centered business models, as well as a clear integration between data and streamlined operational processes.

6. Implications, limitations and future research directions

The present research aimed at offering several insightful and promising implications and recommendations for academicians, decision makers, and practitioners.

First, government should focus on developing a supportive ecosystem to citizens, managers, and workers who need to fulfill their expectations in order to feel themselves satisfied with their life. Indeed, as stated by Niedhammer et al.[58], it is essential for decision-makers and managers to understand their workers' proper motivations and potential job-stressors in order to preserve their psychosocial and mental health in a context of major changes.

Besides, as digital transformation is becoming the root of economic development of countries, government and policymakers are called upon to afford an appropriate digitalized infrastructure that enables citizens to cope with new international trade trends and any other situation related to this recent time.

Like other prior researches, the present study has also several limitations despite its relevant and promising insights to the existing literature. Future investigations could then address them by considering

new directions. In fact, this research was applied only on the Bengali context so that scholars would not be sure that the outcomes reached herby will be identical whether the investigation carried out during a longer time, or in other different contexts. Upcoming studies could then employ the same theoretical framework and test the derived model in other situations and on other populations over longer periods of time. Future investigations may also address other factors (i.e., social support and medical assistance) that might influence life satisfaction and social well-being of citizens[19], and therefore the relationship between higher stress and life dissatisfaction during the COVID-19 crisis. Moreover, upcoming studies could focus on how cultural heritage and social media affect well-being of persons and their life equilibrium[20,42,88].

Author contributions

Conceptualization, AO, SM and MKD; data collection, SM; methodology, SM and MKD; data analysis, MKD; writing—original draft preparation, SM and MKD; visualization, AC; review and editing, SM and AO. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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Appendix: Measurement scales

Construct I. Digital illiteracy and communication crisis.

DICC 1	During the COVID-19 pandemic, I don't really know where to find helpful and useful health resources and information on Internet during the COVID-19 pandemic.	7 point Likert 1 = Totally Disagree; 7= Totally Agree
DICC 2	During the COVID-19 pandemic, I feel doubtful and not really so confident in using information from the internet to make the appropriate health decisions.	
DICC 3	During the COVID-19 pandemic, I have not sufficient information on how to employ virtual assistants (such as Alexa, Google Home) or any other National Emergency Alert Systems (SMS) the manage the health crisis.	
DICC 4	I am not used to employ a computer or any other digital devices (smartphone, notebook) to communicate about health issues during the COVID-19 pandemic.	
DICC 5	I had not been accustomed to benefit from the videos and posts shared and disseminated in the digital communication platforms.	
DICC 6	I had not been accustomed to share with my social media members the content of videos and posts related to the COVID-19 health issues.	

Construct II. Social isolation.

SI 1	There is no one I can turn to closely during the COVID-19 pandemic, including my friends and fools.	7 point Likert 1 = Totally Disagree; 7 = Totally Agree
SI 2	I do not feel myself a part from a social group to which I belong during the COVID-19 pandemic.	
SI 3	My social relationships are becoming superficial during the COVID-19 pandemic, so that I do not find companionship.	
SI 4	I do not feel that my ideas and interests are shared with real persons around me.	

Construct III. Higherwork stress.

HS 1	I am upset and nervous about the unexpected crisis that crops up in our life.	7 point Likert 1 = Totally Disagree; 7 = Totally Agree
HS 2	I am afraid to take care of my personal problems.	
HS 3	I feel many things are beyond my control and ability while working from home.	
HS 4	I feel frustrated with my work from home.	
HS 5	I feel unable to get out from my work during working from home.	

Construct IV. Lifedissatisfaction.

LD 1	During the COVID-19 pandemic, my life becomes worse than my ideal.	7 point Likert 1 = Totally Disagree; 7 = Totally Agree
LD 2	I am not satisfied with my new personal life.	
LD 3	If I could live my life over, I will change my social relatedness and relationships with others during the COVID-19 pandemic.	
LD 4	The conditions of my life are becoming not good during the COVID-19 pandemic.	