Cancer-related Symptoms as Mediators between Treatment and Functional Capacity in Adolescents and Young Adults (AYAs) with Cancer

Chung Tin Justin MA[1], Herbert Ho Fung LOONG[2], Wing Tung IP[1], Junfeng ZHANG[1], Alex Wing Kwan LEUNG[3,4],

Chun Kit NGAN[5], Chi Kong LI[3,4], Yin Ting CHEUNG[1]

[1]School of Pharmacy; [2]Department of Clinical Oncology; [3]Department of Pediatrics; Faculty of Medicine, The Chinese University of Hong Kong
[4]Department of Pediatrics & Adolescent Medicine, Hong Kong Children's Hospital; [5]Department of Data Science, Worcester Polytechnic Institute. USA

Background

- Adolescents and young adults (AYA) typically refer to individuals who are between the age of 15 and 39 years old.
- The functional capacity of AYA patients with cancer are often affected by physical and psychosocial complications throughout the cancer care continuum.
- Although studies in Western countries have demonstrated compromised health and psychosocial functioning in AYA patients, these results may not be generalizable to the Asian population due to ethnocultural differences.

Objectives

- To identify clinical and treatment risk factors of functional capacity among Chinese AYA cancer patients in Hong Kong.
- To examine the mediatory effects of cancer-related symptoms between cancer/treatment characteristics and functional capacity
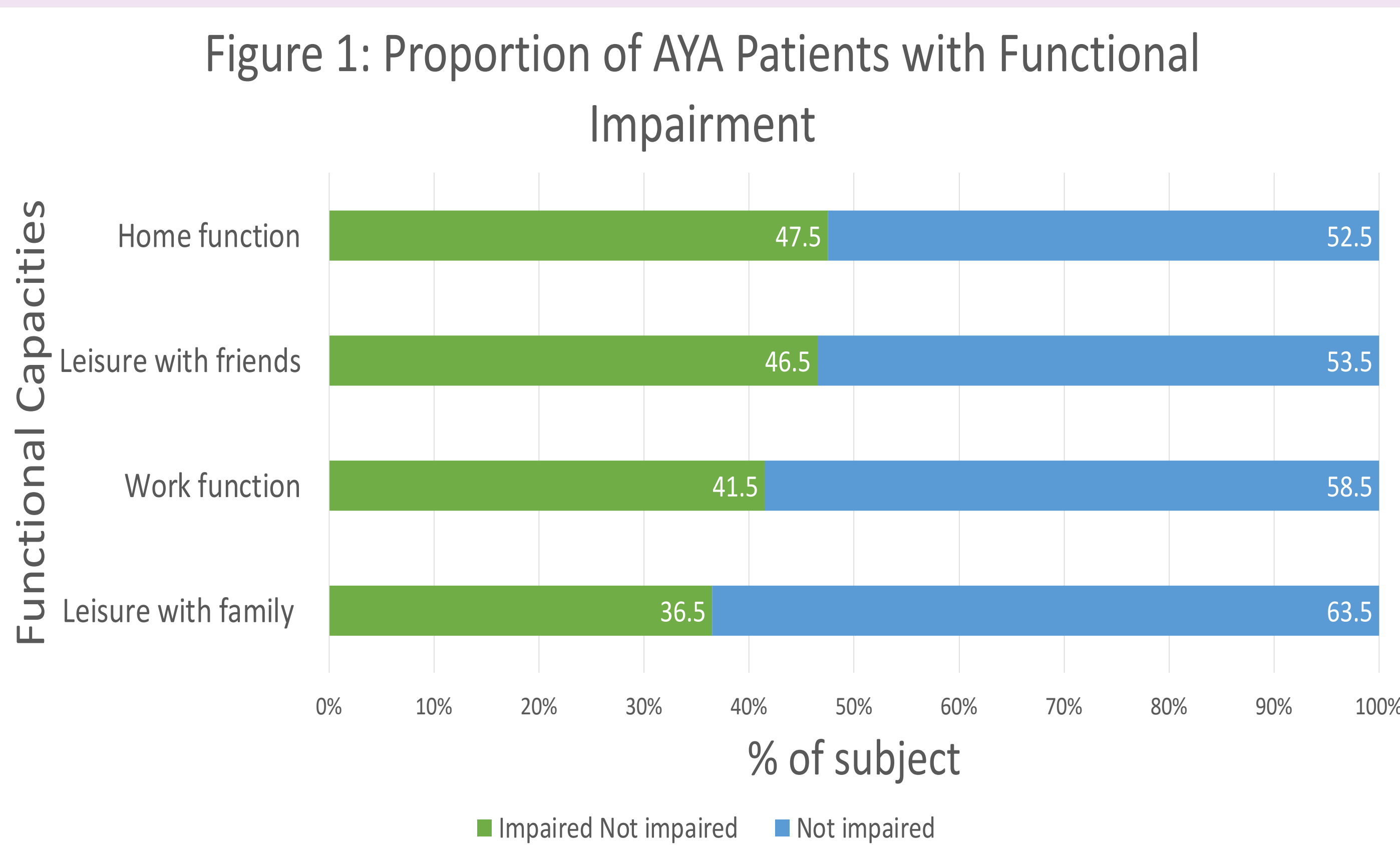
Methods

- This cross-sectional, multi-centered study was conducted at two academic public hospitals in Hong Kong – the Prince of Wales Hospital and the Hong Kong Children's Hospital.
- Study population:
  - Inclusion criteria: Patients who were diagnosed with cancer between 15 and 39 years old
  - Exclusion criteria: Pre-existing conditions associated with cognitive disorders, undergoing end-of-life treatment
- Study outcomes:
  - Functional capacity in performing school/work and home activities (*Life Functioning Questionnaire*)
- Predictive factors/covariates:
  - Treatment-related physical symptoms (*Rotterdam Symptom Checklist*)
  - Cognitive symptoms (*CCSS-Neurocognitive Questionnaire*)
  - Psychological symptoms (*Brief Symptom Invnetory-18*)
  - Clinical and treatment characteristics (*Medical records*)
  - Socioeconomic factors (*Structured questionnaire*)
- Statistical analysis:
  - General linear models to identify factors associated with functional capacity, adjusted for age, sex and cancer diagnosis
  - Structural equation modeling to to identify potential mediators between cancer/treatment factors and functional capacity

Results

- This study recruited 200 AYA patients with cancer (response rate: 98.0%) (Table 1)

Table 1: Clinical Characteristics	n=200 (%)
Age (Mean [SD]) years	33.1 [7.1]
Sex	
Male	83 (41.5)
Female	117 (58.5)
Diagnosis	
Hematological malignancy	67 (33.5)
Sarcoma	27 (13.5)
Breast cancer	34 (17.0)
Gonadal tumor	19 (9.5)
Other solid tumor	53 (26.5)
Treatment modalities	
Chemotherapy	156 (78.0)
Radiation therapy	69 (34.5)
Surgery	63 (31.5)
Immunotherapy	17 (8.5)
Targeted therapy	77 (38.5)

- A substantial proportion of AYA patients reported functional impairment, especially in the domain of home functioning (Figure 1)

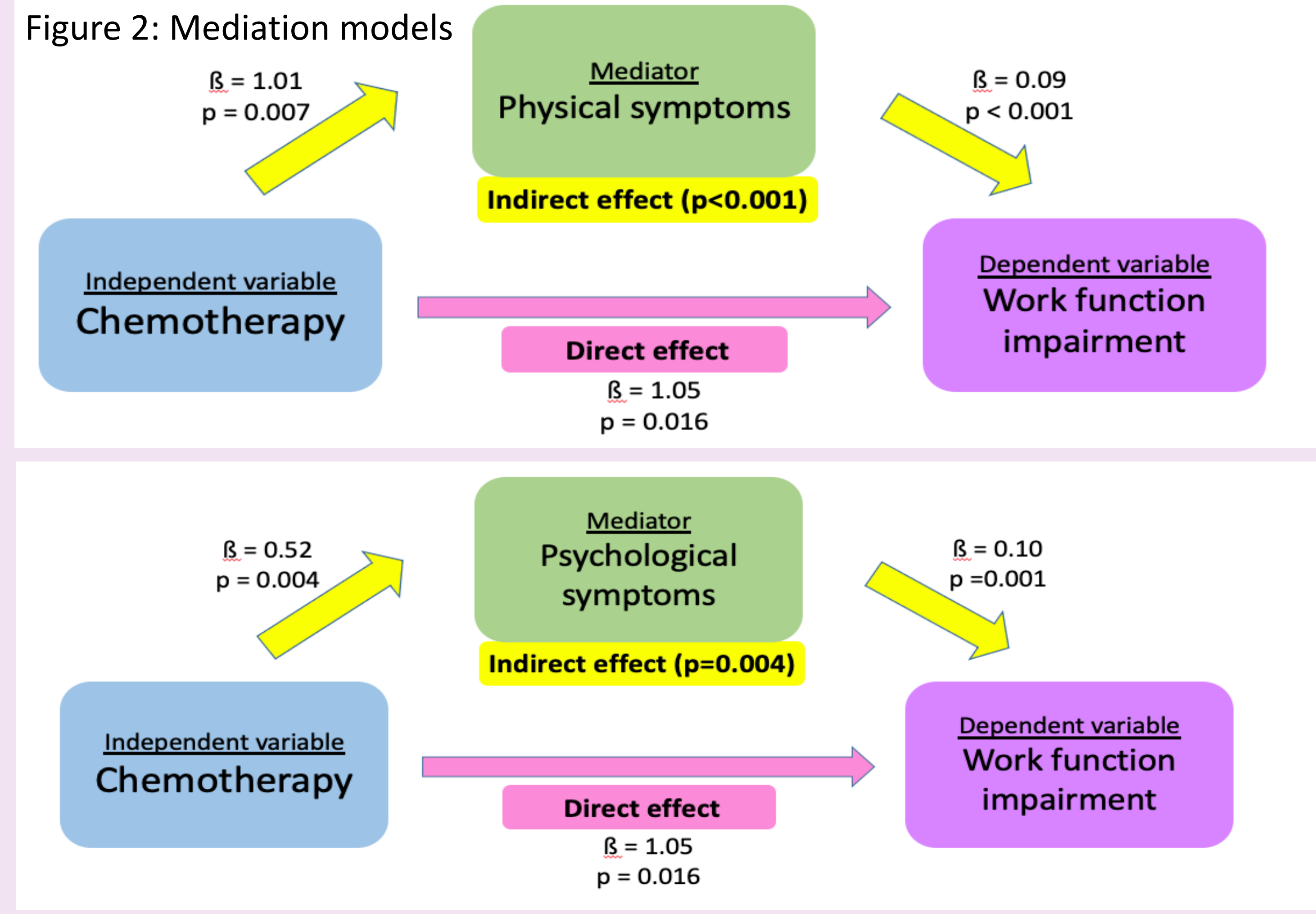Figure 1: Proportion of AYA Patients with Functional Impairment

Functional impairment refers to patients who reported a score of >3 points in the domains of "Leisure with Friend" and "Leisure in Family", or >4 points in the domains of "Home Function" and "Work Function" of the Life Functioning Questionnaire.

Results

Table 2: Factors associated with impaired work functioning	Unstandardized coefficient (B)	Standard error	p-value
Chemotherapy treatment	1.00	0.36	**0.007**
Physical symptoms	0.09	0.03	**<0.001**
Depression symptoms	0.27	0.09	**0.003**
Anxiety symptoms	0.22	0.08	**0.005**
Cognitive symptoms	0.22	0.10	**0.032**

- The mediation analysis showed that physical symptoms and psychological symptoms might mediate the effect of chemotherapy and impaired work function (Figure 2).

Figure 2: Mediation models

Conclusion

- AYA patients reported significant challenges to their functioning at home, school, and workplace.
- Cancer-related symptoms is a potential mediator between cancer treatment and functional limitations.
- This finding emphasizes the importance of symptom management and supportive care during the cancer care continuum.