Parental phubbing and smartphone addiction in adolescents: A meta-analysis review

Liza Marini[1], Wiwin Hendriani[2], Primatia Yogi Wulandari[3]

[123]Doctoral Program, Faculty of Psychology, Universitas Airlangga, Surabaya, Indonesia

[2] wiwin.hendriani@psikologi.unair.ac.id

Keyword :	Abstract
	Abstract— Few studies have found that parental phubbing is a vital precursor of adolescents' problematic smartphone use (smartphone addiction). This meta-analysis uses seven studies selected from multiple electronic databases, namely Scopus, Web of Science, Science Direct, and Google Scholar resulting in a total sample of 6,908 participants, in order to determine how strong the relationship between parental phubbing and smartphone addiction is in adolescents. The literature search was conducted from May 25 to 26 of 2022, limiting it to reputable journals published in English within the last 10 years from 2012 to 2021. The data analysis and the article quality assessment conducted using the Mix Methods Appraisal Tool (MMAT) and Jamovi. The results of the meta-analysis indicate a high level of heterogeneity (89.77%), but no publication bias was found. This heterogeneity is caused by, among other things, the small number of studies, the high variations in the characteristics of the respondents, and differences in research methodologies. This study finds that parental phubbing has a medium positive correlation, i.e. r= 0.32, 95% CI = 0.241 – 0.392. Therefore, it can be concluded that parental phubbing is not the only factor that influences smartphone addiction in adolescents. Hence, future researchers can include other variables that might influence the relationship between parental phubbing and smartphone addiction in adolescents.

INTRODUCTION

Smartphone users in Indonesia are increasing from year to year. As 83.5 million users were recorded in 2018, 92 million people were recorded in the following year. Indonesia ranked fourth globally in the number of smartphone users after China, India and the US (Rahmayani, 2015). One of the features that can be accessed through smartphones is the internet. The 2021 data showed that internet users in Indonesia have reached 202.6 million people. This fact was found by *HootSuite*, a content management service, and *We Are Social,* a social media marketing agency, as reported in *Digital 2021* (Riyanto & Nistanto, 2021). In the following year, Indonesian Internet Service Provider Association (APJII) updated that the number of internet users in Indonesia have increased to 210 million people. Meanwhile, the latest 2023 data shows that internet users in Indonesia have increased again, reaching to 215.63 million people in the beginning of the year, with the highest penetration is in adolescents, namely people with the age range of 13-18 years, by 98.20%. The survey also shows that the internet is accessed 99.51% from smartphones (APJII, 2023).

With the development of information technology, the use of mobile phones (or smartphones) has become more and more popular. Thus, problematic smartphone usage or smartphone addiction, defined as the excessive or compulsive use of mobile phones, especially among adolescents has become a global issue (Niu et al., 2020). Park & Lee (2014) explained that smartphone addiction is the excessive use of smartphones in a way that is difficult to control and that its influence extends to other areas of life in a negative way such as sleep problems, poor academic performance, and anxiety.

Smartphone addiction in adolescents is influenced by several internal and external factors. As the internal factors include self-control (Niu et al., 2020; Zhang et al., 2021), self-esteem and FoMo (Aulyah & Isrofin, 2020), physical and psychological health problems (Cha & Seo, 2018) gender (Cha & Seo, 2018; Lee et al., 2017), self-regulated learning (Anggreani, 2018), and mindfullness (Waty & Fourianalistyawati, 2018), the external factors include adolescent life at school (Kwon et al., 2013; Lee & Lee, 2017; Lee et al., 2017), type of smartphone and apps used (Shin et al., 2012) media influence in smartphones (Agusta, 2016), social environment of friends and social economic status (Cha & Seo, 2018), as well as family and parental environment (Grote et al., 2019; H. J. Kim et al., 2018).

Previous studies have focused their attention to factors influencing problematic mobile phone use and found that family-related issues (e.g., family functioning, parenting style, parental neglect, and parental monitoring or regulating) had a great effect on adolescents' mobile phone addiction or problematic mobile phone use (Lee & Kim, 2018; Liu, Chen, & Lei, 2020; Liu et al., 2020). Thus, parent-related behaviors on mobile phone use should also be given attention. We also need to consider that the family systems theory, stating that information technology (e.g., internet and mobile phones) has become an integral part of family life, plays an important role in the relationship between family members and in the development and adaptation of individuals (Niu et al., 2020). Thus, the influences of parental phubbing on adolescent problematic mobile phone use or smartphone addiction should be further examined.

Terras & Ramsay (2016) explained that problematic smartphone use behavior in parents will become an example for their children. Therefore, if parents repeatedly neglect their children due to excessive smartphone use, it is very possible that adolescents will follow their parents' behavior in the future. McDaniel (2019) also argued that the use of smartphones by parents when they are with their children tends to reduce parental attention, interaction, and responsiveness, which can lead to negative feelings, such as feelings of neglect and confusion in adolescents. The emergence of these negative feelings and emotions could increase the intensity and frequency of smartphone use in adolescents. Smartphone is the most frequently used means of coping. Therefore, if the problem of smartphone uses in parents that results in neglect of their children continues to recur, there is a possibility that adolescents will experience smartphone addiction.

Neglectful behavior towards children due to smartphone use is currently known as parental phone snubbing or abbreviated to parental phubbing. In Indonesia, the term of parental phubbing is related to the term of gadget hangover (Cahyadi, 2018). Parental phubbing has been shown to have both direct and indirect impact on the smartphone usage behavior of teenagers. Several studies (conducted by Xie et al., 2019; Hong et al., 2019; Liu et al., 2019) captured that parental phubbing is directly and positively related to smartphone addiction in kids and adolescents. The two variables are also known to have such effects through several mediators and moderators. The mediating variables are attachment (Xie et al., 2019; Hong et al., 2019) self-esteem (Hong et al., 2019) and subjective norms (Liu et al., 2019), while the moderating variable is gender (Xie et al., 2019).

Based on the theoretical explanation above, this study aims to build and construct a stronger conception based on past empirical studies. We mapped seven articles or studies related to parental phubbing and smartphone addiction or problematic smartphone use in adolescents and examined them.

The meta-analysis technique was used to quantitatively summarize those past research results based on the concept of Moher et al., (2009). This technique can also be used to re-analyze those results by statistically processing them by referring to them as primary data. It helps researchers to construct theories by collecting various studies and summarizing the findings. We can then present the aggregated data and identify the relationships between the variables better (Abdullah, 2023). This technique was used to meet the objective of this study. The result of this study is expected to provide confirmation regarding the relationship between parental phubbing on smartphone addiction, especially in adolescents, because, in the extent of our knowledge, no meta-analysis has been used to discuss this topic.

METHOD

This research uses PRISMA meta-analysis as prescribed by Moher et al., (2009). This guideline consists of identification, screening, eligibility, and inclusion process along with the excluded literature (Moher et al., 2009). We searched through electronic databases namely Scopus, Web of Science, Science Direct, and Google Scholar in finding the necessary and relevant sources. The PI(E)CO criteria was used as the first step in determining the scope of the study (Higgins et al., 2022). This study does not use C=Comparison because there are no groups or variables to compare. Therefore, we used E = Exposure instead, which as specifically described in the table below.

Table 1. PI(E)CO CRITERIA

Participant	Exposure	Outcome
Adolescent/ Youth/ Teenager	Parental Phubbing (Mother & Father/ Mother or Father)	Smartphone Addiction/ Mobile Phone Addiction /Problematic Smartphone

| Teen/	Use/ Problematic Mobile Phone Use/ Mobile Phone Dependency

Based on the PI(E)CO criteria, we used the keywords of ("parental phubbing") AND ("smartphone addiction" OR "mobile phone addiction" OR "problematic smartphone use" OR "problematic mobile phone use" OR "mobile phone dependency") AND (adolescent* OR youth OR teenager OR teen). Here the inclusion and exclusion criteria were applied in the literature search.

The inclusion criteria that we applied are (1) quantitative survey research on the relationship between parental phubbing and smartphone addiction in adolescents, (2) articles published within the last 10 years, namely from 2012 to 2022, (3) articles published in English by reputable journals, (4) quantitative survey research that includes the correlation value between the two variables. The exclusion criteria are (1) research on the relationship between parental phubbing and smartphone addiction that is not quantitative survey research, i.e., literature study or meta-analysis, (2) articles published not within the last 10 years, (3) articles published not in English and not by reputable journals, (4) quantitative survey research that does not include the correlation value between the two variables.

Following the article search using the inclusion and exclusion criteria, we conducted a title and abstract screening, continued by a full-text screening to determine the eligibility of the reports for the meta-analysis inclusion. Jamovi version 2.2.5 for Android was used to manage the research's statistical data.

Literature Search

The literature search was conducted through electronic databases such as Scopus, Web of Science, Science Direct, and Google Scholar from May 25 to 26 of 2022, resulting in 137 articles. The title selection produced 115 articles, and the subsequent abstract selected suggested 39 articles. The last selection process, which is the selection based on the inclusion criteria by paying attention to the correlation value, recommended seven articles to be analyzed using the meta-analysis. Fig. 1 shows an overview of the PRISMA diagram from the results of the literature selection.
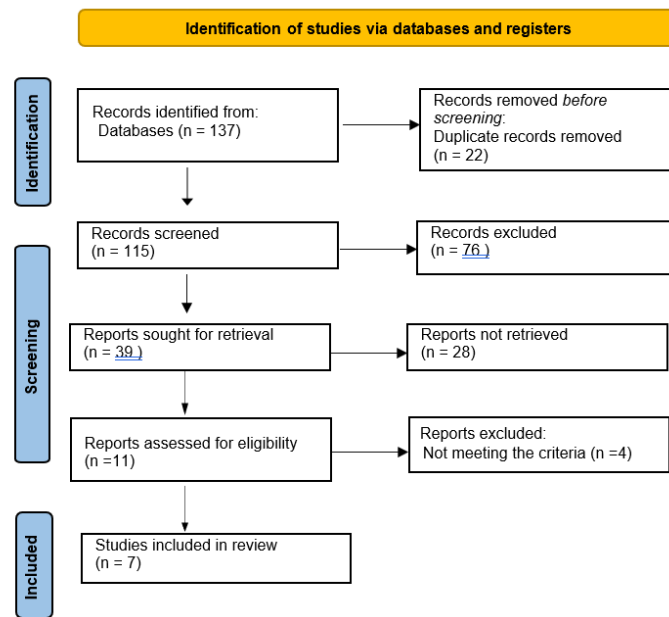
Figure 1. The Flow Diagram of PRISMA

Article Quality Assessment

Following their incorporation in this study, the quality of the seven articles was measured using the Mix Methods Appraisal Tool (MMAT) Version 2018, an assessment tool for systematic review studies designed based on different assessment stages. This process consists of seven questions indicators. Divided into two parts, the first two questions are related to the general question, which is the determinant. If the first and second questions are well answered, the next five indicators can follow; they are related to specific questions for non-randomized quantitative research. In this assessment, the answer choices are "yes", "no" or "cannot be described". The assessment was carried out based on Pluye et al., (2018), who divided the total 100% score into five questions, in which the "yes" answer for each question constitutes a 20% score. The results of the quality assessment on the final seven articles are presented in the table below.

Table 2. Article Quality

No	Author & Year	Assessment Criteria							
		Main Indicator		Non-Randomized Quantitative Indicator					
		S1	S2	3.1	3.2	3.3	3.4	3.5	Total
1	Liu et al. (2019)	Yes	Yes	No	Yes	Yes	Yes	Yes	80%
2	Geng et al. (2021)	Yes	Yes	No	Yes	Yes	Yes	Yes	80%
3	Zhao et al. (2022)	Yes	Yes	No	Yes	Yes	Yes	Yes	80%
4	Niu et al. (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100%

5	Zhang et al. (2021)	Yes	Yes	No	Yes	Yes	No	Yes	60%
6	Hong, BS et al. (2019)	Yes	Yes	No	Yes	Yes	Yes	Yes	80%
7	Xie et al. (2019)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100%

Description:

S1. Are there clear research questions?

S2. Do the collected data allow to address the research questions?

3.1. Are the participants representative of the target population?

3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?

3.3. Are there complete outcome data?

3.4. Are the confounders accounted for in the design and analysis?

3.5. During the study period, is the intervention administered (or exposure occurred) as intended?

Based on the quality assessment results above, all articles were included in the meta-analysis process. This refers to the total percentage of the quality assessment: 0-20% is classified as low quality, 40-60% is classified as average quality, and 80-100% is classified as high quality. Therefore, six articles were considered to have average and high quality.

Table 3. Research Data from Seven Journals for Meta-Analysis

No	Research	N	R
1	Liu et al. (2019)	605	0,3
2	Geng et al. (2021)	1447	0,31
3	Zhao et al. (2022)	931	0,48
4	Niu et al. (2020)	726	0,27
5	Zhang et al. (2021)	471	0,23
6	Hong et al. (2019)	1721	0,22
7	Xie et al. (2019)	1007	0,31
	Total	6908	

Data Analysis

This meta-analysis study uses the random effect model to see the average relationship between parental phubbing and adolescent smartphone addiction. Here the model developed by DerSimonian and Laird (DL) was used. This is the simplest model for meta-analysis (Higgins et al., 2019). The collected data was then synthesized using two methods: qualitative (narrative) and quantitative (meta-analysis). In the narrative synthesis, the findings of each study were explored, then the relationship between articles were identified. Jamovi was then deployed for the quantitative data synthesis. The effect size (or the correlation coefficient value) with a 95% confidence interval was calculated for each article by inputting the data into the program. The Random-Effect Model was used as an estimator to

account for heterogeneity in the included articles. The heterogeneity was seen through the statistical value of I^2, in that $I^2 = 0\%$ means no heterogeneity, $I^2 = 25\%$ means low heterogeneity, $I^2 = 50\%$ means moderate heterogeneity, and $I^2 = 75\%$ means high heterogeneity. The I^2 grade will not be able to reach 100%, while the values of above 90% are classified as very rare (Higgins et al., 2003). Forest plots were used to display the estimated effect size of each study and the pooled effect size at a confidence interval level of 95%. In addition, through forest plots, a visual inspection of the variability between effect sizes of one study and other studies can be carried out (Sedgwick, 2015). Then, as the publication bias was seen from the funnel plot, the asymmetric statistics was tested using Egger's regression intercept test (Sterne & Egger, 2001).

RESULTS AND DISCUSSION

The Characteristics of the Articles

According to Table 3 above, there are seven articles considered suitable for further analysis. They constitute 6.908 participants, and they were all carried out in China, confirming the results of a bibliometric analysis by Khan & Khan (2022) , who found that China is ranked third in productive countries for research on smartphone addiction after South Korea and the United States. The samples are male and female adolescents with the age range of 10-19 years who were at that time studying at junior high schools and senior high schools. Studies of this type are mostly cross-sectional; only one was a longitudinal research.

One of the most widely used measuring tools to measure parental phubbing are is the Partner Phubbing Scale. This measuring tool was created by Roberts & David (2016). It contains nine questions for identifying the level of parental phubbing. There are various instruments for measuring smartphone addiction, but the most widely used is the Smartphone Addiction Scale made by Kwon et al (2013). It contains ten questions for identifying the level of smartphone addiction. The following table summarizes the results of the literature study on parental phubbing with smartphone addiction in the seven articles.

Table 4. Summary of Articles

No	Author & Year	Tittle	Country	Sample	Method	Result
1	Liu et al. (2019)	The Effect of Parental Phubbing on Teenager's Mobile Phone Dependency Behaviors: The Mediation Role of Subjective Norm and Dependency	China	605 adolescents (grade 7-11), 294 girls and 274 boys	Cross-sectional study. Partner Phubbing Scale & Mobile Dependency Scale. Structural equation modelling (SEM).	Parental phubbing positively affects the level of mobile phone dependency behaviors (direct and

		Intention			indirect)
2	Geng et al. (2021)	The Influence of Perceived Parental Phubbing on Adolescents' Problematic Smartphone Use: A Two-Wave Multiple Mediation Model	China	1447 adolescents, age 10-19 years, 875 girls and 572 boys	Longitudinal study. Generic Scale of Being Phubbed & Smartphone Addiction Scale. SEM analysis in AMOS 21.0	Father's phubbing (fphubbing) directly predicts adolescents' problematic smartphone use, and mother's phubbing (mphubbing) indirectly predicted adolescents' problematic smartphone use.
3	Zhao et al. (2022)	The Effect of Parental Phubbing on Chinese Adolescents' Smartphone Addiction During COVID-19 Pandemic: Testing a Moderated Mediation Model	China	931 adolescents of grade 7-9	Random, Online Survey. Partner Phubbing Scale & Smartphone Addiction Index Scale. PROCESS macro in SPSS.	Smartphone addiction was positively associated with parent phubbing after controlling for covariate (direct and indirect)
4	Niu et al. (2020)	Parental Phubbing and Adolescent Problematic Mobile Phone Use: The Role of Parent-Child Relationship and Self-Control	China	726 adolescents, age 12-18 years (grade 7-9)	Cross-sectional study. Convenient Sampling. Partner Phubbing Scale & Mobile Phone Addiction Index. Regression Model.	Parental phubbing was positively correlated with Problematic Mobile Phone Use (PMPU) after controlling age and gender.
5	Zhang et al. (2021)	Why Parental Phubbing Is At Risk For Adolescent Mobile Phone Addiction: A Serial Mediating Model	China	471 adolescents, age 11-16 years (grade 7-9), 282 girls and 189 boys	Cross-sectional study. Cluster Sampling. Partner Phubbing Scale & Mobile Phone Addiction Scale. SEM analysis in AMOS 21.0 & PROCESS macro	The direct and indirect effect of parental phubbing on mobile phone addiction is significant

in SPSS 22.0

| 6 | Hong et al. (2019) | Parents' Phubbing and Problematic Mobile Phone Use: The Roles of the Parent–Child Relationship and Children's Self-Esteem | China | 1721 adolescents, age 11-17 years (grade 7-11) | Cross-sectional study (First data and second data were collected six months apart). Partner Phubbing Scale & Mobile Phone Problem Use scale. Structural Equation Modelling (SEM). | Parental phubbing positively predicts Problematic Mobile Phone Use (PMPU) after controlling age and gender. |
| 7 | Xie et al. (2019) | Parents' Phubbing Increases Adolescents' Mobile Phone Addiction: Roles of Parent-Child Attachment, Deviant Peers, and Gender | China | 1007 adolescents, age 11-16 years (518 girls and 489 boys) | Cross-sectional study. Convenience Sampling. Partner Phubbing Scale & Smartphone Addiction scale. Multivariate Regression. | Parental phubbing is positively associated with mobile phone addiction after controlling age (direct), and parental phubbing is positively associated with mobile phone addiction (indirect) |

Analysis Results

This study uses the Jamovi summary effect, heterogeneity test results, forest plots, and publication bias analysis. The data used as the input is the effect size (ES). In this case the correlation coefficient (r) and the number of samples used in the study (n) is shown in table 3. Seven articles (k = 7) were included in the analysis.

Table 5. Heterogeneity Test

Random-Effect Model (k=7)

	Estimate	se	Z	P	CI Lower Bound	CI Upper Bound
Intercept	0.316	0.0385	8.21	< .001	0.241	0.392

Note. Tau² Estimator: DerSimonian-Laird

Table 6. Heterogeneity Statistics

Tau	Tau²	I²	H²	R²	df	Q	p
0.096	0.0092 (SE= 0.0063)	89.77%	9.771	.	6.000	58.626	< .001

Based on Table 6, it can be seen that the I^2 is 89.77%, indicating a very high heterogeneity. According to Higgins et al (2003), the greater the value of I^2, the greater the inconsistency in the studies. Hence, research on parental phubbing with smartphone addiction has a high inconsistency value, so the results are not always the same, and they affect the heterogeneity. This is also evidenced by the Cochran's Q value of 58.626, indicating heterogeneity between parental phubbing research and smartphone addiction. However, despite the heterogeneity, the actual results from the studies were generally in the same positive direction as the expected mean results. This very high heterogeneity can be caused by differences in the types of participants, interventions, and results between one study and another (Higgins et al., 2019). Viewed based on participants, the seven articles use almost similar participants, namely adolescents with the age range of 11-17 years. Only three articles use different age ranges, namely 10-19 years, 12-18 years, and no age range.

Table 5 shows that the correlation coefficient obtained from the results of the meta-analysis based on the random-effect model on parental phubbing relationships with smartphone addiction is medium, which is equal to 0.316 with a CI (0.241 to 0.392), and the average results are significantly different from zero (z = 8.21, p < 0.0001). According to Cohen (2013), if a research has an effect size correlation of 0.3 to 0.4, it will be considered to have a medium effect size correlation. The forest plot in figure 2 also shows the results of the effect size (ES) random-effects model (REM) analysis of the seven existing studies. The study of Zhao et al., (2022) is the one with the largest ES (0.52 [0.46-0.59]). Other studies, i.e. Liu et al., 2019;Xie et al., 2019;Zhang et al., 2021; Geng et al., 2021; and Niu et al., 2020, has the confidence interval (CI) that was less convincing although they gave rise to true outcomes and effect size , except for Hong et al (2019), which produced the smallest ES (0.22 [0.18-0.27]) accompanied by the biggest block with short confidence interval (CI) compared to other studies.
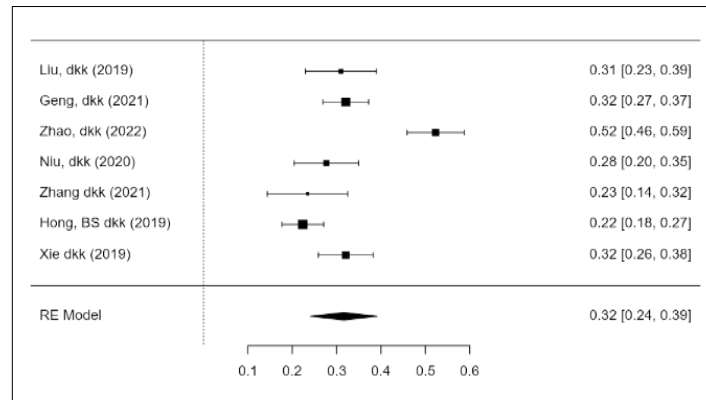
Figure 2. Forest plot of meta-analysis regarding parental phubbing and smartphone addiction

Table 7. Publication Bias Test Results

Test Name	Value	P
Fail-Safe N	1685.000	< .001
Begg and Mazumdar Rank Correlation	-0.143	0.773
Egger's Regression	-0.202	0.840
Trim and Fill Number of Studies	2.000	.
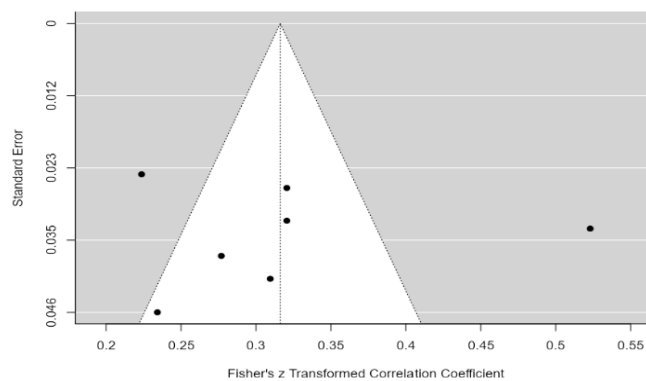
Figure 3. Funnel plot of meta-analysis regarding parental phubbing and smartphone addiction

In addition to the acknowledgment of summary effect, heterogeneity test, and forest plot, this study also identified the possibility of publication bias. This bias can be identified through funnel plots, egger tests, and fail-safe N. The results of the funnel plot (Figure 3) show an asymmetrical pattern, indicating publication bias. However, based on Table 7, the egger test results show the p of >0.05 (p=0.840), an evidence of no publication bias. The fail-safe N analysis resulted in the value of 1685,000, which means that, if there are 1685,000 unpublished studies with insignificant results, the pooled ES will be 0 (no effect). In this case, the result of the effect size (ES) is meaningless because the results of the heterogeneity analysis in Table 5 show a high level of heterogeneity. Similarly, the funnel plot asymmetry cannot be used. After all, less than ten studies obtained in this meta-analysis study (Higgins et al., 2022) have very high different characteristics (Higgins et al., 2019). Hence, what is done next is a narrative synthesis to explain each article.

Discussion

The purpose of this research is to systematically observe the consistency and variability of studies on the relationship between parental phubbing and smartphone addiction in adolescents. Even though the effect size (ES) was concluded to be insignificant so that the consistency of the studies cannot be concluded, we could conduct a qualitative study analysis of the seven existing articles to see their variability. The study by Zhao et al (2022) , which used a random probability sampling technique and collected the data through online surveys, is a study with the largest ES = 0.52 [0.46-0.59] and appearance small block. This result was obtained during the COVID-19 pandemic situation, namely at the beginning of 2021. Therefore, it was very possible for this study to have bias and validity problems in its survey results.

The study that might be more reliable is the research by Hong et al (2019) because the confidence intervals are short (ES=0.22 [0.18-0.27]), but the effect size is the smallest of all studies. The appearance block of this study is the largest, so it can be interpreted that the publication bias is low. Higgins et al (2019) stated that the confidence interval and block in the forest plot show the range of intervention effects in accordance with the results of the study. Its sampling technique was not explained further. Even though it was classified as a cross-sectional study, it carried out its two stages of data collection six months apart. In stage 1 they collected the data for parental phubbing and demographics of research participants. Six months later they collected the data for other variables, namely parent-child relationship, self-esteem, and PMPU (Problematic Mobile Phone Use).

As the study by Geng et al (2021) have the ES of 0.32 [0.27-0.37], the one by Xie et al., (2019) have the ES of 0.32 [0.26-0.38], while the research of Liu et al (2019) have the ES of 0.31 [0.23-0.39], and the study by Niu et al (2020) have the ES of 0.28 [0.20-0.35] and a fairly long CI range, but, still, it give rise to true outcomes with positive results. The data collection method used in these four

studies was not explained in detail. Only two studies, i.e., Xie et al (2019) & Niu et al (2020), explained the sampling technique .

The study by Zhang et al (2021) is the most hesitating study of all because, even though it found a positive correlation, the effect size is very small with the longest CI range of ES=0.23 [0.14-0.32]. In this study, the effect of parental phubbing on parent–adolescent the sample was selected using the random sampling technique, namely the cluster sampling, but this was not accompanied by any explanation regarding the stages involved in the process. In addition, this study also did not elaborate the strategies used to deal with the confounding variables.

Based on the meta-analysis results, a positive correlation with a medium effect size correlation of 0.32 with CI [0.241 -0.392] on the relationship between parental phubbing and smartphone addiction was found. Therefore, parental phubbing is expected to have a moderate effect on smartphone addiction. This means that, if an individual has high parental phubbing, he or she will strongly cause smartphone addiction. Conversely, if an individual has low parental phubbing, he or she will pose an ignorable influence to smartphone addiction. These results are consistent with the results of the correlation studies used in this meta-analysis, which have a positive correlation (Xie et al., 2019; Hong et al., 2019; Liu et al., 2019; Niu et al., 2020; Geng et al., 2021; Zhang et al., 2021; Zhao et al., 2022).

The seven studies included in this meta-analysis research were conducted using Chinese samples, and this may limit the generalization of the findings. Living in a collectivistic culture, Chinese parents have stronger emotional dependence on their children and share more with them, so parental phubbing has an impact on the emergence of smartphone addiction. However, in Western families characterized by individualism, parents and adolescents are relatively independent (Kim et al., 2014 as cited in Xie et al., 2023). The effect of parental phubbing on parent–adolescent relationship quality detected in this study might be weaken when generalized to Western cultures. Therefore, future works on multicultural evaluations should be considered.

The level of heterogeneity in this meta-analysis is categorized as high category with the I^2 of 89.77% ($I^2 > 90\%$). Such heterogeneity can be caused by the small number of studies, the high variations in the characteristics of the respondents, or differences in research methodologies, that can affect their results (Higgins et al., 2022). This meta-analysis can compile only seven articles. This number is relatively few, namely less than ten studies as proposed by Higgins et al (2022), with a varying number of participants but almost the same characteristics of respondents, namely teenagers with an age range of 11 -17 years. It is true that there are three studies that used respondents with different age ranges, namely 10-19 years, 12-18 years and do not include an age range. In terms of research methodology, these seven studies used different types of research, sampling techniques, measurement tools, and data analysis methods (see table 4). There is only one research that use the

longitudinal method; the others two use the cross-sectional method with random and non-random sampling techniques, and the remaining three studies did not explain this. The measurement tools used by those studies also vary. As the Partner Phubbing Scale developed by (Roberts & David, 2016) was mostly used to measure parental phubbing, the Smartphone Addiction Scale developed by (Kwon et al., 2013) was the most common for measuring smartphone addiction in adolescents. For data analysis, the Structural Equation Modeling (SEM) was generally used is those studies.

Parental phubbing has little effect (medium effect category) on smartphone addiction because other factors are thought to have a stronger influence on smartphone addiction. In research conducted by Kwan & Leung (2017) found that secure attachments can inhibit people tendency of overusing smartphones and that insecure attachments can function as a predictor for the possibility of problematic smartphone use. In addition to external factors such as attachment and parental phubbing, internal factors like self-control also need to be taken into account in the context of smartphones in adolescents. Many studies reveal that self-control functions as a negative predictor for various types of addictive behavior, such as alcohol abuse, drug addiction, internet addiction (Ozdemir et al., 2014) and problematic mobile phone use (Kim et al., 2018; Liu et al., 2019)

CONCLUSION

Based on this meta-analysis, various studies conducted by several researchers on the topic of parental phubbing and smartphone addiction in adolescents can obtain some empirical supports. First, the results of this study show that parental phubbing and smartphone addiction have a medium correlation, so it can be said that parental phubbing is not the main factor for smartphone addiction. Second, the heterogeneity of the studies is very high, so we decided not to interpret them as a whole but synthesized the results of each study qualitatively. The heterogeneity is partly caused by the small number of studies, the high variations in the characteristics of the respondents, and differences in research methodologies. Third, the results of the meta-analysis on the seven studies conclude that the research by Hong et al. is the most reliable and that the research by Zhang et al. is the least convincing. Fourth, this meta-analysis is limited by the small number of studies obtained from the search results. Therefore, future researchers are encouraged to be even more extensive in searching the literature. Fifth, future researchers are suggested to include moderating variable (if any) in the meta-analysis process, for example certain characteristics of participants that might cause of heterogeneity, and to use a better meta-analysis design.

REFERENCES

Abdullah, S. M. (2023). The meta-analysis study: Career decision making self efficacy and career maturity. *Insight: Jurnal Ilmiah Psikologi*, *25*(1). https://doi.org/10.26486/psikologi.v25i1.3254

Agusta, D. (2016). Faktor-faktor risiko kecanduan menggunakan smartphone pada siswa di SMK Negeri 1 Kalasan Yogyakarta. *E-Journal Bimbingan Dan Konseling*, *5*(3), 86–96.

Anggreani, N. (2018). Hubungan stres akademik dan self-regulated learning dengan kecanduan jejaring sosial. *Psikoborneo : Jurnal Ilmiah Psikologi*. *6*(2), 158–159.

APJII. (2023). *Metode survei dan sebaran responden penggunaan mobile internet tingkat penetrasi internet penggunaan fixed broadband perilaku penggunaan internet akses konten internet daftar isi*. https://survei.apjii.or.id/home

Aulyah, I., & Isrofin, B. (2020). Hubungan harga diri dan fear of missing out dengan smartphone addiction mahasiswa universitas negeri semarang. *Indonesian Journal of Counseling and Development*, *2*(2), 132–142. https://doi.org/10.32939/ijcd.v1i2.596

Cahyadi N. (2018, November 12). *Phubbing smombie dan nomophobia*. DISDIK Purwakarta. https://disdik.purwakartakab.go.id/phubbing-smombie-dan-nomophobia?phubbing-smombie-dan-nomophobia

Cha, S.-S., & Seo, B.-K. (2018). Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. *Health Psychology Open*, *5*(1), 205510291875504. https://doi.org/10.1177/2055102918755046

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Routledge. https://doi.org/10.4324/9780203771587

Geng, J., Lei, L., Ouyang, M., Nie, J., & Wang, P. (2021). The influence of perceived parental phubbing on adolescents' problematic smartphone use: A two-wave multiple mediation model. *Addictive Behaviors*, *121*. https://doi.org/10.1016/j.addbeh.2021.106995

Grote, L. F., Kothgassner, O. D., & Felnhofer, A. (2019). Risk factors for problematic smartphone use in children and adolescents: A review of existing literature. *Neuropsychiatrie*, *33*(4),179–190. Springer Medizin. https://doi.org/10.1007/s40211-019-00319-8

Higgins, J. P. T., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses testing for heterogeneity. *BMJ, 327*.

Higgins, J., Thomas, J., Chandler, J., Cumpston, M., Li, T., & Page, M. (2022). *Cochrane handbook for systematic reviews of interventions (Welch VA, Ed.; Version 6.3)*. www.training.cochrane.org/handbook

Higgins, J., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J., & Welch, V. A. (2019). Cochrane handbook for systematic reviews of interventions. In *Cochrane Handbook for Systematic Reviews of Interventions*. Wiley. https://doi.org/10.1002/9781119536604.fmatter

Hong, W., Liu, R. De, Ding, Y., Oei, T. P., Zhen, R., & Jiang, S. (2019). Parents' phubbing and problematic mobile phone use: the roles of the parent-child relationship and children's self-

esteem. *Cyberpsychology, Behavior, and Social Networking*, *22*(12), 779–786. https://doi.org/10.1089/cyber.2019.0179

Khan, N. F., & Khan, M. N. (2022). A bibliometric analysis of peer-reviewed literature on smartphone addiction and future research agenda. *Asia-Pacific Journal of Business Administration*, *14*(2), 199–222. https://doi.org/10.1108/APJBA-09-2021-0430

Kim, H. J., Min, J. Y., Min, K. B., Lee, T. J., & Yoo, S. (2018). Relationship among family environment, self-control, friendship quality, and adolescents' smartphone addiction in South Korea: Findings from nationwide data. *PLoS ONE*, *13*(2). https://doi.org/10.1371/journal.pone.0190896

Kwan, H. C., & Leung, M. T. (2017). The structural model in parenting style, attachment style, self-regulation and self-esteem for smartphone addiction. *Journal Psychology and Behavioral Sciences*, *3*(1), 85–103.

Kwon, M., Lee, J. Y., Won, W. Y., Park, J. W., Min, J. A., Hahn, C., Gu, X., Choi, J. H., & Kim, D. J. (2013). Development and validation of a smartphone addiction scale (SAS). *PLoS ONE*, *8*(2). https://doi.org/10.1371/journal.pone.0056936

Lee, E. J., & Kim, H. S. (2018). Gender differences in smartphone addiction behaviors associated with parent-child bonding, parent-child communication, and parental mediation among Korean elementary school students. *Journal of Addictions Nursing*, *29*(4), 244–254. https://doi.org/10.1097/JAN.0000000000000254

Lee, H., Kim, J. W., & Choi, T. Y. (2017a). Risk factors for smartphone addiction in Korean adolescents: Smartphone use patterns. *Journal of Korean Medical Science*, *32*(10), 1674–1679. https://doi.org/10.3346/jkms.2017.32.10.1674

Lee, H., Kim, J. W., & Choi, T. Y. (2017b). Risk factors for smartphone addiction in Korean adolescents: Smartphone use patterns. *Journal of Korean Medical Science*, *32*(10), 1674. https://doi.org/10.3346/jkms.2017.32.10.1674

Liu, R. De, Wang, J., Gu, D., Ding, Y., Oei, T. P., Hong, W., Zhen, R., & Li, Y. M. (2019). The effect of parental phubbing on teenager's mobile phone dependency behaviors: The mediation role of subjective norm and dependency intention. *Psychology Research and Behavior Management*, *12*, 1059–1069. https://doi.org/10.2147/PRBM.S224133

Liu, K., Chen, W., & Lei, L. (2020). Withdrawn: The defensive or disruptive role of attachment style on preparing teens to cope with parental phubbing. *Children and Youth Services Review, Published Online*. https://doi.org/https://doi.org/10.1016/j.childyouth.2020.104932

Liu, Q. Q., Yang, X. J., Hu, Y. T., Zhang, C. Y., & Nie, Y. G. (2020). How and when is family dysfunction associated with adolescent mobile phone addiction? Testing a moderated mediation model. *Children and Youth Services Review*, *111*. https://doi.org/10.1016/j.childyouth.2020.104827

McDaniel, B. T. (2019). Parent distraction with phones, reasons for use, and impacts on parenting and child outcomes: A review of the emerging research. *Human Behavior and Emerging Technologies*, *1*(2), 72–80. https://doi.org/10.1002/hbe2.139

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., Antes, G., Atkins, D., Barbour, V., Barrowman, N., Berlin, J. A., Clark, J., Clarke, M., Cook, D., D'Amico, R., Deeks, J. J., Devereaux, P. J.,

Dickersin, K., Egger, M., Ernst, E., Gøtzsche, P. C., … Tugwell, P. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, *6*(7). https://doi.org/10.1371/journal.pmed.1000097

Niu, G., Yao, L., Wu, L., Tian, Y., Xu, L., & Sun, X. (2020). Parental phubbing and adolescent problematic mobile phone use: The role of parent-child relationship and self-control. *Children and Youth Services Review*, *116*. https://doi.org/10.1016/j.childyouth.2020.105247

Ozdemir, Y., Kuzucu, Y., & Ak, Ş. (2014). Depression, loneliness and Internet addiction: How important is low self-control? *Computers in Human Behavior*, *34*, 284–290. https://doi.org/10.1016/j.chb.2014.02.009

Park, N., & Lee, H. (2014). *Nature of youth smartphone addiction in korea diverse dimensions of smartphone use and individual traits*. 100–132. http://icr.snu.ac.kr/jcr서울대학교언론정보연구소

Pluye, P., Robert, E., Cargo, M., Barlett, G., O'Cathain, A., Griffiths, F., Gagnon, M. P., & Rousseau, M. C. (2018). *Mixed Methods Appraisal Tool (MMAT)—Version 2018*. http://mixedmethodsappraisaltoolpublic.pbworks.com/w/page/24607821/FrontPage

Rahmayani, I. (2015, October 2). Indonesia raksasa teknologi digital Asia. *Kominfo*. https://www.kominfo.go.id/content/detail/6095/indonesia-raksasa-teknologi-digital-asia/0/sorotan_media

Riyanto, G. P., & Nistanto, R. K. (2021, February 23). Jumlah pengguna internet Indonesia 2021 tembus 202 juta. *Kompas*. https://tekno.kompas.com/read/2021/02/23/16100057/jumlah-pengguna-internet-indonesia-2021-tembus-202-juta

Roberts, J. A., & David, M. E. (2016). My life has become a major distraction from my cell phone: Partner phubbing and relationship satisfaction among romantic partners. *Computers in Human Behavior*, *54*, 134–141. https://doi.org/10.1016/j.chb.2015.07.058

Sedgwick, P. (2015). How to read a forest plot in a meta-analysis. *BMJ (Clinical Research Ed.)*, *351*, https://doi.org/10.1136/bmj.h4028

Shin, C., Hong, J. H., & Dey, A. K. (2012). Understanding and prediction of mobile application usage for smart phones. *UbiComp'12 - Proceedings of the 2012 ACM Conference on Ubiquitous Computing*, 173–182. https://doi.org/10.1145/2370216.2370243

Sterne, J. A. C., & Egger, M. (2001). Funnel plots for detecting bias in meta-analysis: Guidelines on choice of axis. *Journal of Clinical Epidemiology*, *54*, 1046–1055.

Terras, M. M., & Ramsay, J. (2016). Family digital literacy practices and children's mobile phone use. *Frontiers in Psychology*, *7*(DEC). https://doi.org/10.3389/fpsyg.2016.01957

Waty, L. P., & Fourianalistyawati, E. (2018). Dinamika kecanduan telepon pintar (smartphone) pada remaja dan trait mindfulness sebagai alternatif solusi. *Seurune Jurnal Psikologi Unsyiah*, *1*(2).

Xie, J., Luo, Y., & Chen, Z. (2023). Relationship between partner phubbing and parent–adolescent relationship quality: A family-based study. *International Journal of Environmental Research and Public Health*, *20*(1). https://doi.org/10.3390/ijerph20010304

Xie, X., Chen, W., Zhu, X., & He, D. (2019). Parents' phubbing increases adolescents' mobile phone addiction: Roles of parent-child attachment, deviant peers, and gender. *Children and Youth Services Review*, *105*. https://doi.org/10.1016/j.childyouth.2019.104426

Zhang, Y., Ding, Q., & Wang, Z. (2021). Why parental phubbing is at risk for adolescent mobile phone addiction: A serial mediating model. *Children and Youth Services Review*, *121*. https://doi.org/10.1016/j.childyouth.2020.105873

Zhao, J., Ye, B., Luo, L., & Yu, L. (2022). The Effect of parent phubbing on Chinese adolescents' smartphone addiction during covid-19 pandemic: testing a moderated mediation model. *Psychology Research and Behavior Management*, *15*, 569–579. https://doi.org/10.2147/PRBM.S349105