



Risk of suicide among adolescents and young adults with cancer and a need for targeted interventions

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Adolescents and young adults (AYA) with cancer are defined as individuals who receive their cancer diagnosis between 15 and 39 years of age based on the definition by the National Comprehensive Cancer Network (1). Cancer incidence in the AYA population has been increasing with more than 1.2 million AYAs estimated to be newly diagnosed with cancer in 2018 worldwide (2,3). AYAs with cancer have higher survival rates than older patients for most types of cancer in high-income countries (4). Even so, survival rates are less improved in AYAs than in children and older adults for certain types of cancer (4) and AYAs with cancer also have an increased risk of death from noncancer causes (5). The loss of healthy life-years by cancer is greater in AYAs than in older adults, leading to decreased productivity in society.

In recent decades, AYAs with cancer are increasingly recognized as a special subgroup distinguished from children and older adults with cancer in terms of psychosocial as well as biomedical aspects. Cancer spectrum and biology in AYAs differ from those in younger and older patients (6) and the AYA population is in a period of biological, psychosocial, and cognitive development. A growing body of literature has suggested that cancer experiences and psychosocial outcomes of AYAs differ from those of the adult population (7,8). Understanding psychological outcomes following cancer diagnosis unique to the AYA population will allow improved psychosocial support for this special age group.

Previous research has consistently reported a higher suicide risk among cancer patients compared with the general population (9). However, the existing literature has investigated suicide risk mainly among adults or all-age cancer patients, with only a few studies focused specifically on the AYA population.

To address this issue, Zhou *et al.* conducted a retrospective, population-based study in the United States to compare suicide risk between an AYA group (age 15–39 years) and all-age group (10). Using a cohort of 5,261,459 all-age patients including 312,313 AYA diagnosed with 20 types of solid malignancies between 1973 and 2015 and registered in the Surveillance, Epidemiology, and End Results (SEER) database, the authors found a slightly lower suicide mortality rate in the AYA group than in the all-age group (0.14% *vs.* 0.15%, respectively). Male sex, white race, unmarried status, localized stage of cancer, and longer survival time within 5 years of cancer diagnosis increased the risk of suicide for both the AYA and all-age groups, although the effect of gender and surgery on the AYA group was not as obvious as that on the all-age group, and localized cancer stage more strongly impacted the AYA group than the all-age group. The authors concluded that AYAs need not be separated as a special group for identifying a higher risk group of suicide among cancer patients. The findings of Zhou *et al.* are important because they highlight the psychological burden experienced by

this understudied population. However, there remain unaddressed limitations and weaknesses in their study.

The authors did not compare the suicide risk of AYAs with cancer with an age- and sex-adjusted general population in the United States. In a SEER study of cancer patients between 1973 and 2014, Zaorsky *et al.* demonstrated that patients diagnosed with cancer at 39 years of age or younger had the highest risk of suicide [standardized mortality ratios (SMR) 37.24; 95% confidence interval, 34.24–40.44] and that SMR gradually decreased as cancer patients were diagnosed at an older age (11). A nationwide Swedish cohort study also demonstrated a significantly higher risk of suicidal behavior in AYA with cancer (age 15–30 years) compared with individuals with no cancer diagnosis (12). These data suggest the high priority of suicide prevention for AYAs with cancer.

The authors demonstrated an elevated risk of suicide in cancer patients with longer survival times within 5 years of cancer diagnosis. This result is surprising because most studies have shown the highest risk of suicide immediately after cancer diagnosis (12–15). Lu *et al.* reported that the first year after cancer diagnosis was the most crucial period for complete suicide and suicide attempt for AYAs with cancer (12). Factors affecting suicidal behavior among cancer patients can vary according to the time phase after cancer diagnosis (16). Emotional stress evoked by cancer diagnosis may affect suicide shortly after cancer diagnosis (14) whereas physical distress, impaired functioning, and poor quality of life due to cancer and its treatment may more often influence long-term risk of suicide (11,12). In the study by Zhou *et al.*, increased suicide risk among AYAs several years after cancer diagnosis may be affected by distress due to decreased quality of life, late effects of cancer therapy, fertility issues, and inadequate medical and psychosocial care during this time phase (7,8). The authors should have examined suicide risk and risk factors for suicide within the first few months after cancer diagnosis among AYAs to assess the impact of their receiving a cancer diagnosis. Suicidal behavior during this period may require preventive strategies that differ from those for long-term cancer survivors (16).

Time course of suicide risk after initial cancer diagnosis has been reported to vary by cancer type (11). However, the authors excluded certain types of cancer that are more common among AYAs, such as leukemia, lymphoma, and testicular cancer (6). A previous study in the United States found that suicide risk among patients with Hodgkin's lymphoma and testicular cancer remained elevated after

5 years of cancer diagnosis whereas suicidal risk among patients with other types of cancer attenuated over time (11). Further analysis including these types of cancer is warranted to better understand unique features of suicide among AYAs with cancer.

In the study by Zhou *et al.*, localized tumor stage seemed to have a stronger impact on suicide risk among AYAs with breast and cervix uteri cancer compared with the all-age group. This finding suggests a strong psychosocial burden in young patients with breast and cervix uteri cancer even when cancer is in the localized stage. Suicide risk among AYAs with cervix uteri and breast cancer in the author's study was prominent within the first year after diagnosis, which is consistent with the Swedish study (12). Acute emotional distress due to cancer diagnosis, alterations in body image, fertility concerns, decreased sexual function, impaired social roles, and hormonal changes caused by cancer treatment may be related to higher suicide risk shortly after diagnosis of these types of cancer among AYAs (17,18)

The authors' study also did not assess the influence of educational and employment status on suicide risk. These factors are particularly important for AYAs based on some studies reporting that most AYA survivors experience problems with education and work after their diagnosis (19) and that cancer-related interruption of education or work was significantly associated with stronger psychological distress among AYAs with cancer (20). Future studies should evaluate the socioeconomic predictors of suicide risk among AYAs with cancer.

Finally, and most importantly, the authors failed to emphasize the medical and psychosocial needs unique to the AYA population. In high-income countries, national suicide prevention strategies in general settings have highlighted children and AYAs as a special subpopulation at high risk of suicide, thus necessitating targeted intervention (21). In oncology settings, AYAs face additional challenges such as physical symptoms, including side effects of cancer treatment, fertility issues, familial and social relationships, educational, occupational and financial concerns, adherence to treatment, and fear of cancer recurrence (7,8,22), but AYAs with cancer have reported unmet needs for information and psychosocial care (23). Although the absolute number of suicides is comparatively low, suicide among AYAs with cancer may represent the psychosocial burden and unmet needs of this age population, which would require suicide preventive strategies that exclusively target this population. Evidence is still scarce for

psychosocial interventions specifically designed for AYAs with cancer (7,24,25), so future studies should explore effective age-appropriate interventions to improve their short- and long-term psychosocial well-being.

In summary, AYAs with cancer experience unique psychosocial challenges that require monitoring of suicide risk for many years after cancer diagnosis. Suicide preventive strategies and psychosocial interventions that exclusively target the AYA population must be developed. Oncology teams should adequately assess the medical, psychosocial, and physical functioning of this population and deliver age-appropriate and tailored care and information at the time of cancer diagnosis, during treatment, and throughout long-term survivorships for suicide prevention and improvement of quality of life.

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Footnote

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