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Original Research Paper

Impact of intergenerational community health intervention on adolescents' views of older adults in Yogyakarta

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Abstract
Low adolescent participation hinders the effectiveness of the Youth Integrated Health Post (Posyandu Remaja). This study evaluates the impact of the NGAJENI Program—an intergenerational intervention based on health education, physical activity, and collaborative arts—on adolescents' perceptions of the elderly and the significance and magnitude of these changes. A cluster quasi-experimental design was implemented in two kelurahan of Mergangsan Sub District, Yogyakarta. Thirty-seven adolescents aged 15–24 years were purposively sampled and allocated by cluster to the intervention group (n = 20) or control group (n = 17). The intervention spanned 3 month and comprised six 90-minute sessions. Perception was measured via a validated 12-item Likert scale (score range 12–60; Cronbach's $\alpha = 0.89$) at pre- and post-intervention. Within-group changes were examined using paired t-tests, between-group differences in change scores (Δ) with independent t-tests, and effect sizes calculated by Cohen's d. Baseline demographics were comparable (all $p > 0.05$). The intervention group's mean perception score increased from 40.20 ± 4.15 to 47.10 ± 3.80 ($\Delta = 6.90$; paired $t = -8.32$; $p < 0.001$; $d = 1.73$), while the control group's score rose from 39.85 ± 4.30 to 42.35 ± 4.05 ($\Delta = 2.50$; paired $t = -3.12$; $p = 0.006$; $d = 0.60$). Independent t-test confirmed significantly greater perceptual change in the intervention cohort ($t = 3.97$; $p < 0.001$). The NGAJENI program significantly improves adolescents' perceptions of the elderly and strengthens intergenerational solidarity at the Youth Posyandu.

Keyword: adolescent perception; community health; intergenerational intervention; Posyandu Remaja; quasi-experimental

1. Introduction

Adolescent engagement in community health services remains a global challenge, particularly in settings designed to promote preventive and promotive well-being (WHO, 2024). In Indonesia, Posyandu Remaja (youth-integrated community health posts) aim to address this gap by offering health education, counseling, and screening for adolescents aged 15–24 years. Yet, participation rates hover below 40 % in many regions, undermining the potential impact of these services on youth health outcomes (Jarrott et al., 2021). Factors contributing to low attendance include perceived irrelevance of program content, lack of intrinsic motivation (Rohmayani, 2024), and limited capacity among community cadres to design engaging activities (Dewi et al., 2025).

Despite the proven benefits of intergenerational programs in fostering empathy, social connectedness, and well-being among adolescents, scant research has explored their integration into Posyandu Remaja (Di Martino et al., 2024). Most intergenerational studies focus on school-based (Murray et al., 2025), residential care settings (Meliyanti et al., 2024), with few examining structured interaction between youth and older adults within community health post frameworks.A Programs that

integrate shared goals and reciprocal activities have consistently demonstrated the most significant positive outcomes for youth; however, the effectiveness of such models within the context of Posyandu Remaja has yet to be explored (Petersen, 2023). This literature gap limits evidence-based guidance for public health nurses and policy-makers aiming to enhance youth participation in community health services (Mardiani et al., 2025).

Theoretical underpinnings from Self-Determination Theory (SDT) suggest that fulfilling basic psychological needs autonomy, competence, and relatedness strengthens intrinsic motivation, leading to sustained engagement in health behaviors (Guay, 2022). In intergenerational contexts, opportunities for meaningful collaboration can satisfy adolescents' need for relatedness and competence, while granting them autonomy in choosing activities. For example, the TriGen pilot in Singapore demonstrated that multimodal intergenerational learning increased youths' self-efficacy and social inclusion through jointly designed projects (Ngiam et al., 2022). Similarly, realist reviews highlight that shared decision-making and co-creation of goals are critical mechanisms driving youth motivation in intergenerational programs (Sixsmith et al., 2023).

Building on these insights, Program NGAJENI (*Ngajak Intergenerasi Jadi Inspirasi/Inviting Intergenerations to Become Inspiration*) integrates health education with collaborative physical activities and creative art projects, structured to foster reciprocal interactions between adolescents and older adults (Rohmawati et al., 2024). By aligning activities with SDT principles providing choices in creative tasks (autonomy), skill-building through guided art and exercise sessions (competence), and emotional connection via paired mentorship (relatedness) NGAJENI seeks to transform Posyandu Remaja into a dynamic platform for intergenerational solidarity and youth empowerment. Preliminary pilot data indicate positive shifts in participants' attitudes and attendance rates, but rigorous evaluation is needed to confirm effectiveness.

Against this backdrop, the current study aims to fill the critical research gap by empirically examining changes in adolescents' perceptions of older adults following a quasi-experimental intergenerational intervention within Posyandu Remaja. By integrating SDT-driven design features and implementing a cluster quasi-experimental framework, this study will provide robust evidence on the potential of intergenerational models to revitalize youth engagement in community health settings and, ultimately, inform scalable strategies for Posyandu Remaja nationwide. Practically, findings from this research can guide community health nurses and policymakers in designing and implementing intergenerational activities that not only enhance adolescent participation but also foster sustainable partnerships between youth and older adults at Posyandu.

2. Research Methods

This study employed a cluster quasi-experimental design with pre-post testing and non-randomized control to evaluate the impact of Program NGAJENI on adolescents' perceptions of older adults within Posyandu Remaja in Mergangsan Sub District, Yogyakarta City. Two Posyandu were purposively selected as clusters based on comparable demographic profiles and accessibility: Posyandu A as the intervention cluster and Posyandu B as the control cluster.

2.1.Sampling and Participants

From an estimated 120 eligible adolescents registered across two Posyandu Remaja sites in Mergangsan, Yogyakarta, thirty-seven young people (aged 10–19 years) who were active members, had no prior intergenerational program experience, and were physically and cognitively able to participate each having provided written informed consent and committed to attend all six sessions and complete pre- and post-tests were enrolled. Recruitment was facilitated by community health cadres, who informed both adolescents and their guardians about the study's objectives and procedures. To minimize

contamination, two clusters were predetermined by kelurahan: Posyandu A served as the intervention site (n = 20) and Posyandu B as the control site (n = 17). Within each cluster, purposive sampling ensured representation across age brackets, gender, and schooling status. Although an a priori power analysis for a large effect size (d = 0.8), 80 % power, and α = 0.05 suggested a need for approximately 26 participants per group, logistical constraints including cadre availability and the finite cluster populations limited the sample to 37; this nevertheless provided sufficient power (> 0.75) to detect large intervention effects. This recruitment process thus combined rigorous inclusion criteria, cluster quasi-experimental design, and pragmatic field considerations to yield a robust and feasible sample for evaluating Program NGAJENI's impact.

2.2.Intervention and Control Conditions

Program NGAJENI spanned 3 month and included six structured sessions (90 minutes each), delivered twice a month by trained community nursing faculty and Posyandu cadres. Sessions 1–2 focused on interactive health education about the role and benefits of Posyandu Remaja; Sessions 3–4 involved paired physical activities with older adults (light exercise and community walks); Sessions 5–6 consisted of collaborative art projects (drawing and handcrafted items) designed and executed by adolescent–elder dyads. The control group continued their standard monthly Posyandu Remaja activities without intergenerational components.

2.3.Ethical Considerations

All participants and their legal guardians signed written informed consent forms prior to data collection. Confidentiality was maintained by assigning unique codes to each participant; no identifying information was stored with the data. Participants were free to withdraw at any time without penalty.

2.4.Instruments and Data Collection

Changes in perception were measured using a 12-item Likert questionnaire (score range 12–60), previously validated by four expert reviewers in community nursing (Content Validity Index = 0.90) and piloted on 15 adolescents (Cronbach's α = 0.89). The instrument assessed dimensions of respect, empathy, and willingness to engage with older adults. Demographic data (age, gender, education level, and residence type) were collected at baseline using a standardized form. Pre-test administration occurred one week before the first intervention session; post-test occurred one week after the final session. Trained research assistants supervised questionnaire completion to ensure accuracy and completeness.

2.5.Data Analysis and Effect Size Calculation

Statistical analyses were conducted to evaluate data distribution and intervention effects. Normality of the pre- and post-test perception scores was assessed using Shapiro–Wilk tests (α = 0.05), which indicated that both sets of scores were normally distributed. Homogeneity of variances between groups was confirmed via Levene's test. Changes within each group were analyzed with paired t-tests, while differences in change scores (Δ = Post − Pre) between the intervention and control groups were examined using two-tailed independent t-tests ($p < 0.05$). Descriptive statistics means, standard deviations, frequencies, and percentages were used to summarize participant characteristics..

$$d = \frac{M_{\text{post}} - M_{\text{pre}}}{SD_{\text{pooled}}} \quad \text{with} \quad SD_{\text{pooled}} = \sqrt{\frac{SD_{\text{pre}}^2 + SD_{\text{post}}^2}{2}}.$$

Where Mpre and Mpost are the mean perception scores before and after the intervention, and SDpre

and SDpost are their respective standard deviations. A *d* value of 0.2, 0.5, and 0.8 was interpreted as small, medium, and large effect sizes, respectively (Aberson, 2019).

By implementing a cluster quasi-experimental design with robust sampling, validated instruments, ethical oversight, and effect size estimation, this methodology ensures reliable assessment of Program NGAJENI's efficacy in enhancing adolescents' perceptions of older adults within community health settings.

3. Results and Discussion

3.1. Result

A total of 37 adolescents participated in the study: 20 in the NGAJENI intervention cluster and 17 in the control cluster. No participants were lost to follow-up. Table 1 summarizes the socio-demographic characteristics of both groups, demonstrating comparability across key variables.

Table 1. Socio-Demographic Characteristics of Participants

Variable	Intervention (n = 20)	Control (n = 17)	Test Statistic	p-Value
Age, mean ± SD (years)	17.3 ± 2.1	17.8 ± 1.9	t = –0.57	0.574
Gender, n (%)			$\chi^2 = 0.00$	1.000
Male	8 (40 %)	7 (41 %)		
Female	12 (60 %)	10 (59 %)		
Education Level, n (%)			$\chi^2 = 0.39$	0.532
SMP (Junior high)	3 (15 %)	2 (12 %)		
SMA (Senior high)	16 (80 %)	14 (82 %)		
Diploma	1 (5 %)	1 (6 %)		
Residence Type, n (%)			$\chi^2 = 0.12$	0.727
With family	17 (85 %)	14 (82 %)		
Dormitory/Other	3 (15 %)	3 (18 %)		

Both groups were well-matched at baseline, with no significant differences in age, gender distribution, education level, or living arrangements (all $p > 0.05$). This balance supports attributing subsequent changes in perception to the NGAJENI intervention rather than demographic confounders.

3.1.1. Change in Perception Scores

Perception of older adults was measured using a 12-item Likert scale (12–60 points). Table 2 displays the pre- and post-intervention scores, paired *t*-test statistics, and effect sizes (Cohen's *d*) for both groups.

Table 2. Pre- and Post-Test Perception Scores, Paired t-Test, and Cohen's d

Group	Mean Pre ± SD	Mean Post ± SD	Mean Δ	Paired *t*	p-value	Cohen's *d*
Intervention	40.20 ± 4.15	47.10 ± 3.80	6.90	–8.32	< 0.001	1.73
Control	39.85 ± 4.30	42.35 ± 4.05	2.50	–3.12	0.006	0.60

Within-group analyses (Table 2) show that the intervention group's mean perception score increased from 40.20 ± 4.15 to 47.10 ± 3.80, yielding a mean Δ of 6.90 (paired $t = –8.32$, $p < 0.001$) and a very large effect size (Cohen's $d = 1.73$). In contrast, the control group's score rose from 39.85 ± 4.30 to 42.35 ± 4.05 (mean Δ = 2.50; paired $t = –3.12$, $p = 0.006$), corresponding to a medium effect size (Cohen's $d = 0.60$). An independent *t*-test on these change scores confirmed that the intervention's improvement (Δ = 6.90) was significantly greater than the control's (Δ = 2.50; $t = 3.97$, $p < 0.001$), underscoring the superior efficacy of the NGAJENI intergenerational program.

3.1.2. Item-Level Analysis

Further examination at the item level showed that the largest gains in the intervention group occurred on statements related to "willingness to spend time with older adults" (mean increase = 1.2 points) and "empathy towards age-related challenges" (mean increase = 1.1 points). Smaller yet significant improvements (mean increase = 0.8–1.0 points) were observed across items assessing respect, communication comfort, and perceived value of older adults' life experiences (all $p < 0.01$). In contrast, the control group exhibited non-uniform improvements, with only 6 of 12 items reaching statistical significance ($p < 0.05$).

Table 3. Item-Level Mean Scores and Change (Intervention vs. Control)

Item	Group	Mean Pre ± SD	Mean Post ± SD	Δ	p-Value
Willingness to spend time with older adults	Intervention	3.4 ± 0.6	4.6 ± 0.5	1.2	< 0.001
	Control	3.5 ± 0.7	3.9 ± 0.6	0.4	0.042
Empathy toward age-related challenges	Intervention	3.6 ± 0.7	4.7 ± 0.5	1.1	< 0.001
	Control	3.7 ± 0.6	4.0 ± 0.6	0.3	0.048
Respectfulness toward older adults	Intervention	3.8 ± 0.5	4.6 ± 0.4	0.8	0.003
	Control	3.9 ± 0.6	4.1 ± 0.5	0.2	0.105
Comfort in communicating with older adults	Intervention	3.7 ± 0.6	4.5 ± 0.5	0.8	0.005
	Control	3.8 ± 0.7	4.0 ± 0.6	0.2	0.112
Perceived value of older adults' life experiences	Intervention	3.5 ± 0.6	4.4 ± 0.5	0.9	0.002
	Control	3.6 ± 0.7	3.8 ± 0.6	0.2	0.130

3.1.3. Attendance and Retention

Attendance logs showed 95 % session attendance in the intervention group and 88 % participation in routine Posyandu sessions for the control group. Retention at post-test was 100 % in both groups, indicating high feasibility and acceptability of the intergenerational activities.

3.1.4. Adverse Events and Acceptability

No adverse events were reported. Post-study satisfaction surveys (n = 20 intervention participants) indicated that 90 % found the intergenerational sessions enjoyable and 85 % felt more connected to the older adult community. These qualitative indicators align with the robust quantitative gains in perception.

The NGAJENI intergenerational intervention produced substantial and statistically significant improvements in adolescents' perceptions of older adults, with a very large effect size (Cohen's $d = 1.73$) compared to moderate change in the control group ($d = 0.60$). Balanced baseline demographics, high attendance, and positive acceptability further strengthen the validity and potential for scaling this model in community health contexts.

3.2. Discussion

The present study demonstrated that the NGAJENI intergenerational intervention significantly improved adolescents' perceptions of older adults yielding a very large effect size (Cohen's $d = 1.73$) compared to a moderate effect in the control group ($d = 0.60$) directly answering our first research

question on whether an SDT-informed intergenerational program can shift youth attitudes. These substantial gains ($\Delta = 6.90$) and uniform item-level improvements align with existing evidence that structured reciprocal activities foster empathy and social connectedness among young participants (Kirsh et al., 2021). By pairing art and exercise sessions, co-creating projects, and granting choice in topics, NGAJENI fulfilled adolescents' needs for relatedness, competence, and autonomy precisely as Self-Determination Theory predicts for environments that support basic psychological needs to generate intrinsic motivation and durable attitude change (Dolan, 2022). Moreover, the pronounced improvements on empathy and willingness-to-engage items indicate that this goal-sharing framework not only enhanced cognitive understanding of aging but also translated into concrete behavioral intentions, thus validating our second research question regarding the mechanism of change and offering a robust model for scalable community health promotion (Kim & Chung, 2022).

Self-Determination Theory (SDT) provides a robust framework for interpreting these findings. By satisfying adolescents' needs for autonomy, competence, and relatedness, NGAJENI likely enhanced intrinsic motivation (Guay, 2022). In particular, granting youth choice in creative tasks (autonomy) and mastering art/exercise skills (competence) within supportive dyads (relatedness) mirrors SDT's pathways to sustained engagement. This theoretical mechanism was similarly invoked by Tan, Lee, and Chua (2020) in the TriGen pilot, where multimodal intergenerational learning elevated youths' self-efficacy and belonging (Leung et al., 2022).

Item-level analyses revealed the strongest improvements in adolescents' willingness to spend time with older adults and their empathy toward age-related challenges. These specific gains align with previous findings indicating that direct, cooperative aging-related activities are more effective than informational sessions alone in reducing ageist stereotypes (Leung et al., 2022). Furthermore, comparable increases in intergenerational empathy have been observed when adolescents engage in shared storytelling activities with older adults, highlighting that active participation is more effective than passive observation in fostering positive attitude change(Shen, 2023).

Attendance and retention rates exceeded 90%, indicating strong feasibility and acceptability of the program. This finding is consistent with evidence that intergenerational programs offering a diverse portfolio of activities sustain higher levels of youth engagement compared to single-modality interventions (Steward et al., 2023). The 95% session attendance observed in the NGAJENI program notably exceeds the typical attrition rates of 20–30% reported in similar community-based studies, highlighting the attractiveness of integrating health education, physical exercise, and creative collaboration (Mondal et al., 2019).

Qualitative satisfaction data further underscore the psychological benefits of the intervention. Ninety percent of participants described the sessions as "enjoyable," supporting the notion that enjoyment serves as a key mediator of sustained program adherence (Jiang & Xiao, 2024). Similarly, adolescent participants in intergenerational digital literacy programs have reported valuing the mutual teaching dynamic, which mirrors NGAJENI's peer mentor model in which older adults and youth engage in reciprocal skill and perspective exchange (Perim et al., 2024).

From a public health perspective, improving youth perceptions of elders holds significant practical implications. Just as prior research has shown that individuals' behaviors and habits are strongly shaped by their environment such as the social settings that influence adolescent smoking (e.g., family and peer smoking norms) the reciprocal determinism framework suggests that behaviors and attitudes evolve through interaction with one's environment (Aristi et al., 2024). In the context of NGAJENI, the structured intergenerational environment served as a powerful cue and reinforcement mechanism that modulated adolescents' habitual attitudes toward older adults. Positive intergenerational attitudes have been associated with increased willingness to support community health initiatives (Peters et al., 2021) and a higher likelihood of volunteering in elder-care programs (Cheng et al., 2022). Therefore, by

embedding adolescents in enriched social settings that promote cooperative art, co-created goals, and physical activities alongside elders, NGAJENI reshaped their normative environment. It not only improved abstract perception scores but also encouraged behavioral intentions consistent with civic engagement. This process mirrors how environmental design can influence habits: just as a pro-tobacco environment normalizes smoking, a pro-intergenerational environment can normalize respect, empathy, and mutual action reinforcing positive youth participation in community health systems and strengthening intergenerational solidarity.

Nevertheless, limitations warrant consideration. The quasi-experimental cluster design, while ecologically valid, precludes random assignment and may introduce selection bias(Miller et al., 2020). Future studies should employ randomized controlled trials to confirm causal relationships. Additionally, the 3 month intervention period limits insights into long-term sustainment; longitudinal follow-ups at 6 and 12 months are recommended to assess durability of perceptual shifts (Herlitz et al., 2020).

Finally, although our sample was demographically representative of Yogyakarta City youth population, replication in rural or under-resourced settings is needed to test generalizability (Freeman et al., 2020). Integrating digital intergenerational components such as virtual art collaborations might further enhance reach and adaptability(Wu, 2021).

In summary, the NGAJENI program effectively transforms adolescents' perceptions of older adults by leveraging SDT principles within a structured, multimodal intergenerational framework. These findings contribute to the limited yet growing body of literature on intergenerational health promotion and offer a scalable model for revitalizing youth engagement in community health settings.

4. Conclusion

In this cluster quasi-experimental study, the NGAJENI intergenerational intervention produced substantial improvements in adolescents' perceptions of older adults within Posyandu Remaja, with a very large effect size (Cohen's $d = 1.73$) compared to a medium effect in the control group ($d = 0.60$). By integrating health education, paired physical activities, and collaborative art projects each designed to satisfy autonomy, competence, and relatedness needs the program successfully fostered empathy, respect, and willingness to engage with elders. High attendance (95 %) and universal retention underscore both feasibility and acceptability. These findings highlight the potential of SDT-informed, multimodal intergenerational models to revitalize youth involvement in community health services and strengthen intergenerational solidarity. For practice, community health nurses and Posyandu coordinators should incorporate structured intergenerational activities such as paired mentoring, collaborative projects, and shared goal setting into routine programming to boost adolescent participation and mutual social support. At the policy level, health authorities and local governments are encouraged to allocate resources and develop guidelines for scaling up intergenerational initiatives across Posyandu sites, ensuring sustainability through training, monitoring, and integration into broader adolescent health promotion frameworks.

Several constraints temper the generalizability of our results. First, the non-randomized cluster assignment may introduce selection bias; future randomized trials are needed to confirm causality. Second, the short intervention duration (3 month) precludes assessment of long-term maintenance of perceptual changes longitudinal follow-up at 6–12 months is recommended. Third, the study was conducted in urban Yogyakarta City and may not reflect rural or socioeconomically diverse contexts; replication across varied settings will clarify external validity. Finally, although quantitative gains were robust, qualitative insights into the lived experiences of participants were limited; incorporating in-depth interviews or focus groups in subsequent research would enrich understanding of underlying mechanisms and inform program refinement.

By addressing these limitations, future studies can build on the promising evidence for NGAJENI

and support scalable, sustainable intergenerational strategies in community health promotion.

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References

Aberson, C. L. (2019). *Applied power analysis for the behavioral sciences*. Routledge.

Aristi, M. A., Hastuti, A. S. O., & Nugraha, D. A. (2024). Relationship of environmental factors with smoking behavior in students. *International Journal of Health Science and Technology*, *6*(1), 55–61. https://doi.org/10.31101/ijhst.v6i1.3591

Cheng, H.-L., Lam, S. C., Cruz, J. P., Almazan, J. U., Machuca-Contreras, F. A., Cecily, H. S. J., Rady, H. E. A. E. A., Papathanasiou, I. V., Ghrayeb, F., Qtait, M., Liu, X.-L., & Balay-odao, E. M. (2022). Willingness to care for older people and associated factors in pre-registered student nurses: A multi-country survey study. *Nurse Education Today*, *110*, 105279. https://doi.org/10.1016/j.nedt.2022.105279

Dewi, N. K. D. L., Parwati, N. W. M., & Darmayanti, P. A. R. (2025). Faktor-Faktor yang Berhubungan dengan Tingkat Kehadiran Remaja dalam Kegiatan Posyandu Remaja di Wilayah Kerja Puskesmas Kuta Selatan. *Jurnal Formil (Forum Ilmiah) Kesmas Respati*, *10*(1), 14–27.

Di Martino, G., Della Valle, C., Centorbi, M., Buonsenso, A., Fiorilli, G., Crova, C., di Cagno, A., Calcagno, G., & Iuliano, E. (2024). Bridging Generations Through Movement:"How and Why" Intergenerational Programs Operate—A Systematic and Narrative Review. *Geriatrics*, *9*(6), 139.

Dolan, P. (2022). Social support, empathy, social capital and civic engagement: Intersecting theories for youth development. *Education, Citizenship and Social Justice*, *17*(3), 255–267.

Freeman, S., Marston, H. R., Olynick, J., Musselwhite, C., Kulczycki, C., Genoe, R., & Xiong, B. (2020). Intergenerational Effects on the Impacts of Technology Use in Later Life: Insights from an International, Multi-Site Study. *International Journal of Environmental Research and Public Health*, *17*(16), 5711. https://doi.org/10.3390/ijerph17165711

Guay, F. (2022). Applying self-determination theory to education: Regulations types, psychological needs, and autonomy supporting behaviors. *Canadian Journal of School Psychology*, *37*(1), 75–92.

Herlitz, L., MacIntyre, H., Osborn, T., & Bonell, C. (2020). The sustainability of public health interventions in schools: A systematic review. *Implementation Science: IS*, *15*(1), 4. https://doi.org/10.1186/s13012-019-0961-8

Jarrott, S. E., Scrivano, R. M., Park, C., & Mendoza, A. N. (2021). Implementation of evidence-based practices in intergenerational programming: A scoping review. *Research on Aging*, *43*(7–8), 283–293.

Jiang, Y., & Xiao, Y. (2024). The association between family physical activity environment and exercise adherence in adolescents: A chain mediation model. *Scientific Reports*, *14*(1), 22117. https://doi.org/10.1038/s41598-024-72964-1

Kim, J., & Chung, S. (2022). Is an Intergenerational Program Effective in Increasing Social Capital among Participants? A Preliminary Study in Korea. *Sustainability*, *14*(3), Article 3.

https://doi.org/10.3390/su14031796

Kirsh, E., Frydenberg, E., & Deans, J. (2021). Benefits of an intergenerational program in the early years. *Journal of Early Childhood Education Research*, *10*(2), 140–164.

Leung, Y. C. G., Yao Yi Ng, K., Yow, K. S., Ngiam, N. H. W., Yeo, D. G. D., Jie-Yin Tey, A., Si Rui Lim, M., Kai Wen Tang, A., Chew, B. H., Tham, C., Yeo, J. Q., Lau, T. C., Wong, S. F., Choon-Huat Koh, G., & Wong, C. H. (2022, October 1). *Impact of a longitudinal student-initiated home visit programme on interprofessional education. | EBSCOhost*. https://doi.org/10.29060/TAPS.2022-7-4/OA2785

Mardiani, D. P., Najwa, F., Mardliyah, S., Nugroho, R., & Setiawan, A. (2025). *Posyandu Remaja as an Advance Step in Improving Healthy Living Skills*. 1710–1719. https://doi.org/10.2991/978-2-38476-317-7_161

Meliyanti, F., Astriana, W., & Haryanto, E. (2024). Analisis Tingkat Kehadiran Remaja Di Posyandu Remaja. *Babul Ilmi Jurnal Ilmiah Multi Science Kesehatan*, *16*(1).

Miller, C. J., Smith, S. N., & Pugatch, M. (2020). Experimental and quasi-experimental designs in implementation research. *Psychiatry Research*, *283*, 112452. https://doi.org/10.1016/j.psychres.2019.06.027

Mondal, R., Sarker, R. C., Acharya, N. P., & Banik, P. C. (2019). Effectiveness of health education-based conventional intervention method to reduce noncommunicable diseases risk factors among rural population. *Cardiovascular Diagnosis and Therapy*, *9*(1), 30–34. https://doi.org/10.21037/cdt.2018.10.09

Murray, L., Church, A., Young, S., Liu, S., Eadie, P., & Page, J. (2025). What is the evidence of young children's learning in intergenerational programs? A scoping review of the literature. *Journal of Intergenerational Relationships*, 1–19.

Ngiam, N. H. W., Yee, W. Q., Teo, N., Yow, K. S., Soundararajan, A., Lim, J. X., Lim, H. A., Tey, A., Tang, K. W. A., & Tham, C. Y. X. (2022). Building digital literacy in older adults of low socioeconomic status in Singapore (project wire up): Nonrandomized controlled trial. *Journal of Medical Internet Research*, *24*(12), e40341.

Perim, C., Sousa, C., & Damásio, M. J. (2024). Game-Based Learning for Fostering Digital Literacy in Older Adults: An Intergenerational Approach. In Q. Gao & J. Zhou (Eds.), *Human Aspects of IT for the Aged Population* (pp. 242–260). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-61543-6_18

Peters, R., Ee, N., Ward, S. A., Kenning, G., Radford, K., Goldwater, M., Dodge, H. H., Lewis, E., Xu, Y., Kudrna, G., Hamilton, M., Peters, J., Anstey, K. J., Lautenschlager, N. T., Fitzgerald, A., & Rockwood, K. (2021). Intergenerational Programmes bringing together community dwelling non-familial older adults and children: A Systematic Review. *Archives of Gerontology and Geriatrics*, *94*, 104356. https://doi.org/10.1016/j.archger.2021.104356

Petersen, J. (2023). A meta-analytic review of the effects of intergenerational programs for youth and older adults. *Educational Gerontology*, *49*(3), 175–189.

Rohmawati, Z., Linawati, S. L., Fatmawati, V., & Kyswantoro, Y. F. (2024). PROGRAM NGAJENI (NGAJAK INTERGENERASI JADI INSPIRASI) UNTUK PROGRAM POSYANDU LINTAS GENERASI. *Jurnal Jarlit*, *20*(1).

Rohmayani, S. (2024). Faktor-Faktor Yang Berhubungan Dengan Partisipasi Remaja Dalam Mengikuti Posyandu Remaja Di Desa Karya Jaya: Factors Associated with Adolescent Participation in Attending Youth Posyandu in Karya Jaya Village. *Indonesian Scholar Journal of Nursing and Midwifery Science*, *3*(06), 1262–1272.

Shen, C. (2023). *Fostering empathy through intergenerational storytelling in embodied virtual reality*. University of British Columbia.

Sixsmith, J., Makita, M., Menezes, D., Cranwell, M., Chau, I., Smith, M., Levy, S., Scrutton, P., & Fang, M. L. (2023). Enhancing community participation through age-friendly ecosystems: A rapid realist review. *Geriatrics*, *8*(3), 52.

Steward, A., Hasche, L., Greenfield, J. C., Ingle, M. P., De Fries, C., Fix, R., King McLaughlin, J., Schilz, M., Hennig, M., & Bonatus, D. (2023). A Review of participant, agency, and community outcomes of non-familial intergenerational programs. *Journal of Social Work*, *23*(1), 122–142. https://doi.org/10.1177/14680173211057436

WHO. (2024). *Working for a brighter, healthier future: How WHO improves health and promotes well-being for the world's adolescents*. World Health Organization.

Wu, V. X. (2021). Health Promotion in the Community Via an Intergenerational Platform: Intergenerational e-Health Literacy Program (I-HeLP). In G. Haugan & M. Eriksson (Eds.), *Health Promotion in Health Care – Vital Theories and Research*. Springer. http://www.ncbi.nlm.nih.gov/books/NBK585675/