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Article

Caregivers’ Baseline Mental Health Predicts Early Childhood Social Skills: Evidence from an Urban Area of Indonesia

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Highlights

What are the main findings?

- Caregivers’ depression, anxiety, and stress problems at baseline predicted lower social skills development after one year in an urban Indonesian context.
- The effects remained significant after adjusting for covariates and clustering at the kindergarten level by mixed-modelling.

What are the implications of the main findings?

- Providing mental health support for caregivers in child-rearing would be necessary to optimize children’s social skills development.
- Integrating the role from family, school, and community around the child may help strengthen early social competence and prevent later socio-emotional difficulties.

Abstract

Background/Objectives: Children’s social development is a significant aspect that supports appropriate behavior in the community, and parents, as the main caregivers, play a central role in developing children’s social skills. However, caregivers experiencing psychological distress – such as depression, anxiety, stress - may find it challenging to provide a nurturing rearing environment. This longitudinal study examined whether caregivers’ baseline mental health predicts children’s social skills 1 year later in an urban Indonesian context. **Methods:** A one-year follow-up study was conducted in an urban area of Indonesia in 2023–2024, inviting all nine kindergartens in the area to participate. Caregivers completed the demographic and Depression, Anxiety, Stress Scale (DASS-21), while teachers assessed children’s social skills using the Social Skills Scale (SSS). Linear mixed-effects models with random intercepts for kindergarten were estimated to account for clustering. **Results:** Finally, a total of 270 parent–child dyads were included. After adjusting for baseline social skills and covariates, higher levels of baseline caregiver depression ($B = -0.15, p < .001$), anxiety ($B = -.22, p < .001$), and stress ($B = -.27, p < .001$) were associated with lower children’s social skills in the follow-up. **Conclusions:** Even subclinical variations in caregiver psychological distress may meaningfully influence children’s social development over time. Strengthening caregiver mental health support, particularly in urban communities, may represent an important pathway for promoting early social competence and long-term developmental outcomes.

Keywords: caregivers; mental health; preschoolers; prospective approach; social development; urban

1. Introduction

These days, early childhood growth and development are prominent and extensively discussed subjects. Growth and development extend beyond mere health and the ability to perform diverse activities; they involve a more comprehensive dimension, including the social-emotional development [1]. Experts emphasize the importance of social skills as fundamental competencies that children must cultivate from an early age, since they are an important key to how children can adapt well to their environment. Experts define social skills as learned behaviors based on social rules enabling children to interact appropriately with others in society [2,3].

Numerous prior research has indicated a rise in the incidence of young children displaying problematic behavior, characterized by diminished social and emotional skills [4,5]. The study in Indonesia also showed that numerous social skills deficiencies exist among children. Some preschoolers exhibit a preference for solitude or shyness, struggle to regulate their emotions and behaviors, resist sharing, and have an inability to collaborate with peers [6].

Several previous studies investigated the determining factors to children's social well-being, and emphasized it is influenced by internal and external factors, including age, gender, familial context, parent-child intimacy, parenting approach, and parental mental health [7–10]. All these factors are around the children and shape their social development.

The mental health of caregivers is regarded as a crucial aspect of preschoolers' development, particularly in relation to children's social skills. Numerous prior studies indicate that parents with mental health illnesses have an elevated risk of having children who experience social developmental issues [11,12]. Particularly in low- and middle-income countries (LMICs), which found that when parents have mental health problems, their children under five are about twice as likely to have unfavorable social and emotional outcomes [12]. Another study also found that parental stress during the infancy period of life would increase the risk of children developing mental health problems in 3-year-old [13], and a prior study in Indonesia also indicates that preschool children reared by women under stress are 19.5 times more susceptible to encountering inadequate parenting and risk to develop developmental problems [14]. These social developmental issues encompass children who display challenges in self-regulation and in engaging with peers in interaction and collaboration. The danger escalates with the degree of the parents' mental health issues.

Parents with mental health illnesses typically find it challenging to manage their emotions and behavior in everyday situations, particularly during interactions with their children [14,15]. Parents with mental health illnesses may exhibit diminished sensitivity to their children's needs and developmental requirements. This parental conduct, witnessed daily by children, is ultimately regarded as "appropriate behavior" in social interactions [16]. Moreover, at this stage, children's capacity to discern good from wrong is not yet fully matured. Therefore, the study to evaluate how caregivers' mental health predicts social skills development through a follow-up approach, particularly in urban areas of Indonesia, is necessary to provide more evidence for childcare practices in the preschool years.

2. Materials and Methods

2.1. Study Design

This study was a follow-up observational study in an urban area of Indonesia called SJ Ward, B City. In August 2023 and October 2024, baseline (T1) and follow-up (T2) data were collected. The baseline data (T1) were collected from teachers and caregivers. Caregivers completed the demographic questionnaire and the Depression, Anxiety, Stress Scale (DASS-21); while teachers used SSS-24 to assess preschoolers' social skills. Only teachers attended the follow-up (T2) data collection for the children's social skill measure. All teachers participated in the training on how to use SSS-24 prior to data collection.

SJ Ward in Bekasi City is a densely populated urban residential district where the study took place. This study chose this place because it is in B City, West Java, the province with the most densely populated [17], an urban neighborhood near Jakarta, Indonesia's capital, with a diverse population that may reflect the Indonesian community. Indonesian kindergartens, which are private, Islamic, or religion-based, have a school day from 7.30 to 11.30 [18].

2.2. Population and Sample

This investigation targeted all nine SJ kindergartens. All eligible caregivers and teachers were invited to participate in the study. The inclusion criteria were: 1) Caregivers of SJ ward kindergarteners aged 4–6; 2) The caregivers agreed to participate in the study and have their children examined at baseline and follow-up; 3) Teachers who are willing to evaluate children's social skills by attending researcher training before data collection. The exclusion criteria were: 1) Children with special needs; 2) Not willing to join the study (baseline and follow-up); 3) Caregivers currently receiving treatment for health problems (physically and mentally).

Twelve of the 383 children-caregivers at SJ Ward Early Childhood Education (PAUD) were excluded from the study owing to special needs. After getting a detailed explanation about the study, participants agreed to complete the consent form and questionnaire. Due to missing demographic, mental health, or children's social skills data, 28 participants were excluded from the 2023 baseline.

Teachers evaluated children's social skills again in 2024. Unfortunately, about 41 children were unable to follow up due to various conditions. Furthermore, 32 participants have been excluded due to incomplete SSS follow-up data. Finally, 270 people were included in this study.

2.3. Measurements

Caregivers' mental health problems were evaluated by the Indonesian version of DASS with 21 items, which has been validated with Cronbach alpha of 0.930 [19]. Depression, anxiety, and stress are the three subscales that are included in this self-report questionnaire. On a Likert scale with four points, each item was given a rating: 0 = None of the criteria applied to me at all; 1 = Applied to me to a certain extent; 2 = Applied to me to a significant extent; and 3 = Applied to me to a great extent. Higher scores indicated more severe negative mental health issues, whereas lower scores indicated less. The overall score for each subscale was doubled and examined continuously without classifying. In addition, the current study also included the total score of DASS, as it was expected that it would be beneficial to produce a composite measure of negative emotional symptoms and provide a new perspective [20]

Preschoolers' social skills were assessed by kindergarten teachers using Social Skill Scale (SSS). The SSS comprises 24 items organized into three sub-scales: (1) assertion; (2) self-control; and (3) cooperation, with each sub-scale consisting of 8 items. Three responses assess every item: 0) Never; 1) Sometimes; 2) Always, based on the teacher's daily observations in kindergartens. The SSS was initially developed and evaluated in a Japanese pediatric population, with a Cronbach's alpha of 0.91 to 0.93 [21]. This scale has been implemented in numerous countries, including China, Nepal, and Indonesia [22–25]. The present study employed the validated and reliable Indonesian version of the SSS, exhibiting a Cronbach's alpha of 0.907 [23]. The final score was calculated by summing the values of all elements within each subdomain. An elevated score indicates enhanced social abilities.

The current study included several covariates: (1) caregivers' age; (2) caregivers' educational level; (3) marital status; (4) monthly household income; (5) child's age; (6) child's sex; (7) presence of sibling; (8) schools' accreditation; (9) children's social skills in the baseline. The selection of these variables was based on previous research, which mentions demographic factors, family factors, and the school's environment as determining factors for children's social skills [3,7,26].

2.4. Statistical Analysis

All data in this study were analyzed using IBM SPSS Statistics version 27.0, with the following steps: descriptive analysis, bivariate correlation analysis, and linear regression mixed-model analysis.

The correlations among the DASS subscales (depression, anxiety, stress) and DASS total score were moderate to strong ($r > .50$, $p < .001$), indicating substantial shared variance. Therefore, developing a separate model for each subscale to avoid multicollinearity would be beneficial.

Prior to testing the main hypothesis, the nested structure of the participants was examined, as participants came from nine different kindergartens. An unconditional (null) model was employed to calculate the intraclass correlation coefficient (ICC). The ICC for children's follow-up social skills was 0.23, indicating that approximately 23% of the variability among kindergartens can be attributed to differences between them, the implementation of multilevel modelling was necessary.

To deal with the hierarchical data structure, we used linear mixed-effects models with random intercepts for kindergarten. This strategy recognizes that observations are not independent and allows intercepts to vary between schools. Only random intercepts were included to ensure model stability, given the few clusters ($n = 9$). Fixed factors included all covariates: caregivers' age, educational level, marital status, monthly household income, child's age, sex, presence of siblings, school accreditation, and children's social skills at baseline. Continuous predictors were incorporated as covariates, and categorical variables were dummy-coded. We utilized restricted maximum likelihood (REML) to ascertain the parameters. Statistical significance was determined by a p-value of less than 0.05.

3. Results

3.1. Descriptive and Bivariate Correlation Results

Table 1 shows the demographics of study participants, including caregivers and children. The average caregiver age was 34.92 years, with a standard deviation of 5.58, showing that majority were in their productive adult years. In this study, for 228 (84.4%) mostly mothers joined the study, while 42 (15.6%) fathers did.

Most caregivers (179, 66.3%) graduated from university (undergraduate). Senior high school had 63 (23.3%) respondents, junior high and postgraduate did not have more than 5%, and only 0.8% had elementary school degrees. The majority of participants were married and living together; only 1.6% were married but living separately for any reason, and the rest (2.6%) were divorced. (95.8%). Over half of respondents (52.2%) earned income above the city's standard wage; 54 (20.0%) earned income equal to it; and 27.8% earned income below it. This household income reflects urban economic diversity. The average age of preschoolers was 60.00 months, or close to 5 years, with a standard deviation of 7.16 months, and 57.4% were girls. Most participants in the current study also have siblings (84.1%). Finally, 64.8% of schools were B-accredited.

Table 1. Demographic of participants (N = 270).

Variables	Categories	M+SD	n	%
Caregivers' Age (Years)		34.92+5.58		
Relationship	Father		42	15.6
	Mother		228	84.4
Caregivers' Education	Elementary		2	0.8
	Junior High School		13	4.8
	Senior High School		63	23.3
	Undergraduate		179	66.3
	Postgraduate		13	4.8

Caregivers' Marital Status	Married-living together	254	6.7
	Married-living separately	4	1.6
	Divorce	7	2.6
Household's income ¹	< City standard	75	27.8
	= City standard	54	20.0
	> City standard	141	52.2
Child's Age (Months)		60.00±7.16	
Child's Sex	Boy	115	42.6
	Girl	155	57.4
Presence of Sibling	Yes	227	84.1
	No	43	15.9
School's Accreditation	A	78	28.9
	B	175	64.8
	C	17	6.3

¹ City standard salary in baseline was around ±\$340.

Baseline caregiver mental health data is shown in Table 2. Total scores for each DASS-21 subscale were multiplied by two and analyzed continuously. Caregivers' stress mean value slightly higher ($M = 8.72$, $SD = 6.19$) compared to depression ($M = 7.67$, $SD = 6.65$), and anxiety ($M = 7.84$, $SD = 6.04$). The minimum and maximum scores for each sub-scale are "0" and 42. Additionally, the mean of DASS total score was 24.12 with $SD = 15.96$, while minimum score was 0, and 79 is the maximum score.

Table 3 shows respondents' baseline and follow-up social skills scores, with an average of 36.06 and a standard deviation of 6.81. The follow-up mean was 40.10 and standard deviation 6.17. The maximal score of SSS is 48, and the result shows after one year, children's social skills improved.

Table 4 shows that each DASS-21 sub-scale has significant negative correlations with children's social skills at baseline and follow-up. The results suggest that caregivers with lowered mental health issues, such as depression ($r = -.35$, $p < .001$), anxiety ($r = -.44$, $p < .001$), stress ($r = -.55$, $p < .001$), and total score of DASS ($r = -.53$, $p < .001$) may predict higher development of children's social skills in the follow-up.

Table 2. Descriptive results of caregivers' mental health (N=270).

Variable	Mean	SD	Min	Max
Depression	7.67	6.65	0	42
Anxiety	7.84	6.04	0	42
Stress	8.72	6.19	0	42
DASS Total Score	24.12	15.96	0	79

Table 3. Descriptive results of children's social skills in the baseline (T1) and in the follow-up (T2) (N=270).

Variable	Mean	SD	Min	Max
Children's Social Skills T1	36.06	6.81	3	46
Children's Social Skills T2	40.10	6.17	20	48

Table 4. Bivariate correlation results of caregivers’ mental health and children’s social skills (N=270).

Variable	1	2	3	4	5	6
1. Caregivers’ Depression	1.00					
2. Caregivers’ Anxiety	.69**	1.00				
3. Caregivers’ Stress	.58**	.67**	1.00			
4. Caregivers’ Total DASS score	.86**	.89**	.85**	1.00		
5. Children’s Social Skills T1	-.19**	-.22**	-.22**	-.25**	1.00	
6. Children’s Social Skills T2	-.35**	-.44**	-.55**	-.53**	.31**	1.00

** p < .001

3.2. Mixed-models linear results

As mentioned in the methods section, the mixed-model linear analysis was performed with random intercepts for kindergarten because the ICC value was 0.23, indicating significant clustering at the kindergarten level. Thus, all following analyses utilized linear mixed-effects models incorporating random intercepts for kindergarten.

In all models (tables 5 to 9), caregivers’ educational level, children’s age, the presence of siblings, and the school’s accreditation were positively associated with higher follow-up social skills scores. In most models, children’s sex was a strong predictor. Lastly, the baseline social skills are also considered as a strong predictor in the caregivers’ depression model (see table 6), which emphasizes that children’s socio-emotional functioning stays the same over time.

In each mixed-model developed, the baseline mental health of caregivers - depression, anxiety, stress, and total score of DASS - negatively impacted children’s social abilities at follow-up (see table 6 – table 10).

Table 5. Mixed-effects model predicting children’s social skills after one-year* (N=270).

Predictor	B	SE	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	-7.27	3.19	147.58	-2.28	.024	-13.57	-0.97
Caregivers’ Age	-0.01	0.04	251.07	-0.35	.005	-0.09	0.06
Caregivers’ Education	1.03	0.33	257.56	3.11	.728	0.38	1.68
Marital Status	0.48	0.61	250.25	0.78	.002	-0.73	1.69
Household Income	-0.28	0.25	250.38	-1.15	.435	-0.77	0.20
Child’s Age	0.53	0.03	257.34	16.20	.253	0.46	0.59
Child’s Sex	0.84	0.42	250.02	1.98	.000	0.00	1.68
Presence of Siblings	2.80	0.59	250.32	4.73	.049	1.63	3.96
Schools’ Accreditation	2.67	0.88	28.01	3.02	.000	0.86	4.48
Children’s Social Skills T1	0.08	0.03	257.39	2.36	.019	0.01	0.15

*Dependent variable: Children’s Social Skills T2
**Random intercept for kindergarten included in all models.

Table 6. Mixed-effects model predicting children’s social skills after one-year from caregivers’ depression* (N=270).

Predictor	B	SE	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	-4.24	3.23	154.69	-1.31	.192	-10.62	2.15
Caregivers’ Age	-0.01	0.04	248.42	-0.32	.746	-0.08	0.06
Caregivers’ Education	0.87	0.32	256.12	2.71	.007	0.24	1.51
Marital Status	0.42	0.59	247.54	0.71	.477	-0.75	1.60
Household Income	-0.29	0.24	247.73	-1.22	.223	-0.77	0.18
Child’s Age	0.50	0.03	256.24	15.39	.000	0.43	0.56
Child’s Sex	0.79	0.41	247.16	1.92	.057	-0.02	1.60
Presence of Siblings	2.76	0.57	247.50	4.81	.000	1.63	3.89
Schools’ Accreditation	3.10	0.89	28.89	3.48	.002	1.28	4.91
Children’s Social Skills T1	0.07	0.03	254.61	2.13	.034	0.01	0.14
Caregivers’ Depression	-0.15	0.04	258.53	-4.01	.000	-0.23	-0.08

* Dependent variable: Children’s Social Skills T2
**Random intercept for kindergarten included in all models.

Table 7. Mixed-effects model predicting children’s social skills after one-year from caregivers’ anxiety* (N=270).

Predictor	B	SE	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	-3.59	3.23	148.00	-1.11	.269	-9.97	2.80
Caregivers’ Age	-0.01	0.03	248.22	-0.33	.742	-0.08	0.06
Caregivers’ Education	0.85	0.31	254.49	2.72	.007	0.23	1.47
Marital Status	0.49	0.58	247.19	0.85	.395	-0.65	1.63
Household Income	-0.28	0.23	247.49	-1.22	.225	-0.74	0.18
Child’s Age	0.47	0.03	256.35	14.60	.000	0.41	0.53
Child’s Sex	0.88	0.40	247.05	2.19	.029	0.09	1.67
Presence of Siblings	2.56	0.56	247.27	4.58	.000	1.46	3.66
Schools’ Accreditation	4.04	0.93	45.99	4.33	.000	2.16	5.92
Children’s Social Skills T1	0.06	0.03	252.20	1.77	.079	-0.01	0.12
Caregivers’ Anxiety	-0.22	0.04	258.73	-5.45	.000	-0.30	-0.14

* Dependent variable: Children’s Social Skills T2
**Random intercept for kindergarten included in all models.

Table 8. Mixed-effects model predicting children’s social skills after one-year from caregivers’ stress* (N=270).

Predictor	B	SE	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	0.57	3.22	162.94	0.18	.859	-5.79	6.93
Caregivers’ Age	-0.09	0.03	247.97	-0.27	.790	-0.08	0.06
Caregivers’ Education	0.67	0.31	254.83	2.20	.029	0.07	1.27
Marital Status	0.41	0.56	246.94	0.74	.460	-0.69	1.52
Household Income	-0.26	0.23	247.16	-1.16	.246	-0.71	0.18
Child’s Age	0.44	0.03	255.59	13.57	.000	0.37	0.50
Child’s Sex	0.81	0.39	246.68	2.09	.037	0.05	1.57
Presence of Siblings	2.85	0.54	246.93	5.27	.000	1.78	3.91
Schools’ Accreditation	3.63	0.88	39.19	4.15	.000	1.86	5.40
Children’s Social Skills T1	0.05	0.03	252.77	1.70	.091	-0.01	0.12
Caregivers’ Stress	-0.27	0.04	256.28	-7.09	.000	-0.34	-0.19

*Dependent variable: Children’s Social Skills T2
**Random intercept for kindergarten included in all models.

Table 9. Mixed-effects model predicting children’s social skills after one-year from caregivers’ total score of DASS* (N=270).

Predictor	B	SE	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	0.84	3.28	147.86	0.26	.798	-5.64	7.32
Caregivers’ Age	-0.01	0.03	248.81	-0.43	.671	-0.08	0.05
Caregivers’ Education	0.59	0.30	254.09	1.98	.049	0.00	1.18
Marital Status	0.44	0.55	247.86	0.80	.423	-0.64	1.52
Household Income	-0.28	0.22	248.12	-1.27	.205	-0.72	0.15
Child’s Age	0.42	0.03	256.27	13.32	.000	0.36	0.48
Child’s Sex	0.79	0.38	247.69	2.09	.038	0.04	1.54
Presence of Siblings	2.65	0.53	247.86	5.01	.000	1.61	3.69
Schools’ Accreditation	4.70	0.93	80.44	5.06	.000	2.85	6.55
Children’s Social Skills T1	0.05	0.03	251.12	1.47	.143	-0.02	0.11
Caregivers’ Total DASS Score	-0.13	0.02	258.96	-7.82	.000	-0.16	-0.10

*Dependent variable: Children’s Social Skills T2
**Random intercept for kindergarten included in all models.

4. Discussion

This longitudinal study investigated the extent to which caregiver mental health forecasts preschool children's social skills one year subsequently, while controlling for several covariates, baseline social skills, and clustering at the kindergarten level. About 23% of the variation in children's subsequent social abilities was attributable to variation between kindergartens, highlighting the significance of contextual clustering in early childhood research.

This study's findings confirm the substantial prediction of caregiver mental health in the baseline, specifically depression, stress, and anxiety, on the social skills of preschool-aged children in urban Indonesia. Each sub-scale represents a dimension of mental health problems based on its

symptoms [20]. The first sub-scale was depression, which typically requires a longer duration for recognition and is frequently preceded by extended, unresolved stress and anxiety [27]. Many relevant studies clarified that caregivers' depression is significantly associated with many aspects of children's development, particularly social-emotional skills development [7,8,28,29]. This phenomenon is caused by the depressed caregivers exhibiting diminished effortful engagement with their children, communicating less frequently and responding more slowly than non-depressed mothers [28]. Depressed caregivers are already exhausted with their own state and find child-rearing to be exceedingly tough. This condition can also be exacerbated by living environments, such as the availability of support or interventions related to child-rearing.

Caregivers residing in urban environments often initially exhibit stress symptoms that can subsequently progress to clinical depression in the absence of suitable intervention. The persistent doubt and stigma around mental health issues, which continue to be regarded as taboo, frequently intensify depression [30]. Consequently, it is imperative to enhance public knowledge on the necessity of contacting health services when assistance is required.

Given that this study was conducted in an urban Indonesian context, the findings contribute to the limited longitudinal evidence on caregiver mental health and child social development in low- and middle-income countries (LMICs), since most existing literature originates from developed countries. Contextual stressors in LMICs—such as economic instability and limited access to mental health resources—may amplify the impact of caregivers' mental health on child outcomes.

In comparison to a prior Indonesian study conducted during the new normal period, the current findings regarding caregiver anxiety reveal a mean of 7.48 which in the "normal" to "mild" range, highlighting that parents face similar challenges in balancing work and family, with approximately 70% of parents experiencing normal anxiety and 10% experiencing mild anxiety [23]. Previous research findings align with the current study, which identified an association between caregivers' anxiety and children's social skills issues [31,32].

As for caregivers' stress, our findings show a lower prevalence of stress than in the study conducted during the COVID-19 pandemic. A study conducted in Indonesia by Husniyyah & Geovania Azwar (2021) found that the number of parents experiencing moderate to extremely severe stress was high 40.1%, while in this study the mean was 8.72 which include in "normal" range. This contrasts with the pandemic's exacerbation of stress due to job loss, economic instability, and heightened concerns regarding childcare and financial matters [33–35]. Therefore, the time and stability of the situation also contribute to the mental health of caregivers.

The mechanism of caregivers' mental health affects the children's social skills can be explained through the ecological system theory from Bronfenbrenner. According to Bronfenbrenner's Ecological Systems Theory, an individual's development is shaped by multiple environmental layers and the interactions among them. In this idea, caregivers or family members form the microsystem, the layer nearest to the individual, hence exerting a substantial influence on daily interactions [36]. Consequently, when caregivers encounter mental health challenges, it profoundly affects their relationships with the various microsystems surrounding the child.

In addition, the current study not only includes the mental health of caregivers, but also includes several covariates of caregivers' and children's demographic factors, schools' quality, which have been mentioned as significant factors in the previous studies [3,7,32]. Children's age and sex have been discussed as determining factors for children's social skills, since children would develop their social skills as they grow, and girls are often mentioned to develop their skills earlier than boys [7,37]. As for caregivers' education also known to contribute to children's development, because caregivers with better education tend to provide a better environment to stimulate children's development in any aspect [38].

The current study also mentioned the presence of siblings as a significant factor in children's social skills, and a previous study emphasized that siblings may help each other to develop their social development [39]. The school's accreditation was also found to be significant with children's social skills, since in Indonesia, accreditation of school related to the quality of programs to stimulate

children's development [40]. Lastly, the sub-scale of caregivers' mental health in each model – depression, anxiety, stress – might predict children's social skills.

In conclusion, the findings corroborate the research hypothesis that fewer caregiver-reported mental health problems would be significantly associated with enhanced social skills, after adjusting for several covariates, including caregivers' and children's demographic factors and the school environment. These findings correspond with other research indicating that parents with mental health challenges frequently have difficulty exhibiting affection and assertiveness, particularly in daily life, resulting in children emulating their parents' conduct [8,14–16]. This is in line with the advanced findings that mentioned parents with emotionally unstable characterization of mood disorders as problems impacting emotions, cognition, and behavior towards the children [41].

To the best of our knowledge, this study is the first investigation to clarify how caregivers' mental health difficulties predict children's social skills using a longitudinal methodology within an urban Indonesian demographic, utilizing the Social Skill Scale (SSS-24) among Indonesian preschoolers, which has been validated. However, the limitations of the study must also be acknowledged for subsequent research. Firstly, there were missing data for multiple questions that could influence the outcomes. Second, this study was conducted solely in one urban location and exclusively in private kindergartens, which may restrict its representativeness of all regions in Indonesia. Third, the study incorporated a limited set of determinant elements; therefore, future research should include more variables to enhance the model's comprehensiveness, including parenting conduct, parenting style, home-rearing environment, parental intimacy, school curriculum, and the community's socio-cultural background.

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Abbreviations

The following abbreviations are used in this manuscript:

DASS	Depression Anxiety Stress Scale
SSS	Social Skills Scale

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