

BMJ Open Factors influencing reproductive concerns and their correlation with quality of life among adolescents and young adults with acute leukaemia in Hunan province, China: a cross-sectional study

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ABSTRACT

Objective This study aimed to examine the reproductive concerns and their influencing factors among adolescents and young adults with acute leukaemia and to explore the relationship between reproductive concerns and patients' quality of life.

Design A cross-sectional study.

Setting The haematology departments of four tertiary-level hospitals in Hunan province, China.

Participants Convenience sampling method was used to recruit 233 adolescents and young adults with acute leukaemia, from June 2024 to December 2024.

Primary and secondary outcome measures The primary outcome was assessed using the Chinese version of the Reproductive Concerns After Cancer and the secondary outcome was measured by the 12-item Short Form Health Survey.

Results Adolescents and young adults with acute leukaemia had a mean reproductive concerns score of 55.57 ± 7.57 , a quality of life physical component summary (PCS) score of 38.54 ± 8.58 and a mental component summary (MCS) score of 39.84 ± 8.78 . Univariate analysis showed significant differences in reproductive concerns based on fertility status, place of residence, education level, fertility counselling and family history of acute leukaemia ($p < 0.05$). Multiple linear regression analysis revealed already childbearing ($\beta = -0.169$, $p = 0.009$), a high education level ($\beta = -0.256$, $p = 0.020$), rural residence ($\beta = 0.183$, $p = 0.006$), receipt of fertility counselling ($\beta = 0.161$, $p = 0.012$) and family history ($\beta = 0.139$, $p = 0.029$) as independent risk factors for reproductive concerns. Spearman correlation analysis showed no significant correlation between reproductive concerns and the PCS but revealed a significant negative correlation between reproductive concerns and the MCS ($\beta = -0.170$, $p < 0.01$).

Conclusion Adolescents and young adults with acute leukaemia exhibited moderately high levels of reproductive concerns, particularly those who had no children, had a low education level, resided in rural areas, had a family history of acute leukaemia or had received fertility

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Single-factor analysis, multiple linear regression analysis and correlation analysis were used to explore the influencing factors of reproductive concerns in adolescents and young adults (AYAs) with acute leukaemia and their relationship with quality of life.
- ⇒ Owing to the cross-sectional characteristic of this research, we were unable to explore the longitudinal alterations in the reproductive concerns of AYAs with acute leukaemia.
- ⇒ The study only investigated patients in Hunan Province, China, which restricts the promotion and application of the research results among a larger group and in more diverse scenarios.
- ⇒ The quantitative methods employed in this study lack a deeper exploration of participants' thoughts, feelings and experiences.

counselling. Therefore, we suggest that healthcare providers prioritise addressing reproductive concerns in high-risk patients by offering tailored, high-quality and continuous fertility counselling and psychological support. Strengthening these strategies can help alleviate reproductive concerns and improve both mental health and overall quality of life in this population.

BACKGROUND

Leukaemia is a malignant clonal disease that originates from haematopoietic stem cells, with acute leukaemia being prevalent among adolescents and young adults (AYAs). According to the 2020 cancer statistics in the USA, the incidence of acute leukaemia in AYAs was 10.1 per 100,000, with an annual increase of 0.4%–1.9%.¹ The age-standardised incidence rate of leukaemia in China is 8.19 per 100 000, and this rate in AYAs is steadily

increasing above the global average, contributed mainly by the high incidence rate of acute leukaemia.^{2 3} As cancer treatment modalities continue to evolve, most AYAs with acute leukaemia can achieve long-term cancer survivorship, with 5-year survival rates ranging from 51% to 74%.¹ However, in this group of patients, treatments such as chemotherapy, radiotherapy and bone marrow transplants are associated with delayed effects and toxicity to the reproductive system, potentially impairing fertility to varying degrees.⁴ According to the literature,^{5–8} both alkylating agents (eg, cyclophosphamide and anthracyclines) and radiotherapy can impair gonadal function in patients, causing premature ovarian failure, uterine hypoplasia, testicular dysfunction and adverse pregnancy outcomes. Given that AYAs with acute leukaemia are in the prime age of family building and childbearing, fertility has naturally become an issue of great concern in this population.⁹ AYAs with cancer demonstrate a desire to have children,¹⁰ but their cancer treatments impair their fertility or delay their fertility plans, triggering a range of adverse fertility-related psychological burdens.

‘Reproductive concerns’ refer to the negative effects that cancer treatment has on an individual’s fertility and the associated psychological distress. This distress includes concerns about fertility potential, partner disclosure, child’s health, personal health, acceptance and becoming pregnant.¹¹ These concerns often represent a substantial psychological burden, which, in some cases, may exceed the stress caused by the cancer diagnosis itself and can persist long after treatment. Related^{12–14} studies have found that reproductive concerns have a significant negative impact on the treatment compliance, family function and intimate relationships of young cancer patients. Meanwhile, detectable signs of post-cancer fertility issues, such as menstrual irregularities, have been correlated with further declines in quality of life, underscoring the long-term impact of these concerns on patients’ well-being.^{15–17} As such, reproductive concerns in AYAs with acute leukaemia must be proactively addressed within the healthcare system to ensure comprehensive care.

The WHO defines quality of life as an individual’s subjective experience of their life situation, taking into account physical health, psychological well-being and social factors, all within the framework of a cultural value system that incorporates life goals, expectations and standards.¹⁸ In patients with acute leukaemia, quality of life is frequently compromised by the side effects of the disease and its treatment, including restricted physical mobility and compromised mental health.¹⁹ Moreover, reproductive concerns can negatively impact quality of life. The research^{20–22} on the reproductive concerns of breast cancer patients and their quality of life indicates that the patients’ reproductive concerns are an independent influencing factor for their quality of life and show a negative correlation. That is, when the level of patients’ reproductive concerns increases, their overall quality of life may decrease. These research findings emphasise the significance of alleviating cancer patients’

reproductive concerns in improving their overall quality of life. However, no studies have yet explored the correlation between reproductive concerns and quality of life in AYAs with acute leukaemia. Further research is urgently needed in this area.

Currently, most studies on reproductive concerns in cancer patients have focused primarily on breast cancer patients, while limited research has addressed this issue among AYAs with acute leukaemia. Although these concerns may significantly affect the quality of life of all cancer patients, studies exploring the relationship remain scarce, particularly among AYAs with acute leukaemia. Given this research gap, this study sought to investigate the current status of reproductive concerns and their relationship with quality of life among AYAs with acute leukaemia in Hunan province, China. The findings of this study offer valuable insights for clinical practitioners and support the development of targeted psychological interventions to enhance patients’ quality of life and overall well-being.

METHODS

Study design

This study used a cross-sectional design and adhered to the Declaration of Helsinki. The Strengthening the Reporting of Observational Studies in Epidemiology statement was followed for reporting research methods and results.²³

Study subjects

Convenience sampling method was used to select AYAs with acute leukaemia who met the established selection criteria. The inclusion criteria for AYAs with acute leukaemia were as follows: (1) pathologically confirmed diagnosis of acute leukaemia; (2) aged 18–39 years (the National Comprehensive Cancer Network guidelines²⁴ define AYAs as individuals aged 15–39 years; the 18–39 age range was used in the present study based on the application of the Reproductive Concerns After Cancer (RCAC) scale); (3) having the desire to have children and (4) having the ability to independently participate in the survey and demonstrate mental stability, including normal reading, understanding, cognitive and judgement skills. The exclusion criteria were: (1) concurrent tumours in other parts of the body; (2) comorbidities such as severe liver, kidney or endocrine disorders, significant organ failure or organic brain diseases or (3) disease progression to the terminal stage or extremely unstable conditions that prevent participation in the survey.

Sample size

Based on a rough estimation of sample size for descriptive studies, the sample size for multiple regression analysis should be approximately 10–20 times the number of independent variables.²⁵ The questionnaire comprised three sections: a demographic questionnaire with 20 items, an 18-item reproductive concerns questionnaire

and a 12-item quality of life questionnaire. In this study, 20 potential independent variables related to sociodemographic and disease characteristics were considered. Based on the recommendation of at least 10 cases per variable and accounting for a 10% rate of invalid questionnaires, the minimum required sample size was calculated to be 220 participants.

Data collection

From June to December 2024, participants were screened by the researchers in strict accordance with the selection criteria. The purpose, significance and content of the study were explained to each participant, and their informed consent was obtained before beginning the survey. Each AYAs with acute leukaemia completed a standardised questionnaire individually with the assistance of trained researchers, which took 10–15 minutes to complete (online supplemental file 3). Additionally, the investigator provided clarifications in person for any difficult content. On completion, the investigator collected the questionnaire immediately, reviewed and verified its accuracy and requested any necessary revisions or additions from the participant as needed.

Research instruments

General information questionnaire: demographic data on AYAs with acute leukaemia, including age, gender, ethnicity, religion, literacy, occupation, income status, marital status, fertility status, method of medical care payment, number of children, primary caregiver and fertility counselling, were collected. Disease and treatment characteristics, including pathology type, disease duration, family history, relapse status and treatment phase, were also collected.

Reproductive concerns: the RCAC scale developed by Gorman *et al*¹¹ and validated in Chinese cancer patients was used.^{26 27} The RCAC scale consists of six dimensions (fertility potential, partner disclosure, child's health, personal health, acceptance and becoming pregnant) and 18 items. All items are rated on a Likert 5-point scale, with scores from 1 to 5 corresponding to 'strongly disagree', 'disagree', 'neither agree nor disagree', 'agree' and 'strongly agree'. The total score ranges from 18 to 90, with higher scores indicating greater reproductive concerns. The Cronbach's alpha coefficient of the scale is 0.83, and it has good reliability.

Quality of life: quality of life was assessed using the 12-item Short Form Health Survey (SF-12).²⁸ The SF-12 is a generalised scale designed to measure patients' quality of life over the past 4 weeks and consists of 12 items with two composite scores, the physical component summary (PCS) and the mental component summary (MCS). Each item is scored according to a standardised method, with higher scores reflecting better quality of life. The SF-12 is straightforward, easy to understand and time-efficient. The total scale has a Cronbach's alpha coefficient of 0.775, indicating good reliability and validity.

Statistical analysis

Descriptive statistics were used to present the general data of AYAs with acute leukaemia, with continuous variables presented as the mean $\pm$ SD, and categorical variables presented as frequency and proportion. After performing the normality test, the total scores of reproductive concerns followed a normal distribution and were expressed as the mean $\pm$ SD. Although the quality of life score did not meet the normality criteria, the Q-Q plot showed that the values closely approximated a straight line, and the frequency histogram approximated a bell-shaped curve, allowing the quality of life score to be treated as normally distributed and described. Using the mean $\pm$ SD, the differences in total reproductive concerns scores based on general demographic variables were assessed using t-tests and one-way analyses of variance (ANOVA). Levene's test for equality of variances was performed prior to the ANOVA, confirming that the conditions for ANOVA were met across the subgroups defined by the general information variables. Multiple linear regression was used to explore the relationship between demographic variables and reproductive concerns. The total reproductive concerns score was used as the dependent variable, and significant variables from the univariate analysis (fertility status, place of residence, education level, fertility counselling and family history) were included as independent variables. Spearman's correlation analysis was used to assess the relationship between reproductive concerns and quality of life, based on the nature of the data.

Patient and public involvement

No patient or public contributors participated in the planning, analysis or dissemination strategies of this study, but they did participate in the data collection process.

RESULTS

General information of AYAs with acute leukaemia

Demographic data of AYAs with acute leukaemia

A total of 245 questionnaires were distributed, and 233 valid responses were collected after excluding invalid submissions. Overall, 233 AYAs with acute leukaemia were included in this study. Among the three age groups, a plurality (36.9%) of the AYAs belonged to the age group 18–24 years ($n=86$), and more than half were female (57.9%, $n=135$). Most participants identified as Han Chinese (91%, $n=212$), and 60.9% ($n=142$) were unmarried. Regarding reproductive status, a considerable proportion of participants (69.5%, $n=162$) were childless. The demographic characteristics of the study population are detailed in [table 1](#).

Disease treatment characteristics of AYAs with acute leukaemia

Among the 233 AYAs with acute leukaemia, the majority (58.8%, $n=137$) were diagnosed with acute myeloid leukaemia. A substantial proportion (40.8%, $n=95$) had a disease duration of ≤ 6 months, and most participants

Table 1 Demographic characteristics of AYAs with acute leukaemia (n, %)

Variables	Variable hierarchy	Frequency	Percent
Age (years)	18–24	86	36.9
	25–31	78	33.5
	32–39	69	29.6
Gender	Female	135	57.9
	Male	98	42.1
Ethnicity	Han	212	91.0
	Other	21	9.0
Marital status	Unmarried	142	60.9
	Married	87	37.3
	Divorced	4	1.7
Fertility status	Bearing no child	162	69.5
	Already childbearing	71	30.5
Number of children	No children	162	69.5
	1 child	33	14.2
	≥2 children	38	16.3
Place of residence	Urban	137	58.8
	Rural	96	41.2
Religiosity	No	222	95.3
	Yes	11	4.7
Education level	Junior high school and below	21	9.0
	Senior or technical secondary school	58	24.9
	College and above	154	66.1
Medical insurance type	Rural cooperative medical insurance	99	42.5
	Urban medical insurance	45	19.3
	Commercial medical insurance	6	2.6
	Employee medical insurance	83	35.6
Per capita monthly household income (¥)	≤3000	62	26.6
	3001–5000	98	42.1
	≥5001	73	31.3
Work status	Employed	60	25.8
	Unemployed	173	74.2

Continued

Table 1 Continued

Variables	Variable hierarchy	Frequency	Percent
Primary caregivers	Spouse	51	21.9
	Parents	168	72.1
	Sibling	4	1.7
	Other	10	4.3
Fertility counselling	No	153	65.7
	Yes	80	34.3
Fertility preservation	No	213	91.4
	Yes	20	8.6

AYAs, adolescents and young adults.

(87.6%, n=204) had no history of relapse. The disease and treatment characteristics of the study population are detailed in [table 2](#).

Reproductive concerns in AYAs with acute leukaemia

The total reproductive concerns score for the 233 AYAs with acute leukaemia was 55.57 ± 7.57 . Among the six dimensions, the highest concerns scores were for personal health (10.84 ± 2.04) and child's health (10.76 ± 2.53), followed by fertility potential (9.48 ± 2.29), becoming pregnant (8.51 ± 1.68), partner disclosure (8.36 ± 2.26) and acceptance (7.62 ± 2.23). The detailed results are provided in [table 3](#).

Table 2 Disease and treatment characteristics of AYAs with acute leukaemia (n, %)

Variables	Variable hierarchy	Frequency	Percent
Disease type	Acute lymphoid leukaemia	96	41.2
	Acute myeloid leukaemia	137	58.8
Course	≤6 months	95	40.8
	7–12 months	56	24.0
	13–18 months	23	9.9
	≥19 months	59	25.3
Relapse status	No	204	87.6
	Yes	29	12.4
Family history	No	220	94.4
	Yes	13	5.6
Treatment phase	Remission induction	83	35.6
	Intensified consolidation	66	28.3
	Maintenance therapy	84	36.1

AYAs, adolescents and young adults.

Table 3 Dimensions and total scores of reproductive concerns in AYAs with acute leukaemia ($\bar{x} \pm S$)

Dimensions	Number of items	Score range	($\bar{x} \pm S$)
Reproductive concerns	18	35–74	55.57±7.57
Personal health	3	6–15	10.84±2.04
Child's health	3	3–15	10.76±2.53
Fertility potential	3	3–14	9.48±2.29
Becoming pregnant	3	3–13	8.51±1.68
Partner disclosure	3	3–14	8.36±2.26
Acceptance	3	3–13	7.62±2.23

AYAs, adolescents and young adults.

Single-factor analysis of reproductive concerns in AYAs with acute leukaemia

The results indicated significant differences in reproductive concerns based on patients' fertility status, place of residence, education level, fertility counselling and family history among AYAs with acute leukaemia ($p < 0.05$). The details are shown in online supplemental table S1.

Multiple linear regression analysis of reproductive concerns in AYAs with acute leukaemia

Multiple linear regression analysis was conducted to identify independent risk factors for reproductive concerns in AYAs with acute leukaemia. The specific assignment for variables is shown in table 4. Multiple linear regression analysis revealed that the variance inflation factor ranged from 1.034 to 3.086, indicating the absence of multicollinearity. The regression equation yielded an $F = 5.297$, $p < 0.001$, indicating statistical significance. The Durbin-Watson statistic was 1.790, which is close to 2, suggesting that the residuals in the regression model were independent. Results of the multiple linear regression analysis suggested that fertility status, education level, place of residence, fertility counselling and family history were related to reproductive concerns scores. The details are presented in table 5.

Table 4 Assignment method for influencing factors of reproductive concerns in AYAs with acute leukaemia ($n = 233$)

Variables	Assignment
Fertility status	Bearing no child=0 (reference value); already childbearing=1
Place of residence	Urban=0 (reference value); rural=1
Education level	Junior high school and below=0 (reference value); senior or technical secondary school=1; college and above=2
Fertility counselling	No=0 (reference value); yes=1
Family history	No=0 (reference value); yes=1

AYAs, adolescents and young adults.

Relationship between reproductive concerns and quality of life in AYAs with acute leukaemia

Table 6 presents the SF-12 quality of life physical health summary (ie, PCS) scores and mental health summary (ie, MCS) scores of AYAs with acute leukaemia. The PCS scores of the patients were 38.54 ± 8.58 , significantly lower than those of the general population (51.2 ± 6.6),²⁹ and their MCS scores were 39.84 ± 8.78 , also significantly lower than those of the general population (49.9 ± 7.7).²⁹ The values suggest that AYAs with acute leukaemia experience greater stress regarding physical health than regarding mental health.

Online supplemental table S2 presents the correlation between reproductive concerns scores and quality of life PCS and MCS scores in AYAs with acute leukaemia. The total reproductive concerns score was not correlated with the PCS score but was significantly negatively correlated with the MCS score ($\beta = -0.170$, $p < 0.01$). The personal health dimension of patients' reproductive concerns was significantly negatively correlated with the PCS score ($\beta = -0.169$, $p < 0.01$). The becoming pregnant dimension ($\beta = -0.239$, $p < 0.01$) and the personal health dimension ($\beta = -0.265$, $p < 0.01$) of the patients' reproductive concerns were significantly negatively correlated with the MCS score.

DISCUSSION

Reproductive concerns among AYAs with acute leukaemia

In this study, the total reproductive concerns score among AYAs with acute leukaemia was 55.57 ± 7.57 , indicating a moderately high level of concern. This result is consistent with the findings of Micaux *et al*,²⁷ who reported similar levels of reproductive concerns among young cancer patients. However, the scores in this present study were lower than those reported by Wang *et al*³⁰ for women of reproductive age with cervical cancer (61.38 ± 5.65). This difference may be attributable to the fact cervical cancer directly affects reproductive organs, posing a greater threat to patients' fertility and sexual quality of life. The high reproductive concerns among AYAs with acute leukaemia could be attributable to several factors. At this stage in life, patients are expected to fulfil reproductive aspirations while also assuming responsibilities such as caring for their families and raising children.^{10 31} High expectations for parenthood, coupled with infertility risks associated with treatment, may lead to substantial psychological conflict. Additionally, these patients face significant disruptions to their fertility and family planning due to the long-term medical challenges and post-treatment effects of cancer survivorship.^{32 33} These additional stressors further exacerbate their fertility concerns.

Reproductive concerns among AYAs with acute leukaemia are multidimensional, encompassing various aspects. In this study, analysis of the different dimensions of reproductive concerns revealed that the personal health and child health dimensions had the highest scores. This finding aligns with the results reported by

Table 5 Multiple linear regression analysis of reproductive concerns in AYAs with acute leukaemia (n=233)

Variables	B	β	T	P value
Constant term	57.570		31.096	0.000
Fertility status (Reference value = bearing no child)				
Already childbearing	-2.767	-0.169	-2.644	0.009**
Place of residence (reference value=urban)				
Rural	2.804	0.183	2.765	0.006**
Education level (reference value = junior high school and below)				
Senior or technical secondary school	-3.014	-0.173	-1.627	0.105
College and above	-4.087	-0.256	-2.341	0.020*
Fertility counselling (reference value=no)				
Yes	2.563	0.161	2.532	0.012*
Family history (reference value=no)				
Yes	4.582	0.139	2.198	0.029*

*p<0.05, **p<0.01.
AYAs, adolescents and young adults.

Zhu *et al.*³⁴ indicating that AYAs with acute leukaemia experience significant anxiety about their own health and the potential impact of the disease on their children. Acute leukaemia imposes a substantial disease burden and psychological stress on patients, who not only worry about their physical health but also fear that the familial aggregation of the disease may affect their children's health.^{35 36} The next highest scoring dimension of reproductive concerns was fertility potential. This may be due to a considerable proportion of the participants in this study being childless, leading to increased attention to future fertility. Studies^{37 38} have shown that intensive treatment for acute leukaemia increases the risk of infertility, with the highest infertility rates observed in patients undergoing allogeneic transplantation, followed by those undergoing autologous transplantation or chemotherapy only. Additionally, the high relapse risk associated with acute leukaemia³⁸ may contribute to patients' elevated concerns about planning for pregnancy. The acceptance dimension had the lowest score, which is consistent with the findings of Ljungman *et al.*³⁹ This may be attributable to the higher education level of the patients in this study, as higher education is associated with greater access to fertility-related information and a more informed approach to reproductive needs,⁴⁰ leading to greater acceptance of infertility.

Table 6 Quality of life dimension scores of AYAs with acute leukaemia ($\bar{x} \pm S$)

Dimension	Score range	($\bar{x} \pm S$)
PCS	17.82–59.07	38.54±8.58
MCS	15.48–64.97	39.84±8.78

AYAs, adolescents and young adults; MCS, mental component summary ; PCS, physical component summary.

Factors influencing reproductive concerns among AYAs with acute leukaemia

The results indicated several factors influencing reproductive concerns in AYAs with acute leukaemia, including fertility status, place of residence, education level, fertility counselling and family history of acute leukaemia. In the study, patients without children exhibited significantly higher levels of reproductive concerns than those with children. This result is consistent with the conclusion of Wang *et al.*,^{12 30} and this might be due to the stronger desire for having children among younger patients or those without children.¹⁰ As such, patients without children are more likely to experience profound regret and emotional distress due to impaired fertility, finding it particularly difficult to cope with infertility.⁴¹ Therefore, before initiating treatment, healthcare professionals should engage in comprehensive fertility discussions with patients and their families to ensure that treatment plans align with the patient's reproductive aspirations and personal circumstances, minimising regret related to fertility loss. The results also revealed that AYAs with acute leukaemia from urban areas exhibited significantly lower levels of reproductive concerns than their rural counterparts. This finding aligns with that of Yao *et al.*,⁴² and the disparity between rural and urban patients may be attributable to the stronger influence of traditional beliefs regarding lineage continuation in rural areas than in urban areas. While the concept of 'raising children for old age' is deeply ingrained in rural areas, urban areas offer more developed eldercare systems and diverse perspectives on reproduction. Furthermore, the study found that AYAs with higher education levels had lower levels of reproductive concerns, which is consistent with the findings of He *et al.*⁴³ but contradicts those of Wang and Tan.⁴⁵ This discrepancy may be attributable to the small proportion of patients with lower educational levels

in the sample of the present study. Additionally, patients with higher education levels often demonstrate greater self-awareness and independent thinking, enabling them to focus on their reproductive rights and choices.⁴⁶ Their rational approach to fertility issues contributes to the lower levels of reproductive concerns observed. Fertility counselling, which aims to provide reproductive health knowledge and facilitate access to fertility preservation techniques, is theoretically a protective factor for alleviating reproductive concerns.⁴⁷ However, this study found that AYAs with acute leukaemia who received fertility counselling exhibited higher levels of reproductive concerns, which may be due to the inadequacy or poor quality of the counselling they received.^{48 49} Therefore, clinical practice must prioritise improving the quality of fertility counselling, ensuring that reproductive health information is provided in a timely, comprehensive and adequate manner. Such improvements are crucial for meeting patients' needs and achieving optimal counselling outcomes. Lastly, this study revealed that AYAs with a family history of acute leukaemia reported higher levels of reproductive concerns than those without such a family history. These concerns extended beyond their own health and included profound worries about the health of their children, which further exacerbated their reproductive concerns.

Relationship between reproductive concerns and quality of life in AYAs with acute leukaemia

The findings of this study indicate a negative correlation between reproductive concerns and MCS score of quality of life in AYAs with acute leukaemia, but no significant correlation was found between the reproductive concerns score and the PCS score. Specifically, lower levels of reproductive concerns were associated with higher MCS scores. This result is similar to that of Benedict *et al*,¹⁴ although the tools used for quality of life assessment differed between the two studies. Additionally, both the becoming pregnant and personal health dimensions of reproductive concerns were significantly negatively correlated with the MCS. This reflects the substantial psychological stress patients experience when considering future reproductive plans and their health status. These findings highlight the complex relationship between reproductive concerns and quality of life among AYAs with acute leukaemia. Psychosocial interventions targeting reproductive concerns may help alleviate psychological stress, thereby improving overall quality of life.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study was limited to AYAs with acute leukaemia in Hunan province, China. Due to the homogeneity of study sites, the findings may lack broad generalisability. The differences in the level of cognition about fertility preservation among medical staff may affect the accessibility of effective fertility counselling for patients. Moreover, this study collected data using patient-reported

outcomes, which may introduce potential subjective bias risks. Another limitation of this study is the potential lack of in-depth insights into participants' perspectives and experiences, which could have been addressed through complementary qualitative interviews. Incorporating qualitative methods in future research may provide a more nuanced understanding of the underlying reasons and contexts behind the observed quantitative trends. Additionally, a longitudinal study design may allow for a more thorough examination of the long-term effects of reproductive concerns in AYAs with acute leukaemia.

CONCLUSION

In summary, the study findings indicate that AYAs with acute leukaemia have moderate-to-high levels of reproductive concerns. Several factors influence reproductive concerns, and more attention should be paid to patients who have no children, a low education level, reside in rural areas, have a family history of acute leukaemia or have received fertility counselling. Reproductive concerns were not significantly correlated with the PCS but showed a significant negative correlation with the MCS. Given these findings, clinical healthcare providers should enhance psychological interventions and provide targeted support to address reproductive concerns in this patient population. By helping patients gain a clear and accurate understanding of reproductive issues, healthcare teams can effectively alleviate reproductive concerns and enhance patients' overall quality of life.

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