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Parent-Reported Evaluations of Pharmacists among Parents of Children Younger than 6 Years with Different Community Pharmacy Use Patterns

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In pediatric pharmacotherapy, parents often play a central role in medication management and administration support, and continuous support from community pharmacists is important. However, it remains unclear how continuity of pharmacy use is associated with parent-reported evaluations of pharmacists. This study conducted a web-based survey of 1,788 parents of children younger than 6 years and examined the association between these factors. Parent-reported evaluations of pharmacists were assessed using items adapted based on the Japanese version of the Medical Interview Satisfaction Scale (MISS-21J), with Distress relief, Communication comfort, and Rapport used as evaluation indicators. Multiple linear regression analyses showed that, compared with the usually same pharmacy group, the always same pharmacy group had significantly higher Distress relief and Rapport scores and a significantly lower Communication comfort score. The different pharmacy each time group had a significantly lower Distress relief score than the usually same pharmacy group, whereas no significant differences were observed for Communication comfort or Rapport. These findings suggest that consistent use of the same pharmacy may be associated with parents' perceived distress relief and rapport with pharmacists. However, the observed differences were small, and their practical and clinical relevance remains uncertain. Further studies are needed to confirm these findings using validated measures and medication-related or clinical outcomes.

Key words community pharmacy, parent-reported evaluations, pharmacy continuity, pharmacists, pediatric pharmacotherapy

INTRODUCTION

In pediatric pharmacotherapy, parents often play a central role in medication management and administration support for their children. Therefore, community pharmacists are expected not only to provide medication information but also to help relieve parents' concerns and support medication use.[1,2] In particular, for infants and young children, parents often need to make decisions and respond at home regarding how to administer medications, how to manage dosage forms, and how to deal with medication refusal.[3-5] Thus, explanations and support provided by pharmacists at community pharmacies are considered to play an important role in ensuring the safe and smooth continuation of pediatric pharmacotherapy.[6]

Previous studies in Japan and other countries have reported parents' difficulties with pediatric medication use, information that parents seek from pharmacists, and the current status of medication counseling for children and parents in community pharmacies.[7-9] However, how parents perceive and evaluate the involvement of community pharmacists has not been sufficiently clarified. Evaluations of pharmacists may not be captured as a single measure of satisfaction; rather, they may comprise multiple aspects, such as distress relief, rapport, ease of communication, and ease of expressing concerns.[10,11] Therefore, when examining parent-reported evaluations of pharmacists, it is important to assess these evaluations from multiple perspectives.

Continuity of pharmacy use may also be associated with parent-reported evaluations of pharmacists. When parents consistently use the same pharmacy, pharmacists may be more likely to understand the background of the child and parents, and accumulated explanations and support may improve parents' evaluations regarding distress relief and rapport with pharmacists. However, it remains unclear whether such continuity is similarly associated with parents' perceived ease of communication and ease of speaking up during pharmacy interactions. Because parents often manage medications for young children, appropriate medication-related information and counseling for parents may contribute to safer medication use.[12] To examine the practical implications of continuous involvement in community pharmacies, it is necessary to clarify the association between continuity of pharmacy use

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and parent-reported evaluations of pharmacists across different aspects.

This study aimed to clarify how differences in continuity of community pharmacy use are associated with parent-reported evaluations of pharmacists among parents receiving medications for their children. To assess parent-reported evaluations of pharmacists from multiple perspectives, we used modified items adapted for parents of young children based on the Japanese version of the Medical Interview Satisfaction Scale (MISS-21J).[10] Specifically, continuity of pharmacy use was classified into three groups: different pharmacy each time, usually same pharmacy, and always same pharmacy, and the associations with parent-reported evaluations based on the modified items were examined.

MATERIALS AND METHODS

Survey Period and Participants This was a cross-sectional web-based survey conducted in March 2026 among parents in Japan. The survey was administered using registered monitors of Macromill, Inc., an internet research company. Macromill recruits monitors through open registration and conducts regular quality control checks and updates registered information to reduce fraudulent or inappropriate responses.

Before the main survey, a preliminary screening survey was conducted to identify eligible participants. The screening survey was distributed to registered monitors in the Macromill panel who had children. Participants with two or more children were asked to answer about their youngest child to standardize the target child across respondents and to focus on younger children, for whom medication management is highly dependent on parental involvement and pharmacist support may therefore be particularly relevant.

Parents were eligible for the main survey if they had a youngest child younger than 6 years, had used a community pharmacy within the past 3 months to receive prescription medications for that child, and did not have a healthcare professional qualification, such as physician, nurse, pharmacist, or other allied health professional. Those who did not meet these criteria in the screening survey were not invited to the main survey.

The survey vendor performed routine data-quality screening before delivering the dataset, including checks for inappropriate responses such as extremely short response times and inconsistent responses. Only responses that passed the vendor's quality-control process were included in the delivered dataset. The final analysis included 1,788 eligible parents of children younger than 6 years. All questionnaire items used in the present analysis were mandatory; therefore, no item-level missing data were present, and no imputation was performed.

Survey Items and Scoring Parent-reported evaluations of pharmacists were assessed using 21 items adapted for parents of young children based on the Japanese version of the Medical Interview Satisfaction Scale (MISS-21J), a scale for evaluating satisfaction with healthcare professionals reported by Hanya *et al*.[10] While retaining the intent of the original MISS-21J items, the wording was modified so that respondents could evaluate pharmacists' responses regarding their child's pharmacotherapy rather than their own, using expressions such as "my child," "my child's illness," and "my child's problem." Respondents were asked to rate their impressions and satisfaction with the explanations and support most recently received from a pharmacist at a community pharmacy on a 7-point scale ranging from 1 to 7 for each item.

The modified items were scored as Distress relief, Communication comfort, Rapport, and Compliance intent, based on the four-subscale structure of the original MISS-21J. In accordance with previous studies, each subscale score was calculated as the mean of the corresponding items.[10]

To examine the applicability of the modified items, Cronbach's α was calculated for each subscale. In addition, as a supplementary psychometric analysis, factor analysis using the principal axis method with Varimax rotation was performed on all 21 adapted items. A four-factor solution was specified to facilitate comparison with the four-subscale structure of the original MISS-21. The adapted items were used as provisional indicators of parent-reported evaluations based on the original MISS-21J subscale structure. Because the wording and target of evaluation were modified for parents' evaluations of community pharmacists, the construct validity of these adapted items in the present population has not been established. Subscales with acceptable internal consistency were used as outcome measures in the main analysis examining associations with continuity of pharmacy use.

Parents' age and sex were obtained from the basic information registered with Macromill, Inc. Information on the child included the number of children and the age of the youngest child. Continuity of pharmacy use for receiving prescription medications for the youngest child during the past year was assessed by asking participants to select one of the following: always same pharmacy, usually same pharmacy, or different pharmacy each time. This variable was used as the main explanatory variable. This variable represented continuity at the pharmacy level and did not indicate continuity of care by the same individual pharmacist. The survey did not collect information on the reasons for pharmacy selection, whether the pharmacy was located near a particular medical institution, whether prescriptions from multiple medical institutions were brought to the same pharmacy, or whether participants regularly encountered the same individual pharmacist.

Details of the modified MISS-21J items are shown in Supplementary Table 1, and survey items regarding the child's basic information and continuity of pharmacy use are shown in Supplementary Table 2.

Statistical Analysis Background characteristics were compared among the three continuity-of-pharmacy-use groups using one-way analysis of variance for continuous variables and the χ^2 test for categorical variables. The child's age was categorized into three groups: younger than 1 year, 1 to younger than 3 years, and 3 to younger than 6 years. The number of children was categorized as one child or two or more children. For parent-reported evaluations of pharmacists, each subscale score was compared among the three continuity-of-pharmacy-use groups using one-way analysis of variance.

Furthermore, to examine the independent association between continuity of pharmacy use and parent-reported evaluations, multiple linear regression analyses were performed with each subscale score as the dependent variable. The main explanatory variable was the three-category continuity-of-pharmacy-use variable. Parent age, parent sex, child age group, and number of children were included in the model as covariates. Adjusted least-squares means were estimated from each model, and comparisons were performed using the usually same pharmacy group as the reference. Results are pre-

Table 1. Participant Characteristics According to Pharmacy Continuity

Characteristic	Different pharmacy each time (n=79)	Usually same pharmacy (n=796)	Always same pharmacy (n=913)	p value
Parent age, mean (SD)	32.5 (5.4)	33.6 (5.3)	32.7 (5.2)	0.003
Sex, n (%)				0.597
Female	55 (69.6)	521 (65.5)	615 (67.4)	
Male	24 (30.4)	275 (34.5)	298 (32.6)	
Child age group, n (%)				0.006
<1 year	34 (43.0)	194 (24.4)	257 (28.1)	
1 to <3 years	24 (30.4)	314 (39.4)	359 (39.3)	
3 to <6 years	21 (26.6)	288 (36.2)	297 (32.5)	
Number of children, n (%)				0.529
One child	47 (59.5)	524 (65.8)	596 (65.3)	
Two or more children	32 (40.5)	272 (34.2)	317 (34.7)	

Table 2. Descriptive Statistics and Internal Consistency of the Adapted MISS-21J Subscales

Subscale	No. of items	Mean	SD	Cronbach's α
Distress relief	6	4.85	0.97	0.881
Communication comfort	4	4.17	1.41	0.890
Rapport	8	4.68	0.96	0.886
Compliance intent	3	4.37	1.00	0.499

sented as adjusted mean differences, 95% confidence intervals, and p values. As a sensitivity analysis to assess the influence of the relatively small different pharmacy each time group, the regression analyses were repeated after excluding this group, comparing the always same pharmacy group with the usually same pharmacy group using the same covariates. Statistical significance was set at $p < 0.05$. All statistical analyses were performed using JMP Pro 17 software (SAS Institute, Cary, NC, USA).

Ethics Approval and Consent to Participate This study was conducted in accordance with the Ethical Guidelines for Medical and Biological Research Involving Human Subjects. The study protocol was approved by the Bioethics Committee of Toho University Faculty of Pharmaceutical Sciences (approval number: 2025-009). On the web-based survey screen, participants were informed of the purpose of the study, that participation was voluntary, that they would not be disadvantaged if they chose not to participate, and that their responses would be anonymized and used for statistical analyses in a manner that would not identify individuals. Only those who confirmed these explanations and provided consent by checking the consent box proceeded to the questionnaire.

RESULTS

Participant Characteristics Participant characteristics are shown in Table 1. The analysis included 1,788 parents, who were classified according to continuity of pharmacy use into the different pharmacy each time group (n = 79), usually same pharmacy group (n = 796), and always same pharmacy group (n = 913). Significant differences were observed among the three groups in parent age and child age group, whereas no significant differences were observed in parent sex or number of children.

Psychometric Characteristics of the Modified MISS-21J Items The 21 items adapted for parents of young children based on the MISS-21J were scored as Distress relief, Communication comfort, Rapport, and Compliance intent according to the four-subscale structure of the original scale. The internal consistency of each subscale is shown in Table 2. Distress relief, Communication comfort, and Rapport showed good Cronbach's α values. In contrast, Compliance intent showed a lower Cronbach's α than the other subscales and did not demonstrate sufficient internal consistency. Therefore, Distress relief, Communication comfort, and Rapport were used as indicators of parent-reported evaluations of pharmacists in the subsequent main analyses. In the supplementary factor analysis, the four-factor solution explained 69.4% of the total variance (Supplementary Table 3). The four Communication comfort items loaded strongly on the same factor (loadings, 0.783–0.857). However, Compliance intent items 20 and 21 also loaded strongly on this factor, and several Distress relief and Rapport items showed loading patterns that differed from the original MISS-21 subscale structure.

Association between Pharmacy Continuity and Parent-Reported Evaluations of Pharmacists Comparisons of subscale scores among the three continuity-of-pharmacy-use groups are shown in Table 3. Significant differences were observed among the three groups for Distress relief, Communication comfort, and Rapport. Mean Distress relief and Rapport scores were highest in the always same pharmacy group, whereas the mean Communication comfort score was lowest in this group.

Table 4 shows the results of multiple linear regression analyses examining the associations between continuity of pharmacy use and each subscale score, adjusted for parent age, parent sex, child age group, and number of children. Compared with the usually same pharmacy group, the always same pharmacy group had significantly higher Distress relief (adjusted mean difference = 0.212, 95% CI 0.121 to 0.304, $p < 0.001$) and Rapport scores (0.254, 95% CI 0.164 to 0.344, $p < 0.001$), and a significantly lower Communication comfort score (−0.172, 95% CI −0.304 to −0.040, $p = 0.010$). The different pharmacy each time group had a significantly lower Distress relief

Table 3. Unadjusted Comparisons of Parent-Reported Evaluation Scores across Three Levels of Pharmacy Continuity

Outcome	Different pharmacy each time (n=79)	Usually same pharmacy (n=796)	Always same pharmacy (n=913)	p value
Distress relief	4.47 (0.88)	4.76 (0.94)	4.97 (0.98)	<0.001
Communication comfort	4.32 (1.27)	4.26 (1.35)	4.07 (1.47)	0.014
Rapport	4.38 (0.82)	4.56 (0.95)	4.82 (0.96)	<0.001

Values are presented as mean (SD).

Table 4. Adjusted Associations between Pharmacy Continuity and Parent-Reported Evaluation Scores

Outcome	Comparison	Adjusted mean difference (95% CI)	p value
Distress relief	Always same pharmacy vs Usually same pharmacy	0.212 (0.121 to 0.304)	<0.001
Distress relief	Different pharmacy each time vs Usually same pharmacy	−0.290 (−0.513 to −0.068)	0.011
Communication comfort	Always same pharmacy vs Usually same pharmacy	−0.172 (−0.304 to −0.040)	0.010
Communication comfort	Different pharmacy each time vs Usually same pharmacy	0.081 (−0.239 to 0.401)	0.619
Rapport	Always same pharmacy vs Usually same pharmacy	0.254 (0.164 to 0.344)	<0.001
Rapport	Different pharmacy each time vs Usually same pharmacy	−0.192 (−0.411 to 0.027)	0.086

Adjusted for parent age, parent sex, child age group, and number of children. Adjusted mean differences and 95% confidence intervals were estimated from least-squares means obtained from the multiple linear regression models. The usually same pharmacy group was used as the reference group for these comparisons.

score than the usually same pharmacy group (−0.290, 95% CI −0.513 to −0.068, p = 0.011), whereas no significant differences were observed for Communication comfort (0.081, 95% CI −0.239 to 0.401, p = 0.619) or Rapport (−0.192, 95% CI −0.411 to 0.027, p = 0.086).

In the sensitivity analysis excluding the different pharmacy each time group (n = 79), 1,709 participants were included. Compared with the usually same pharmacy group, the always same pharmacy group had significantly higher Distress relief (adjusted mean difference = 0.213, 95% CI 0.121 to 0.304, p < 0.001) and Rapport scores (0.255, 95% CI 0.164 to 0.346, p < 0.001), and a significantly lower Communication comfort score (−0.172, 95% CI −0.305 to −0.040, p = 0.011). These results were consistent with the corresponding comparisons in the primary analysis (Supplementary Table 4).

DISCUSSION

This study examined the association between continuity of community pharmacy use and parent-reported evaluations of pharmacists among parents of children younger than 6 years. After assessing the internal consistency of items adapted for parents of young children based on the MISS-21J, three subscales, Distress relief, Communication comfort, and Rapport, were used in the main analyses. A supplementary factor analysis was also conducted to examine the psychometric characteristics of the adapted items. In analyses adjusted for background factors, compared with the usually same pharmacy group, the always same pharmacy group showed significantly higher Distress relief and Rapport scores and a significantly lower Communication comfort score. The different pharmacy each time group showed a significantly lower Distress relief score than the usually same pharmacy group, whereas no significant differences were observed for Communication comfort or Rapport.

The higher Distress relief and Rapport scores observed in the always same pharmacy group compared with the usually same pharmacy group suggest that pharmacy-level continuity may be associated with more favorable parent-reported evaluations in these domains. Importantly, the significant differences between the always and usually same pharmacy groups indicate that these findings were not dependent solely on comparisons with the relatively small different pharmacy each time group. Furthermore, the sensitivity analysis excluding the different pharmacy each time group yielded essentially the same associations between the always and usually same pharmacy groups, supporting the robustness of these comparisons. For Distress relief, the different pharmacy each time group also had a significantly lower score than the usually same pharmacy group, showing an ordered pattern across the three pharmacy-use categories. However, this pattern should not be interpreted as evidence of a causal or dose-response relationship. Relational continuity of care in community pharmacies has been reported to be potentially associated with patient satisfaction and medication-related behaviors,[13] although the continuity assessed in the present study was at the pharmacy level rather than at the level of an individual pharmacist. In pediatric pharmacotherapy, parents often play a central role in medication management and administration support.[14] Previous research has shown that medication-related educational support for caregivers of young children can reduce medication administration errors and improve adherence, suggesting that appropriate medication-related support for parents may contribute to safer medication use.[12] Repeated use of the same pharmacy may provide greater continuity in medication-related information and support. However, the present study did not assess whether parents repeatedly interacted with the same individual pharmacist; therefore, the findings should not be interpreted as evidence that continuous interpersonal relationships or trust with a particular pharmacist had been established. However, reverse causality is also possible; parents who reported more favorable evaluations of Distress relief or Rapport may have been more likely to continue using the same pharmacy.

In contrast, Communication comfort was lower in the always same pharmacy group than in the usually same pharmacy group, unlike Distress relief and Rapport. The reason for this inverse association is unclear. A previous study among adult patients with metastatic cancer also found that contin-

uous relationships with pharmacists and evaluations related to communication were not necessarily associated in the same direction.[15] In the supplementary factor analysis, the four Communication comfort items loaded strongly on the same factor; however, two Compliance intent items also loaded strongly on this factor, and the original four-subscale structure of the MISS-21 was not fully reproduced. Thus, although Communication comfort showed good internal consistency, the supplementary analysis does not establish the construct validity of the adapted measure in the present population. The absolute difference in Communication comfort was small. The observed inverse association may therefore reflect measurement characteristics of the adapted items, residual confounding, or chance. Moreover, because three outcome domains were examined, the possibility of a chance statistically significant finding should also be considered when interpreting this result. Therefore, this finding should be interpreted cautiously and should not be considered evidence that continuous use of the same pharmacy reduces parents' communication comfort.

Across the statistically significant adjusted comparisons, the absolute mean differences ranged from 0.172 to 0.290 points on a 1–7 point scale. Although statistically significant, these differences were small in absolute magnitude. Moreover, no established threshold for a clinically or practically meaningful difference is available for the adapted measures used in this study. Therefore, the practical and clinical relevance of these associations remains uncertain, and the findings should be interpreted as hypothesis-generating. This study did not assess medication adherence, medication administration errors, adverse events, treatment effectiveness, or other clinical outcomes in children. Therefore, it remains unknown whether the observed parent-reported evaluations are associated with safer or more effective pediatric medication use. Future longitudinal studies should examine pharmacy use patterns together with medication-related behaviors and clinical outcomes.

This study has several limitations. First, because this was a cross-sectional study, causal relationships between continuity of pharmacy use and parent-reported evaluations of pharmacists cannot be determined. It is also possible that parents who evaluate pharmacists more highly are more likely to continue using the same pharmacy, suggesting the possibility of reverse causality. Second, pharmacy use and evaluations of pharmacists were based on self-report and may have been affected by recall bias and subjective evaluation. Third, the items used in this study were adapted for parents of young children based on the MISS-21J, and this study was not intended to develop or formally validate a new measurement scale. Although internal consistency was assessed and a supplementary factor analysis was performed, the original four-subscale structure of the MISS-21 was not fully reproduced. Moreover, these analyses did not constitute a comprehensive assessment of construct validity. Therefore, the validity of the modified items requires further investigation. Fourth, the number of participants in the different pharmacy each time group was smaller than that in the other groups, and caution is required regarding the stability of the estimates. Although the sensitivity analysis excluding this group yielded results consistent with the primary comparisons between the always and usually same pharmacy groups, the imbalance in group sizes remains a limitation. Fifth, the survey did not distinguish between pharmacies located near a specific medical institution and pharmacies used to consolidate prescriptions from multiple medical institutions. The reasons for pharmacy selection and whether participants repeatedly encountered the same individual pharmacist were also unknown. Sixth, potentially relevant factors, including the child's disease and disease severity, medication burden, duration of medication use, parental health literacy, socioeconomic status, and pharmacy accessibility, were not measured. In addition, although the study population was restricted to parents who had used a community pharmacy for their child within the previous 3 months, differences in the frequency of pharmacy visits during this period may have influenced both pharmacy use patterns and parent-reported evaluations. Therefore, residual confounding cannot be excluded. Finally, because this study was conducted among registered monitors of an internet research company, the findings may not fully represent all parents of young children.

In this exploratory cross-sectional study, parents who reported always using the same community pharmacy had slightly higher Distress relief and Rapport scores and a slightly lower Communication comfort score than those who reported usually using the same pharmacy. Parents who reported using a different pharmacy each time also had a lower Distress relief score than those who usually used the same pharmacy. However, the observed differences were small, causal relationships cannot be determined, and the adapted evaluation items require further validation. Further studies are needed to clarify whether community pharmacy use patterns are associated with medication-related behaviors or clinical outcomes in pediatric pharmacotherapy.

Competing interests The authors declare that they have no competing interests.

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