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# Understanding global mobility of dietetic talents: a survey study of overseas-educated dietetic returnees in China

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## Abstract

**Background** Although international mobility of medical personnel has gained scholarly attention, there has been limited empirical research on overseas-educated dietetic professionals. China has experienced a notable return of highly skilled professionals. This study aims to explore the experiences of Chinese overseas-educated dietetic returnees, focusing on their practice areas, job satisfaction, motivations for returning, post-return challenges, and career development strategies.

**Methods** A web-based survey, conducted from July to December 2022, targeted dietetic returnees with degree(s) from institutions outside mainland China. Participants were recruited from professional group chats on a social media platform. Job satisfaction was assessed using a 7-item scale, with responses ranging from 0 to 5 for each item. Its internal consistency was evaluated via Cronbach's alpha. Responses were analyzed using descriptive statistics, t tests, and ANOVA. A multivariate regression helps further predict job satisfaction. Thematic analysis guides the analysis of an open-ended question.

**Results** Participants ( $N = 138$ ) were mainly female (86.2%), had a master's degree (79.0%), and had studied in the United States (37.7%). Clinical roles dominated post-return employment, but returnees also pursued biomedicine, biotechnology, and media. The mean job satisfaction score of 3.39 indicated moderate satisfaction. Job satisfaction varied across subgroups (e.g., older participants); however, in the multivariable regression model, only salary level remained a significant predictor. Key motivations for returning included familial ties, societal connections, and a desire to contribute to home country development. Returnees identified limited domestic networking connections as a top challenge. Meanwhile, they demonstrated agency in navigating post-return career development, such as by leveraging transnational social networks. Returnees also envisioned systematic workforce changes, such as improving licensure and regulation for foreign-trained professionals.

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**Conclusion** Returnees have diverse career pathways. Post-return job satisfaction, however, was significantly predicted only by salary level, emphasizing the critical role of compensation and economic viability in sustaining careers in the dietetic field. Our findings suggest that while returnees were primarily motivated by personal and cultural factors, they faced significant re-entry challenges that warrant attention from educators and policymakers. Future research should explore the global mobility of the dietetic profession and its potential to contribute to 'brain gain' in China's healthcare sector.

**Keywords** Registered dietitian, Dietetic returnees, China, Job satisfaction, Global mobility, International education, Healthcare workforce, Brain circulation, Brain gain

## Introduction

Student mobility in globalization has received scholarly attention in higher education. In 2019, China, one of the top sending countries of international students, reported a total of 703,500 students seeking education overseas [1]. Between 1978 and 2019, 4,231,700 students, or 86% of students who had completed their studies overseas, chose to return to China [1]. During the pandemic, there was a rising proportion of returnees reported by the Ministry of Education in China. This return of highly skilled professionals is theorized to improve a nation's international competitiveness through the gain of human talent, a phenomenon termed 'brain gain' [2]. Particularly in STEM<sup>1</sup> fields (e.g., health and medical fields), the gain and circulation of talents with international credentials are argued to improve China's research and innovation, further boosting economic development [3]. To reverse the potential 'brain drain,' the loss of talent for the sending country, China has issued talent policies such as the Thousand Talents Program and government incentives such as Hukou<sup>2</sup> privileges for top-tier overseas graduates.

While the enacting Chinese talent policies is a key motivation for return, scholars have identified other personal, professional and societal factors influencing the decision. Drawing on the push - pull framework [4], a 2017 systematic review highlights key pull factors favoring return, including family ties, expanding career opportunities in China, and collectivist decision-making [5]. Conversely, culture shock, challenges in obtaining foreign citizenship, and a lack of social networks in destination countries are major push factors encouraging return [5]. Notably, these push and pull factors can evolve and also drive re-expatriation, where returnees move overseas again to become global careerists [6]. Dissatisfaction with life and career in their home country, reverse culture shock, and the belief that relocating will offer better career prospects, family opportunities, and overall quality of life contribute to re-expatriation and brain circulation [7].

Assumptions are often made that studying abroad equips returnees with substantial social and cultural capital [8, 9], thereby increasing their potential to succeed in career and advance their countries and their respective fields. However, the literature points to many disadvantages and challenges returnees face when readapting to the home country for job embeddedness, such as reverse cultural shock and a lack of knowledge of the domestic context [5, 10]. Thus, the salary competitiveness of Chinese returnees and their contributions to the country after returning become highly debated topics [5]. Scholars report mixed findings on returnees' salary satisfaction and their limited political influence compared to local talents, who more often attain leadership roles [5].

Given the rising rate of diet-related chronic diseases [11, 12], demand for sustainable food system transformation [13, 14], and concern for food security [15], dietitians are well placed health professionals to help meet the population needs. Employability of dietetic graduates has received global attention, with most of the literature discussed in the context of the United States [16]. A scoping review identifies emerging or expanding areas of practice in the global dietetic field and pointed to nutrition informatics as a growth area [16]. Nevertheless, scholars identified a lack of institutional protection for registration and dietetic education resources in China [17]. High-income countries have recognized the expanding needs of the dietetic workforce: support for career transitions among internationally trained professionals has been reported in Australia and Canada, where a special credentialing process for overseas-educated immigrant dietitians has been created and improved [18, 19]. However, the employability of internationally educated dietetic professionals from the Global South upon returning is poorly understood within the dietetic workforce. Recent qualitative evidence suggests that Australian-trained international dietetic graduates from Asia experience diverse career trajectories and report misalignment in practice upon returning to their home countries [20]. In other words, it remains unclear whether dietetic returnees can leverage their capitals to navigate successful career transitions.

In China, overseas-educated dietitians are estimated to comprise less than 1% of the nutrition workforce [17]. With growing recognition of nutrition professionals and

<sup>1</sup> STEM stands for Science, Technology, Engineering, and Mathematics.

<sup>2</sup> The hukou system was established in 1958 in China to help the government manage social services for residents including access to education and health care. Despite several rounds of reform, it has received critiques on inhibiting the internal migration.

organizations in China [21], the dietetic returnee group has grown and been granted test exemptions in the Chinese registered dietitian accreditation system [17]. It indicates a recognition of returnees, who often possess training in evidence-based practice; contribute diverse competencies across clinical, community, food systems, and policy settings; and demonstrate skills in intercultural nutrition communication [22, 23, 24, 25, 26].

To better understand the emerging dietetic returnees, we seek to (1) examine the post-return employment among Chinese dietetic returnees, (2) explore associations between social demographics and post-return job satisfaction, (3) understand motivations to return and challenges returnee face, and (4) describe key strategies used for a successful post-return transition. This study can advance our knowledge of the post-graduate career trajectories of dietetic returnees from the Global South. This ensures that their unique challenges and opportunities are considered in future international nutrition workforce planning, including the exploration of the potential pathways for returnees to contribute to the nutrition and dietetics field in their home countries.

## Methods

### Study design and study setting

The survey was conducted between July 2022 and December 2022 by a research team in Shanghai, China. A web-based survey was chosen to protect the personal health of respondents and study investigators during the pandemic. This study received ethical exemption from the Medical Ethics Committee of Xinhua Hospital Affiliated with Shanghai Jiao Tong University School of Medicine, China, on June 23, 2022.

### Sampling and data collection

We used purposive sampling to identify returnees in the dietetic field. The leading investigator (YZ) selected WeChat, the most popular social media platform among Chinese users, as a platform to distribute recruitment information. With existing access to diverse group chats in the nutrition community, such as ‘Dietetic Overseas’<sup>3</sup> and ‘China-US Dietetics’<sup>4</sup>, the leading researcher (YZ) shared in groups the recruitment script (invitation to

participate) and linked it to electronic consent. Respondents who had received a degree in the food and nutrition field from an institution outside of mainland China were targeted. Overall, one hundred and eighty-three (183) respondents participated in the survey.

## Instrument

### Survey development

The development of the questionnaire was informed by a review of the literature [27, 28, 29, 30] and interviews with leaders from the Chinese Nutrition Society (CNS), students studying abroad, and dietetic returnees working in different fields. Expert-driven and respondent-driven pretesting techniques were applied to strengthen survey development. For example, in 2022, 2 experts with diverse backgrounds in education and working experience were given a copy of the draft survey, and a pre-test questionnaire was administered among a group of 4 returnees. Based on the feedback, the survey questions were revised.

The final version of the 53-item questionnaire covers four key aspects related to returnees’ experiences: demographic background, employment history and current status, job satisfaction, and recommendations for future returnees. The last set of questions is about perceived impact of studying abroad on employment, including an open-ended question, “What suggestions would you offer to a dietetic graduate who wants to return?”

## Measures

In the following sections, we first describe the sociodemographic measures and then define the key variables pertinent to our research questions.

**Gender.** Gender was collected using a single item question with two options (Female and Male).

**Year of birth.** Year of birth was entered numerically.

**Current workplace.** Current workplace was collected through an open-ended fill-in question, with respondents providing the province and city of their current workplace.

**Highest degree obtained.** Highest degree obtained was collected as a categorical measure presenting three options, titled bachelors, master’s and PhD.

**Multi-Country (Region) study abroad.** Multi-Country (Region) study abroad was collected through an open-ended text box, where respondents specified the country or region where they attained their [Doctorate/Master’s/Bachelor’s].

**Overseas work experience.** Overseas work experience was collected as a numeric response. Respondents were asked to indicate the number of years they had worked overseas.

**Holding a domestic degree.** Holding a domestic degree was assessed with three single-item questions,

<sup>3</sup> The informal professional groups were initiated and organized since 2015 by the lead investigator (YZ), an active member of the Chinese Nutrition Society. Group members were connected through nationwide social media platforms in China, such as Weibo, Xiaohongshu, the Dingxiangyuan BBS, and the alumni networks of nutrition related programs. Eligible members are exclusively oversea educated nutrition and dietetics professionals and students, regardless of their current country of practice or study.

<sup>4</sup> The informal group primarily serves professionals and students who currently work and live in the United States. Some members who have returned to China choose to remain in the group due to a shared identity. Notably, most returnees in “China-US Dietetics” group have joined the “Dietetic Overseas” group.

each asking, ‘Where did you achieve your [Doctorate/Master’s/Bachelor’s] degree?’ with response options ‘Abroad’ or ‘Domestic.’

**Overseas credential(s).** Overseas credential(s) were measured using a dichotomous (yes/no) question asking

**Table 1** Participant characteristics from a web-based survey on global mobility in dietetic fields (N = 138)

Characteristics	Results n(%)
<b>Gender</b>	
Female	119(86.2)
Male	19(13.8)
<b>Age (years)</b>	
20–25	17(12.3)
26–30	52(37.7)
30–35	48(34.8)
36–40	19(13.8)
>40	2(1.5)
<b>Current Workplace</b>	
Metropolitan areas <sup>a</sup>	90(65.2)
Others	48(34.8)
<b>Highest Degree Obtained</b>	
Bachelor	22(15.9)
Master	109(79.0)
PhD	7(5.1)
<b>Multi-Country (Region) Study Abroad</b>	
Yes	19(13.8)
No	119(86.2)
<b>Overseas Work Experience (years)</b>	
0	95(68.8)
1–3	36(26.1)
>3	7(5.1)
<b>Holding a Domestic Degree (yes/no)</b>	
Yes	57(41.3)
No	81(58.7)
<b>Overseas Work Experience (yes/no)</b>	
Yes	43(31.2)
No	95(68.8)
<b>Overseas Credential(s) (yes/no)</b>	
Yes	41(29.7)
No	97(70.3)
<b>Domestic Credential(s) (yes/no)</b>	
Yes	82(59.4)
No	56(40.6)
<b>Salaries (Chinese yuan/month)</b>	
<5,000	7(5.1)
5,001–10,000	46(33.3)
10,001–20,000	59(42.8)
20,000–30,000	16(11.6)
>30,000	10(7.3)
<b>Post Return Job Mobility (yes/no)</b>	
Yes	70(50.7)
No	68(49.3)

<sup>a</sup> Metropolitan areas include four major cities in China: Beijing, Shanghai, Guangzhou, and Shenzhen. They have been recognized as Tier 1 cities due to their central role in commerce, finance, and industry

respondents whether they possess any credentials earned overseas.

**Domestic credential(s).** Domestic credentials were assessed using a multiple-choice question with options for ‘Registered Dietitian,’ ‘Dietetic Technician, Registered,’ ‘other’ (with free text), or ‘none.’

**Salaries.** Salaries were measured using a drop-down question with income categories ranging from less than 5,000 yuan/month to over 30,000 yuan/month.

**Post-return job mobility.** Post-return job mobility was measured using a dichotomous (yes/no) question asking respondents whether they changed their job after returning.

**Job satisfaction.** Job satisfaction was measured via a 7-item scale, which includes job scope, management style, interpersonal relations, compensation level, organizational culture, skill development, and career opportunities.

**Motivations to return.** Motivation to return was collected with a seven-category item, plus “others”; respondents could select all that applied.

**Practice areas.** Practice areas were collected during the pre- and post-return period. A 21-category measure captured practice areas overseas, while a 25-category measure helps identify domestic practice areas.

**Advantages of studying abroad for domestic employment.** Advantages of studying abroad for domestic employment were evaluated using a single item listing 12 response options (including ‘others’). Respondents could select all that applied and enter additional details in the ‘others’ box.

**Disadvantages of studying abroad for domestic employment.** Disadvantages of studying abroad for domestic employment were measured using a single item with 7 response options, including an ‘others’ category. Respondents could select all applicable options and provide additional details for ‘others.’

## Data analysis

All data were deidentified and cleaned prior to analysis. We first excluded four incomplete responses, resulting in a completion rate of 97.8%. Forty-one respondents who had the intention to return but had not returned to China by the time of survey administration were also excluded in the analysis.

Age was calculated using year of birth. Host country responses were tallied and examined, and only one response was recoded: ‘Scotland’ was reclassified as ‘the United Kingdom.’ To retain flexibility in potential analyses, we created a three-category measure for overseas work experience (see Table 1). Current workplace responses were tallied and examined at province and city level. Given the high living cost of metropolitan areas, we created a binary measure for current workplace (see

Table 1) to adjust for the potential cofounder effect in the relationship between salary and job satisfaction. Individuals who listed at least two different countries/regions were categorized as having multi-country (region) study abroad experience. Additionally, because the full version of practice areas was impractical for comparison, responses were grouped into eight broader categories (see Fig. 3). When reviewing categorical responses to advantages and disadvantages of studying abroad for domestic employment, we made special effort to extract 'no advantage' and 'no disadvantage' from 'others' categories because of its unique perspective.

All the statistical tests were conducted with SPSS 21.0, and the significance level was set at  $p < 0.05$ . Cronbach's alpha was employed to assess the internal consistency of the job satisfaction scale. A threshold of  $\geq 0.70$  was used as an acceptable standard for reliability.

Descriptive statistics and frequencies were calculated for the demographic variables. The mean overall job satisfaction score was calculated by averaging the 7 aspects equally. After ensuring normality via the Kolmogorov-Smirnov test, two-group comparisons were made using *t* tests for normally distributed data, whereas ANOVA was applied for multiple-group comparisons. Next, a linear regression model is adopted to analyze the relationship between independent variables of interest (dummy variables) and the dependent variable "job satisfaction". Its general form can be expressed as  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \epsilon$ . The Ordinary Least Squares (OLS) method is used to estimate the coefficients of the regression model. The method minimizes the sum of squared residuals between the observed values and the model - predicted values, ensuring optimal estimates of the regression coefficients. Model fit was evaluated using  $R^2$ , adjusted  $R^2$ , and the *F*-test.

Using NVivo 14, the qualitative responses to one open-ended question were compiled and reviewed by two members of the research team (YZ and LZ). By applying principles of thematic analysis [31], the team created a codebook and identified themes. Team meetings were held to address any discrepancies.

## Findings

### Participant characteristics

Participants ( $N = 138$ ) were 86.2% female, aged between 24 and 46 years old, and mostly held a master's degree (79.0%) (Table 1). More than one-third (37.7%) of the participants had attained their highest level of education in the United States, with the next highest proportion in the United Kingdom and the Republic of Korea (Fig. 1). The group predominantly consists of individuals working in metropolitan areas, with Shanghai (31.2%) and Beijing (21.0%) as the top reported workplace locations (Fig. 2). Individuals with a monthly salary between 10,000 and

20,000 yuan made up approximately half of the sample (42.8%). Overseas working experience is not uncommon among the group, with 31.1% reporting having worked abroad. Just over a quarter (29.7%) reported holding credentials issued by a foreign authority, such as the Commission on Dietetic Registration (CDR) in the United States. Almost 60% of participants obtained domestic credential(s) through groups like the Registered Dietitian Committee (RDC) of the CNS. The peak year for returning and studying abroad were 2020 and 2015, respectively (Fig. 3).

### Post-return employment

Dietetic professionals diversified their practice areas when returned, with emerging post-return opportunities in the fields of biomedicine and biotechnology as well as media and communications. When practicing abroad, hospitals and clinics were the top employers, accounting for 64% of overseas professional practices (Fig. 4). This clinical focus shifted but continued to dominate post-return employment among dietetic professionals, with 20% of returnees working in hospitals and clinics in China.

We observed increased involvement in five areas: the food industry, corporate and health technology, higher educational systems, biomedicine and biotechnology, and media and communications. Nevertheless, dietetic professionals became less active in public health and disease prevention institutions after their return. The pre- and post-return employment comparisons indicate a broader scope of post-return professional involvement in different industries.

### Post-return job satisfaction

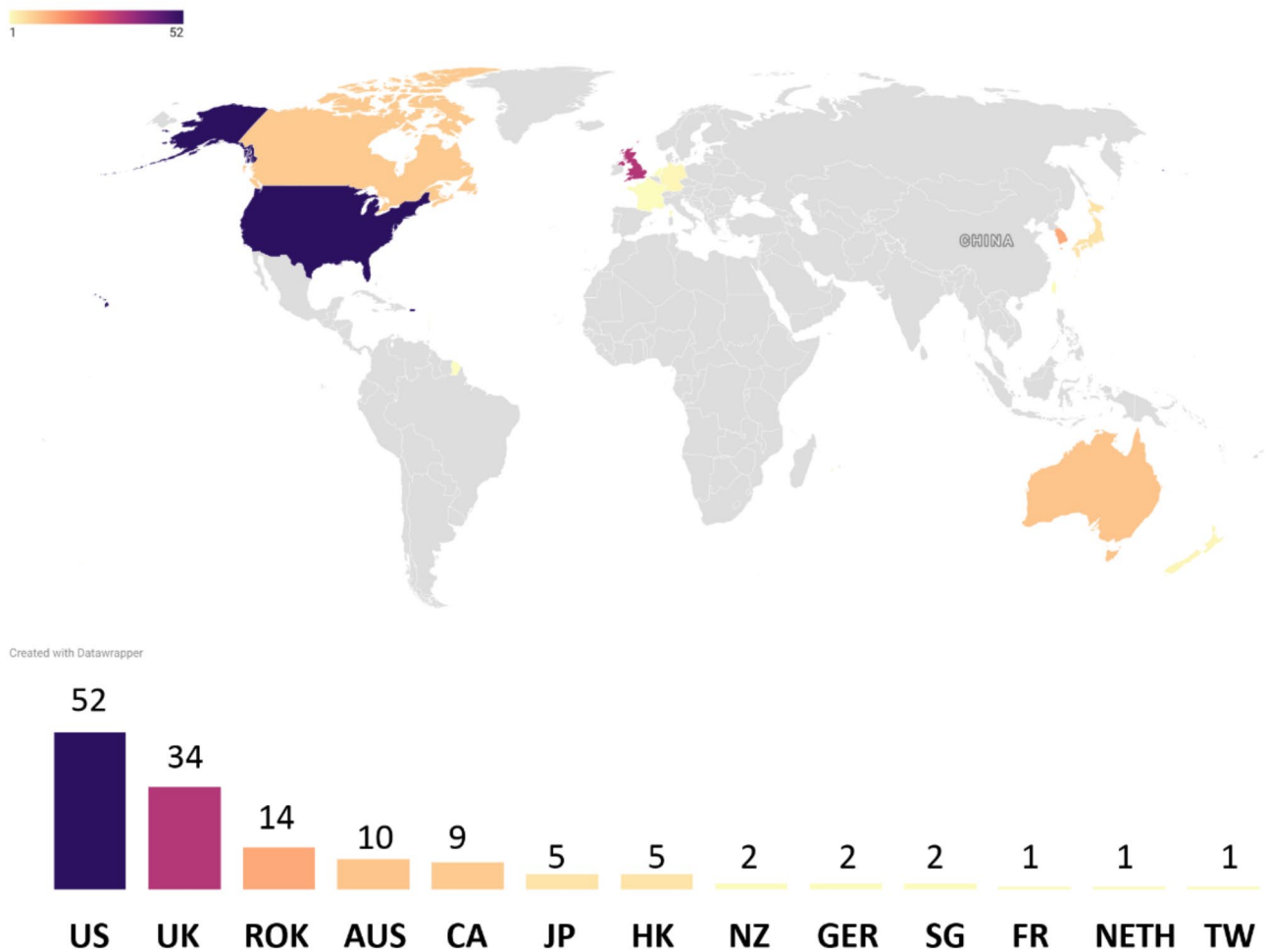
Participants were asked to rate their post-return job satisfaction by answering a 7-item question. The ratings for every item ranged from "1 = completely dissatisfied", "2 = somewhat dissatisfied", "3 = neutral", "4 = somewhat satisfied", and "5 = very satisfied". The mean overall job satisfaction score was 3.39, with a standard deviation of 0.815. This indicates a moderate level of satisfaction. The internal consistency of the job satisfaction scale was strong, with a Cronbach's alpha of 0.90.

Participants reported the highest level of satisfaction with job scope and interpersonal relationships, whereas the compensation level was rated as the least satisfying aspect. Figure 5 presents the overall job satisfaction and its seven dimensions in order from the most highly rated to the least highly rated.

Among the eleven sociodemographic variables analyzed, age ( $p = 0.025$ ), highest degree obtained ( $p = 0.020$ ), holding a domestic degree ( $p = 0.004$ ), salary ( $p < 0.001$ ), and post-return job mobility ( $p = 0.010$ ) were significantly associated with job satisfaction in bivariable



## Number of Participants



**Fig. 1** Countries and regions with the highest education levels among Chinese dietetic returnees. Footnote: Country and region names are abbreviated using ISO Alpha-2 codes: US (United States), UK (United Kingdom), ROK (Republic of Korea), AUS (Australia), CA (Canada), JP (Japan), HK (Hong Kong), NZ (New Zealand), GER (Germany), SG (Singapore), FR (France), NETH (Netherlands), and TW (Taiwan)

analysis. Participants who were older, held higher degrees, obtained a domestic degree, had higher salaries, or changed their job after returning reported greater job satisfaction. No significant associations were found for other variables, such as gender and holding overseas credential(s) (Table 2).

As shown in Table 3, the regression model demonstrates a good fit, which explained 22.5% of the variance in job satisfaction ( $R^2=0.225$ , adjusted  $R^2=0.108$ ) and was statistically significant ( $F=1.920$ ,  $p=0.020$ ). Compared with those earning <5000 yuan/month, returnees earning >30,001 yuan/month had significantly higher job satisfaction ( $\beta=0.357$ ,  $SE=0.495$ ,  $t=2.429$ ,  $p=0.017$ ). No other variables reached statistical significance ( $p>0.05$ ).

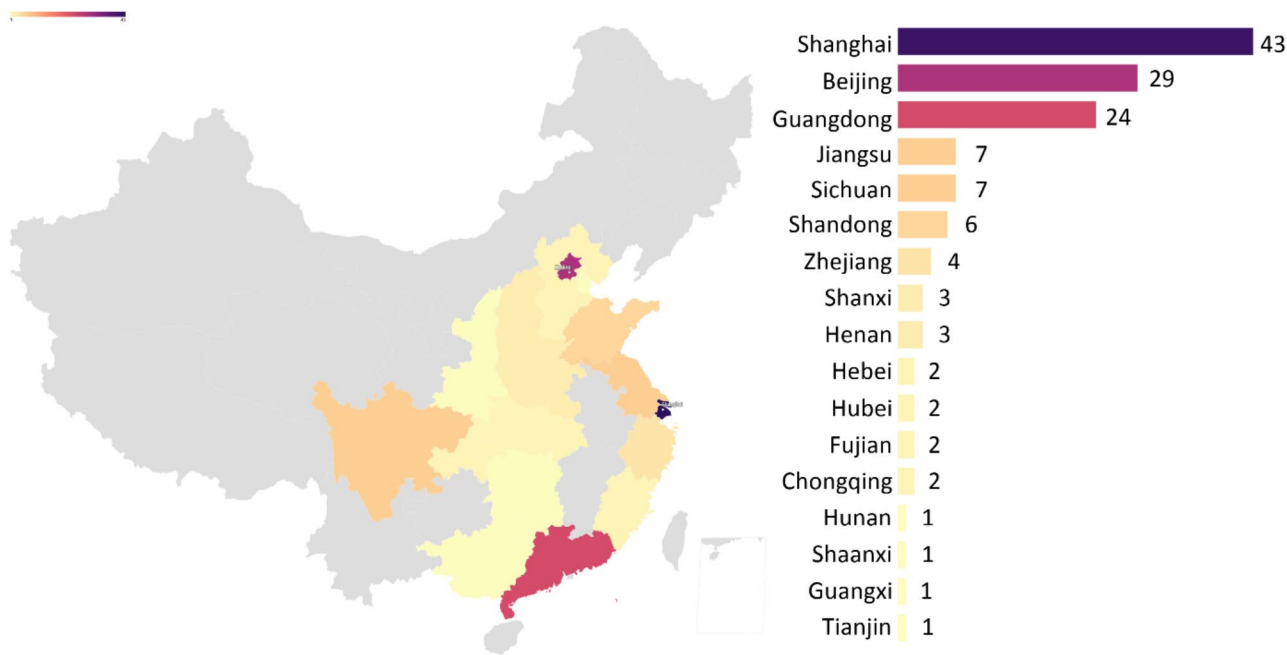
### Motivations to return

Returnees prioritized familial and societal connections, with approximately 77% of respondents selecting

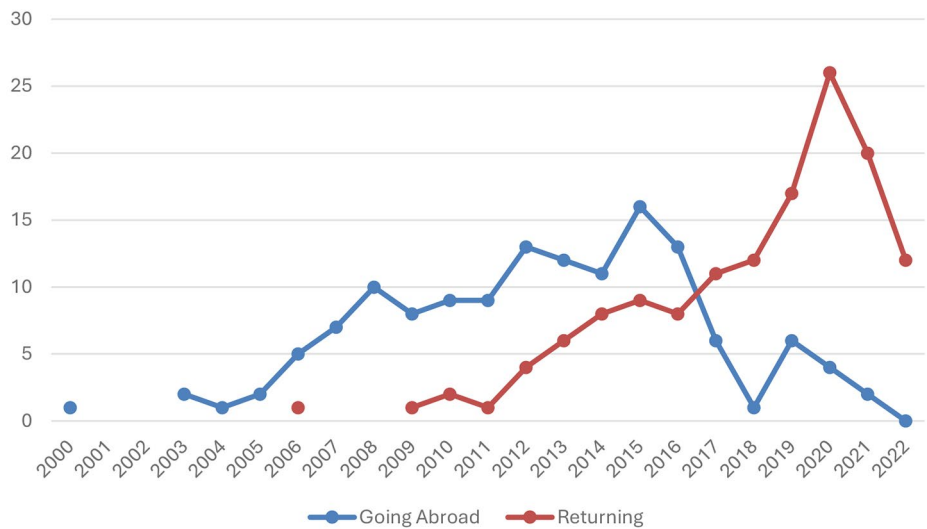
‘Reunion with family and friends’ as their reasons for returning to work in China. 50% wished to contribute to their home country, reflecting an aspiration to engage in national development by leveraging their expertise. Social stability, which enhances comfort and convenience in life, reached 36%, whereas the prospect of career development in their field within the home country resonated with 27% of the individuals. Returnee policies and better social networks were less significant drivers. In the open-ended “Other” category, 9% of the respondents highlighted the COVID-19 pandemic and strict immigration policies in their study abroad countries as major factors for their return. Interestingly, high salary in the nutrition industry was the least significant factor, with only 2% of the responses (Fig. 6).

To better understand the broader context of returnees’ motivations, we also explored their perceived advantages of studying nutrition abroad for domestic employment.

Number of Participants



**Fig. 2** Province-level distribution of current workplace locations among Chinese dietetic returnees



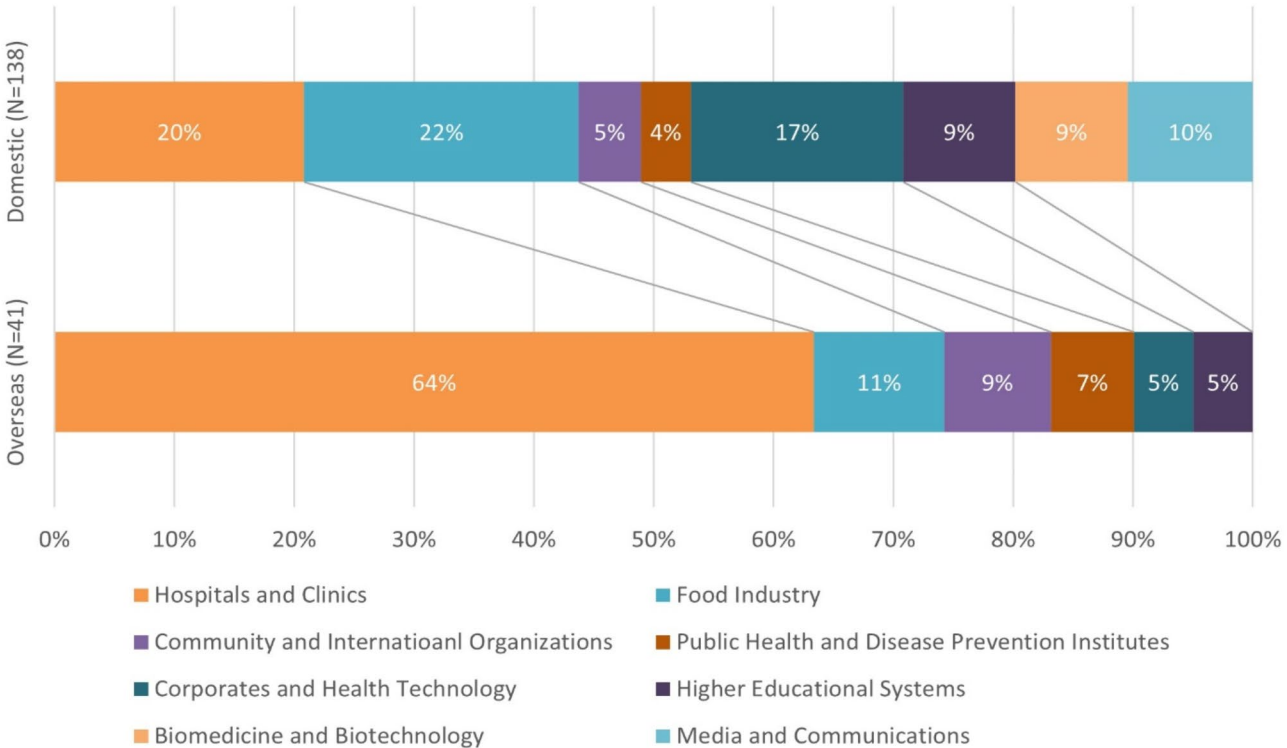
**Fig. 3** Trends in Going Abroad and Returning from 2001 to 2022

Results showed that most participants emphasized the academic and professional skills acquired during their training (Fig. 7-A). Conversely, alumni resources and overseas work and internship experience were not regarded as significant leverage. Among the participants, 86 (62%) believed that professional knowledge helps them stand out in the domestic job market, while about 60% indicated that their foreign language skills bolster their post-return careers. The societal recognition of foreign degrees in China was highly valued, with nearly 70%

considering it an advantage. Interestingly, the reputation and prestige of the school were seen as less impactful. Other important skills for returnees include a broadened way of thinking, personal perseverance and independence, and strong research and communication skills.

**Challenges returnees face**

We explored the challenges returnees face by asking about the disadvantages they perceive from their study abroad in domestic career development. The majority



**Fig. 4** Percentage of practice areas among overseas-educated dietetic talents in overseas and domestic contexts



**Fig. 5** Mean score of job satisfaction for overall and seven dimensions among overseas-educated dietetic talents

(65%) pointed to limited domestic networking connections. More than half of the respondents reported difficulties due to misalignment between competencies and domestic job requirements, whereas nearly half adapted to domestic administrative procedures, different work values, and different cognitive approaches. Notably, nearly one-third of the returnees considered the language

barrier, characterized by language expressions and translating professional terminology into Chinese, as a significant challenge to overcome (Fig. 7-B). Furthermore, our qualitative analysis of the open-ended question regarding suggestions for returnee career development further confirmed these reintegration difficulties. Out of 126 respondents who provided valid



**Table 2** Mean overall job satisfaction score of dietetic returnees in China by sociodemographic factors (N = 138)

Characteristics	Percentage	Mean(SD <sup>a</sup> )	P value <sup>b</sup>
<b>Gender</b>			
Female	86.2	3.20(0.80)	0.880
Male	13.8	3.23(0.91)	
<b>Age (years)</b>			
20–25	12.3	3.13(0.55)	0.025
26–30	37.7	3.00(0.82)	
30–35	34.8	3.24(0.86)	
36–40	13.8	3.62(0.75)	
>40	1.5	4.10(0.42)	
<b>Current Workplace</b>			
Metropolitan areas <sup>c</sup>	65.2	3.49(0.91)	0.051
Others	34.8	3.19(0.77)	
<b>Highest Degree Obtained</b>			
Bachelor	15.9	2.88(0.86)	0.020
Master	79.0	3.22(0.79)	
PhD	5.1	3.83(0.76)	
<b>Multi-Country (Region) Study Abroad</b>			
Yes	13.8	2.95(0.60)	0.146
No	86.2	3.24(0.84)	
<b>Holding a Domestic Degree</b>			
Yes	41.3	3.44(0.76)	0.004
No	58.7	3.03(0.82)	
<b>Overseas Work Experience (years)</b>			
0	68.8	3.34(0.71)	0.440
1–3	26.1	3.44(1.11)	
>3	5.1	3.75(1.46)	
<b>Overseas Credential(s)</b>			
Yes	29.7	3.28(0.99)	0.481
No	70.3	0.17(0.73)	
<b>Domestic Credential(s)</b>			
Yes	59.4	3.29(0.82)	0.179
No	40.6	3.07(0.84)	
<b>Salaries (Chinese yuan/month)</b>			
<5,000	5.1	2.79(0.90)	0.000
5,001–10,000	33.3	2.84(0.65)	
10,001–20,000	42.8	3.26(0.79)	
20,000–30,000	11.6	3.46(0.70)	
>30,000	7.3	4.36(0.42)	
<b>Post Return Job Mobility (yes/no)</b>			
Yes	50.7	3.57(0.75)	0.010
No	49.3	3.19(0.95)	

<sup>a</sup> SD = Standard deviation<sup>b</sup> Estimated with t tests (for two groups) or ANOVA (for three or more groups)<sup>c</sup> Metropolitan areas include four major cities in China: Beijing, Shanghai, Guangzhou, and Shenzhen. They have been recognized as Tier 1 cities due to their central role in commerce, finance, and industry

suggestions, sixteen expressed explicit negative attitudes toward returning, with eleven stating, “Do not return”. Four respondents elaborated on their conservative perspectives by highlighting the lack of domestic opportunities, particularly in inpatient, clinical, and counseling settings. These sentiments indicate negative experiences associated with returning and a more favorable perception of career potential in overseas workplaces, which may result in re-expatriation.

### Navigating returnees’ career development: key strategies

Among the 126 valid responses to the open-ended question on suggestions to support future returnees’ career development, we identified four strategies for a successful post-return transition: (1) self-adapting and planning are fundamental, (2) confronting the gain and loss, (3) maximizing compatibility in decision making, and (4) seeking systematic changes.

**Self-adapting and planning are fundamental:** Returnees highlighted agency in addressing significant gaps in knowledge systems between countries, particularly concerning credentials and the scope of practice in clinical settings. Acquiring a credential from a foreign authority before returning was perceived to be beneficial for enhancing professional credibility. Additionally, the group values continuing education as a strategy to stay current with industry trends and be better prepared for unexpected opportunities in a growing but mismatched job market. Additional strategies include gaining overseas work experience (both internships and full-time jobs), staying informed about domestic needs and trends, expanding domestic networks, and obtaining domestic internship experiences. Interestingly, we observed a wide spectrum of opinions toward attending graduate schools: three respondents with a master’s degree highly recommended obtaining doctoral degrees for domestic employment, whereas one respondent said, “Work experience is more important than your degrees if you are not into research.” The tension between education and post-return employment experience suggests that returnees face hidden contextualized and situational factors in advancing careers.

**Confronting the gain and loss** Feeling uncertain and despair after returning, at least initially, is normalized and justified by listing reverse culture shocks, including differences in work culture, gendered expectations of professional achievements, and the hierarchical preference for professional titles over academic degrees in China. One returnee reflected on her perceived and passively reinforced cultural expectations, such as getting married and having children by the age of 30. The examination of loss upon returning evoked resilience for sustainable growth. Some returnees encouraged reassessing value priorities

**Table 3** Coefficients for regression analysis of job satisfaction score

Variables <sup>a</sup>	Unstandardized Coefficients		Standardized	t	p	95.0% Confidence Interval for B	
	B	SE <sup>b</sup>	Beta			Lower Limit	Upper Limit
(Constant)	3.005	0.398		7.545	0.000	2.216	3.793
<b>Gender</b>							
Male	0.072	0.217	0.028	0.331	0.741	-0.359	0.502
<b>Age (years)</b>							
< 30	-0.298	0.245	-0.166	-1.218	0.226	-0.783	0.187
30–35	-0.305	0.261	-0.167	-1.170	0.244	-0.822	0.211
35–40	-0.200	0.319	-0.079	-0.626	0.533	-0.832	0.432
> 40	-0.227	0.725	-0.031	-0.313	0.755	-1.664	1.209
<b>Current Workplace</b>							
Metropolitan areas <sup>c</sup>	0.086	0.187	0.047	0.457	0.648	0.285	0.456
<b>Highest Degree Obtained</b>							
Master	0.115	0.235	0.054	0.489	0.626	-0.350	0.579
PhD	0.783	0.414	0.197	1.894	0.061	-0.036	1.602
<b>Holding a Domestic Degree</b>							
Yes	0.003	0.198	0.002	0.015	0.988	-0.389	0.395
<b>Overseas Credential(s)</b>							
Yes	-0.149	0.203	-0.078	-0.732	0.466	-0.550	0.253
<b>Domestic Credential(s)</b>							
Yes	0.071	0.182	0.040	0.390	0.697	-0.289	0.430
<b>Overseas Work Experience (years)</b>							
1–3	0.027	0.204	0.013	0.131	0.896	-0.377	0.430
> 3	0.067	0.375	0.017	0.180	0.858	-0.676	0.810
<b>Salaries (Chinese yuan/month)</b>							
5001–10,000	0.060	0.348	0.032	0.172	0.864	-0.629	0.749
10,001–20,000	0.352	0.362	0.199	0.971	0.334	-0.365	1.069
20,001–30,000	0.336	0.438	0.123	0.765	0.445	-0.532	1.204
> 30,001	1.201	0.495	0.357	2.429	0.017	0.222	2.181
<b>Post Return Job Mobility</b>							
Yes	0.275	0.164	0.158	1.672	0.097	0.051	0.600
R <sup>2</sup>	0.225						
Adjusted R <sup>2</sup>	0.108						
F	F = 1.920, p = 0.020						

<sup>a</sup> Reference groups are not displayed in the table. Coefficients reflect comparisons against the omitted category

<sup>b</sup> SE = Standard Error

<sup>c</sup> Metropolitan areas include four major cities in China: Beijing, Shanghai, Guangzhou, and Shenzhen. They have been recognized as Tier 1 cities due to their central role in commerce, finance, and industry

by placing greater importance on recognition from colleagues and society than on financial rewards. One participant explicitly stated.

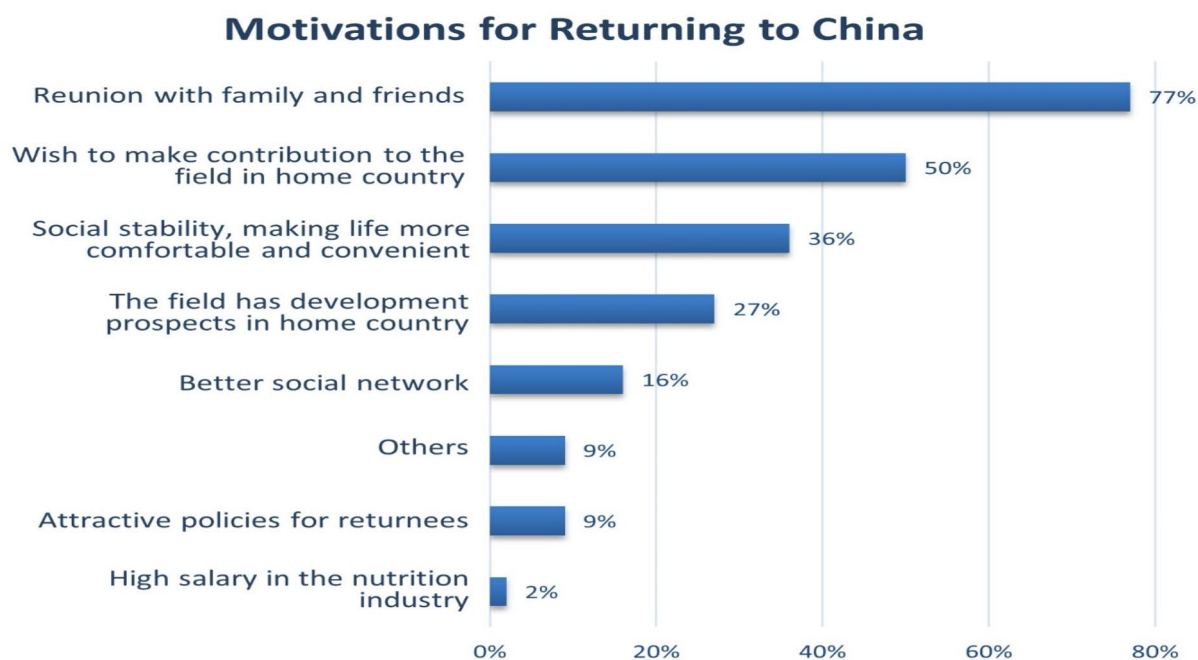
*If you want to make money, don't study nutrition. This is a profession with social responsibility.*

While the statement risks lecturing, it effectively confronts the lack of instrumental motivations, such as earning money, by strategically strengthening intrinsic motivation in dietetic professional performance. To tackle reintegration, returnees emphasized the importance of gaining community support from alumni who have returned and dietetic professionals who are

domestically trained. Social networks benefit post-return employment. One returnee said,

*Always pay attention to job openings or internal referrals from alumni or acquaintances.*

**Maximizing compatibility in decision making** In regard to recommendations in practice areas, many discourage working in hospitals and clinics in China due to poor career alignment. In the current Chinese healthcare system, nutrition departments are staffed predominantly by physicians specializing in nutrition, often leaving out overseas-educated dietitians. One respondent who currently works in a public hospital explained.



**Fig. 6** Percentage of Chinese dietetic returnees indicating their motivations for returning to China

*Working in hospitals, we dietitians are at the lower end of the professional hierarchy and get classified as technicians. Without a physician qualification certificate, it's tough for us to get involved in clinical nutrition diagnosis and treatment.*

This mismatch in credentialing and institutional hiring processes likely pushes dietetic returnees with a passion for clinical nutrition into careers in research institutions, corporate roles, and the food industry. As one participant who currently works in health technology field suggested:

*I'd recommend going for roles in research and development or management instead of clinical positions; clinical work is a waste of talent.*

Future graduates are encouraged to explore new and interdisciplinary fields, such as health technology, beyond traditional nutrition roles.

Compatibility also evidences in choosing the first post-return job. Foreign enterprises were considered returnee friendly. As one participant noted, "Going with a foreign company is the best choice. Their approach is easier to get used to, plus we can retain our language advantage." Similarly, metropolitan areas are recommended for their greater resources and higher demand for nutrition-related jobs.

**Seeking systematic changes** Returnees envisioned changes at a systematic level. At the community level,

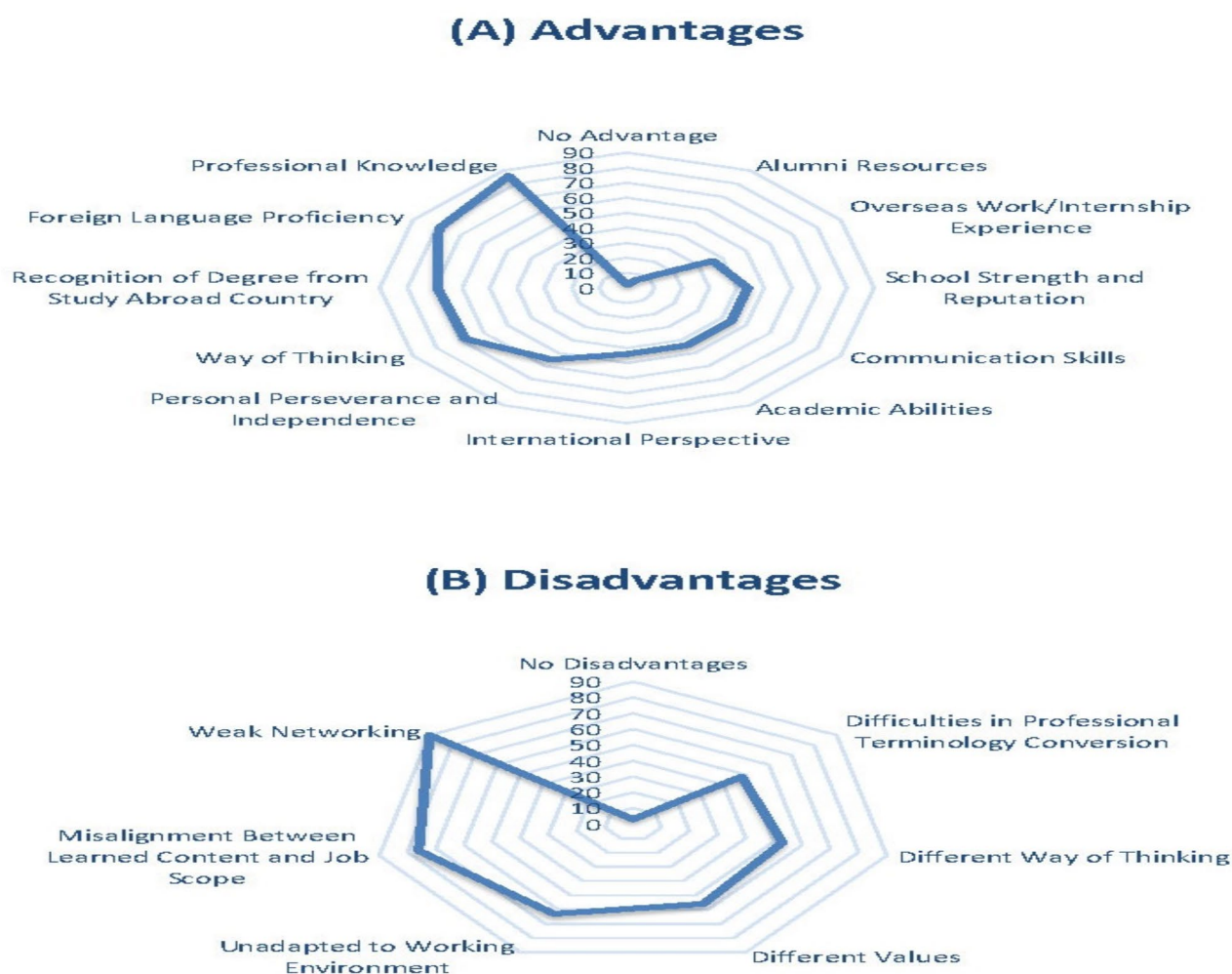
returnees proposed a mentorship system, in addition to job posting platforms, to assist with their transition and career development. With respect to educational systems, returnees hoped that improving domestic nutrition programs would enhance the competencies of the Chinese nutrition workforce, enabling it to meet international standards and support both licensure and regulation for foreign-trained professionals. They also highlighted the need for advocacy led by professional groups such as CNS. The envisioned institutional changes include job shadowing and training programs for new graduates and opening pathways to practice for internationally trained health professionals.

## Discussion

The current study provides valuable insights into the global mobility of dietetic professionals. This research fills a significant gap in the literature by examining the experiences of Chinese dietetic returnees, an area that has been very limited.

### Interplay between sociodemographic factors and job satisfaction

To our knowledge, this is the first study revealing the sociodemographic characteristics of Chinese dietetic returnees. In our study, the majority of females with a master's degree mirrored the global trend of an increasing number of international students pursuing postgraduate degrees abroad, with the field of health attracting



**Fig. 7** Number of Chinese dietetic returnees reporting perceived advantages and disadvantages of international education for employment

the most female international students [32]. Spatial disparities are worth attention as economically developed and more populous coastal and urban areas attract the majority returnees. The limited representation of dietetic returnees in western and less-developed provinces may exacerbate the already uneven distribution of dietetic professionals in China [17]. The wage gap among participants is also pronounced. Nearly 40% of participants were estimated to earn less than the average professional in the health and social service sector in China, reported as 135,222 yuan/year in 2021 [33].

Returnees are moderately satisfied with their post-return job, which is similar to dietetic professionals in South Africa [34] and Jordan [35]. Existing literature shows that age, salary, education level, workplace and job experience significantly contribute to dietitians' job satisfaction [34, 35]. Our bivariable analysis similarly found that older age, higher education, domestic degree attainment, higher salary, and job mobility were associated with greater job satisfaction. However, in the multivariable

regression model, only salary remained a significant predictor. This aligns with findings from a cross-sectional survey of Jordanian dietitians, where monthly salary was the sole significant factor in multivariable analysis [35]. These findings suggest that while educational background and career transitions may shape initial job satisfaction, adequate compensation plays a decisive role in sustaining it. Policies advocating for competitive salaries and improved economic incentives are essential to support dietetics long-term retention and satisfaction in the domestic dietetics workforce.

#### Push and pull factors in migration

In describing the motivations of Chinese returnees, we extend the push and pull model [4] by emphasizing the importance of family ties, cultural connections, and the desire to contribute to national development in understanding the mobility of global talent. This result is consistent with Lee and Kim's [36] study on South Korean returnees with U.S. doctorate degrees and Chow and

colleagues' analysis on Australian-trained dietitians who returned to Asia [20]. Additionally, we learned that while financial considerations are relevant, they are outweighed by other aspects when deciding to return to China. This signifies that professional growth and industry potential are pivotal aspects of attracting future returnees.

On the other hand, returnees reported unutilized or underutilized professional knowledge and skills, specifically in clinical settings. This contrasts with their top perceived advantage of studying abroad: the expectation that academic and professional skills acquired during their overseas training would benefit domestic career development. Together, these findings highlight a concerning brain waste in the nutrition and dietetics fields. Previous studies on migrant nurses and healthcare workers identified similar challenges [37, 38]. Collectively, these findings imply that global talent often faces structural constraints in their destination countries that hinder their ability to fully utilize their competencies.

To gain an in-depth understanding of the career struggles of returnees in different sectors and with diverse backgrounds, future research should consider integrating qualitative evidence by conducting case studies, interviews and focus groups. Additionally, exploring best practices of leveraging talent mobility with neighboring countries, such as Japan and South Korea—where scholars have noted similar concerns regarding 'brain drain' [39, 40, 41]—could inform discussions on returnees in the dietetic workforce and foster international dietetic communities.

The literature shows that a sense of professional identity effectively mediates the effect of difficulty in re-entry adjustment on returnees' job embeddedness [42]. For dietetic returnees, this identity is shaped by multicultural experiences [20]. Future research could expand on our analysis of the seven dimensions of job satisfaction to examine the motivations and barriers influencing dietetic returnees. This includes exploring how cross-cultural identity shapes their professional identity and identifying strategies to strengthen it.

### Policy implications

Acknowledging dietetic returnees as integral members in the Chinese dietetic field, this study offers several policy implications to support their adaptation and job satisfaction. Addressing deskilling among returnees is a pressing need. Research indicates that licensure enhances job satisfaction [43] and improves job quality [44]. Therefore, policies should focus on creating pathways for returnees to practice under licensure and developing transition programs and resources for credential recognition and professional integration. These initiatives would increase job satisfaction, ensure sustainable workforce growth,

and leverage the 'brain gain' effect for the public health sector.

The motivations to return and post-return challenges we identified could provide a framework to strategically improve the quality of human resources in the healthcare sector. For example, organizations such as CNS should prioritize addressing systematic factors, such as authorization rules, while promoting critical dialogs to enhance returnees' professional identity and job embeddedness. Such initiatives will not only help returnees engage in roles that match their expertise but also facilitate knowledge sharing and skill transfer. Ultimately, such efforts would enrich domestic dietetic education and support the broader healthcare workforce.

Receiving countries that host international students would benefit from establishing career centers and dietetic programs with consideration of transnational career development. In higher education, partnerships such as exchange programs and visiting scholar positions could improve re-entry adaptation, enhancing global talent mobility and utilization. The next generation of dietetic students would greatly benefit from mentors and instructors with cross-cultural education and training backgrounds, preparing them for globalized practice. By creating inclusive systems that integrate globally and locally trained dietetic professionals, these initiatives will strengthen public health and advance the field of dietetics at both the national and international levels.

### Limitations

While our study provides timely investigation into the emerging trend of global mobility among dietetic professionals, it is not without limitations. The cross-sectional nature of the survey and the convenience sampling limit the generalizability of the findings. Distributing surveys via social media may introduce selection bias, as respondents are more likely to be those who are active in professional networks. Our relatively small sample size further limits the robustness of the regression modeling and the detection of nuanced effects. Thus, establishing a task force to collect comprehensive workforce data is critical to improve sampling representativeness, strengthen regression modeling, and enable longitudinal analyses to track evolving needs in the dietetics profession. Furthermore, the lack of rigorous validity assessment of job satisfaction is a limitation that future studies should address. Self-reported job satisfaction may be influenced by recall bias or social desirability bias. Using the Minnesota Satisfaction Questionnaire [45] with cultural adaptations would be an ideal approach to ensure more accurate results. Despite these limitations, our study serves as a pilot, providing a foundation for future research into the global mobility of dietetic talent and its impact on the Chinese dietetic field.



## Conclusion

This study sought to explore emerging overseas-educated dietetic returnees in China, focusing on identifying their unique professional development needs that are not readily addressed in the current dietetic profession. The comparison between overseas and domestic practice areas highlights the diverse career pathways of dietetic returnees beyond their clinical roles. Sociodemographic factors influenced post-return job satisfaction, but salary level was the only significant predictor of job satisfaction. Although family ties, cultural connections, and a desire to contribute to national development motivated their return, these returnees faced challenges in domestic workplaces, particularly the risk of deskilling in clinical settings. Nevertheless, returnees demonstrated their agency through self-adaptation and called for systematic support to enhance their professional identity. Understanding these dynamics is crucial for developing education, public health, and labor policies that effectively engage returnees in the domestic workforce, leveraging returnees' human capital to advance population health.

## Abbreviations

CDR	Commission on Dietetic Registration
CNS	Chinese Nutrition Society
RDC	Registered Dietitian Committee
STEM	Science, Technology, Engineering, and Mathematics

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## Author contributions

WC, XW and YZ contributed to the conception of the study; YZ organized and executed the research; LZ and YZ contributed significantly to analysis and manuscript preparation; YZ and LZ performed the data analysis and wrote the manuscript; XW, XS, YF, and YN helped organizing the research; WC, XW and XS reviewed the analysis with constructive discussions. All authors approved the final version of the manuscript.

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## Data availability

No datasets were generated or analysed during the current study.

## Declarations

### Ethics approval and consent to participate

The research was approved by the Research Ethics Committee of Xinhua Hospital, School of Medicine, Shanghai Jiao Tong University.

### Clinical trial number

Not applicable.

### Consent for publication

Not applicable.

## Competing interests

The authors declare no competing interests.

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