Bibliometric Analysis of Social Support for Congenital Microtia and Charitable Applications of Healing-Themed Character IP

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Abstract: Congenital microtia is a common craniofacial developmental anomaly that not only affects hearing and appearance but may also give rise to a range of psychosocial challenges. Focusing on social support for people with microtia, charitable applications of healing-themed character intellectual property (IP), and the use of digital tools to empower vulnerable groups, this study systematically retrieved relevant literature published between 2015 and 2025 from CNKI, the Web of Science Core Collection, and other databases. Bibliometric analysis was combined with content analysis to map the development of domestic and international research and identify major research hotspots. The findings indicate that current studies on microtia remain predominantly medically oriented, whereas research on psychological support, social integration, and public-interest empowerment is comparatively limited. Healing-themed IP and lightweight digital tools have demonstrated distinctive value in services for vulnerable groups; however, research that integrates the two and tailors them specifically to people with microtia remains largely unexplored. By summarizing existing research gaps and emerging trends, this study aims to provide a theoretical reference for the "Warm-Hearted Whispers" project and similar initiatives.

Keywords: Microtia; Social Support; Psychological Intervention; Digital Philanthropy; Healing-themed Character IP

1. Introduction

Congenital microtia is a common congenital craniofacial developmental anomaly in clinical practice, featured by hypoplastic auricle and atresia or stenosis of the external auditory canal, and is often accompanied by conductive hearing loss. Epidemiological studies indicate that the incidence of microtia in China ranges from 2.79 to 4.08 per 10,000 live births, with a slight upward trend in recent years, and it has become a notable birth defect affecting children's physical and mental health [1]. After decades of clinical development, domestic surgical techniques including auricular reconstruction and hearing reconstruction have grown increasingly mature, providing solid technical support for patients' physical rehabilitation. Nevertheless, the psychosocial impacts caused by the condition have not been resolved in step with advances in medical technology.

Existing clinical evidence confirms that the appearance difference and hearing impairment caused by microtia can persistently impair patients' self-esteem, social competence and emotional state, and surgical intervention alone cannot fully resolve long-term psychosocial adaptation problems [2]. A systematic review by Liu et al. further points out that patients' psychological distress does not occur in isolation: family members' anxiety, household financial pressure, social stereotypes and unwanted attention at school jointly constitute multiple stressors. Furthermore, as children grow older and develop stronger self-awareness of their appearance, psychological problems tend to worsen progressively [3]. Currently, domestic microtia research remains highly focused on clinical surgery, while studies on psychological support and social integration started late with limited outputs, and a comprehensive support system covering the entire growth cycle has not yet been established [3].

From a broader perspective of vulnerable group support, China's charitable sector is undergoing transformative development. The policy orientation has gradually shifted from traditional relief assistance to diversified, empowering social support, with growing participation from social organizations, digital technologies, cultural and creative IP and other diverse forces [4]. Among them, digital tools, with their strengths of low cost, wide coverage and easy access, have become a vital carrier for

empowering services for vulnerable groups, demonstrating remarkable advantages in scenarios such as information matching, resource integration and community mutual aid [5]. Meanwhile, the value of cultural and creative forms such as healing-themed IP in psychological companionship and public welfare communication has gradually emerged. However, such innovative models are mostly applied to groups like autistic populations and left-behind children, while customized design and practice tailored specifically to the microtia population remain almost unexplored.

International research on psychosocial support for microtia started earlier. As summarized by Du et al. from international findings, the global academic community incorporated psychological intervention into the entire care pathway at an early stage, forming a multidisciplinary support framework integrating peer support, school-based education and family empowerment [6]. That said, mature international models rely heavily on well-developed civil society organizations and social security systems, which differ significantly from China's cultural context and social environment and thus cannot be directly transplanted.

Against the above background and existing research gaps, this study takes literature published from 2015 to 2025 in CNKI and Web of Science Core Collection as data sources, and adopts a combined approach of bibliometric analysis and content analysis. It systematically sorts out the research trajectories and hotspots in three major domains at home and abroad: social support for microtia, charitable application of healing-themed IP, and digital tool empowerment. By comparing domestic and international research differences and identifying current research gaps, it proposes a localized integrated empowerment model. This study can, on the one hand, fill the gap of interdisciplinary research in the microtia field and expand the application scenarios of digital and cultural-creative public welfare; on the other hand, it can provide theoretical reference and practical basis for the "Warm-Hearted Whispers" project and similar initiatives, so as to promote the improvement of the comprehensive support system for people with microtia.

2. Data Sources and Research Methods

2.1 Data Sources

Chinese-language literature was retrieved from China National Knowledge Infrastructure (CNKI), and international literature was retrieved from the Web of Science Core Collection. The Chinese search terms were the Chinese-language equivalents of "microtia", "congenital microtia", "psychological support", "social integration", "healing-themed IP", "public welfare/philanthropy", "digital tools", and "mini program". The English search terms included "microtia", "psychological support", "social integration", "healing IP", "digital tools", and "vulnerable groups". The literature search covered 2015–2025. After initial retrieval, duplicate removal, and screening of abstracts and full texts, 92 eligible Chinese-language publications and 67 eligible international publications were included，as shown in Figure 1, See Figure 1 for details.

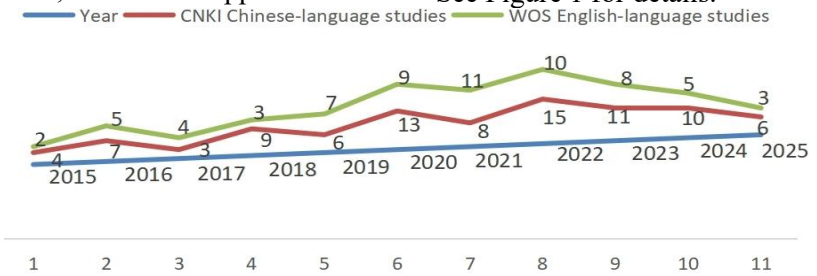

Figure 1. Annual Publication Trends of Chinese- and English-Language Literature, 2015–2025.

2.2 Research Methods

This study adopted a research approach combining bibliometric analysis and content analysis. First, bibliometric methods were used to statistically analyze the publication years, source journals, and keyword distributions of the included literature, thereby outlining the overall development trajectory and changes in research hotspots in China and abroad. Second, content analysis was used to classify and code the literature into three major themes: "current support and needs of people with microtia," "charitable applications of healing-themed IP,"

and “digital tools for empowering vulnerable groups,” in order to systematically synthesize the core perspectives and research progress in each area. Third, cross-theme integration and comparison were conducted to identify current research gaps and future directions and to provide a theoretical basis for project implementation.

3. Publication Trends and Research Hotspots in China and Abroad

3.1 Analysis of Publication Trends

From 2015 to 2020, research on microtia in China was concentrated primarily in clinical medicine, with auricular reconstruction, hearing restoration techniques, and postoperative rehabilitation as the main directions, while psychological and social research accounted for a relatively small proportion. After 2020, with the advancement of the Healthy China initiative and growing public attention to philanthropy, the number of studies addressing psychological intervention, social inclusion, and family support for people with microtia increased markedly, and the research focus gradually shifted from “disease treatment” toward “holistic care.” International research on microtia began earlier and has developed a more comprehensive system, with sustained attention to patients’ psychosocial development across the life course, social adaptation, and public awareness and education. Research on digital support platforms and charitable applications of IP is also more mature internationally.

3.2 High-Frequency Keywords and Research Hotspots

As shown in Table 1, domestic and foreign studies have exhibited an increasingly evident "de-medical-centralization" trend, with the focus expanding from physical rehabilitation to multiple dimensions including psychological adjustment, social adaptation and digital-based services. Domestic research has long centered on improvements in surgical techniques and evaluations of clinical outcomes, while psychological and social support have received increasing attention in recent years. International research addressed patients’ long-term psychological development, social adaptation, and quality of life at an earlier stage, resulting in a more mature research system. Cross-disciplinary topics such as healing-themed IP, empowerment through cultural and creative products, and lightweight digital tools remain relatively underexplored in microtia-specific research and are more often discussed within broader fields such as support for vulnerable groups and digital philanthropy. Differences in the frequencies of core research keywords between Chinese and international literature visually reflect their distinct research priorities, as shown in Figure 2.

4. Core Themes in Domestic Research

4.1 Current Support and Needs of People with Microtia

Early domestic research on microtia was highly concentrated in clinical medicine, focusing mainly on improvements in auricular reconstruction techniques, evaluation of hearing reconstruction outcomes, prevention of complications, and postoperative care. These studies provided a solid technical basis for the physical rehabilitation of people with microtia. As public attention to the health and well-being of vulnerable groups has increased, a growing number of researchers have begun to examine the psychological status and social-integration difficulties of people with microtia, and research has gradually expanded from the physiological level to psychological, family, and social dimensions.

Xie et al. [2] using standardized scales in 149 children with congenital microtia, found that their health levels in the dimensions of personality, volitional behavior, and emotion were significantly lower than national norms. Anxiety and depressive emotions were common, and the children tended to show limited initiative in building self-confidence and interpersonal relationships. The emotional dimension of quality of life was particularly impaired, whereas cognitive and thinking functions were not significantly affected. A systematic review by Liu et al. [3] further indicated that the psychological distress experienced by people with microtia does not occur in isolation. Anxiety among family members, financial pressure on the family, social stereotypes, and unwanted attention at school jointly constitute sources of stress. Moreover, as children grow older and become more aware of their appearance, psychological problems tend to intensify.

Table 1. High-Frequency Research Keywords

No.	High-Frequency Keywords in Chinese Literature	Frequency	High-Frequency Keywords in English Literature	Frequency
1	Microtia	87	Microtia	76
2	Psychological intervention	43	Psychological support	52
3	Social integration	38	Social integration	41
4	Healing-themed IP	29	Healing-themed IP	28
5	Public-interest communication	26	Public-interest communication	33
6	Mini program	24	Mini program	19
7	Empowerment of vulnerable groups	22	Empowerment of vulnerable groups	35
8	Design patent	18	Design patent	17
9	Software copyright	16	Software copyright	15
10	Social cognition	15	Social cognition	22
11	Cultural and creative merchandise	13	Cultural and creative merchandise	14
12	Digital service platform	12	Digital service platform	26
13	Social entrepreneurship	10	Social entrepreneurship	18
14	Sustainable philanthropy	9	Sustainable philanthropy	24

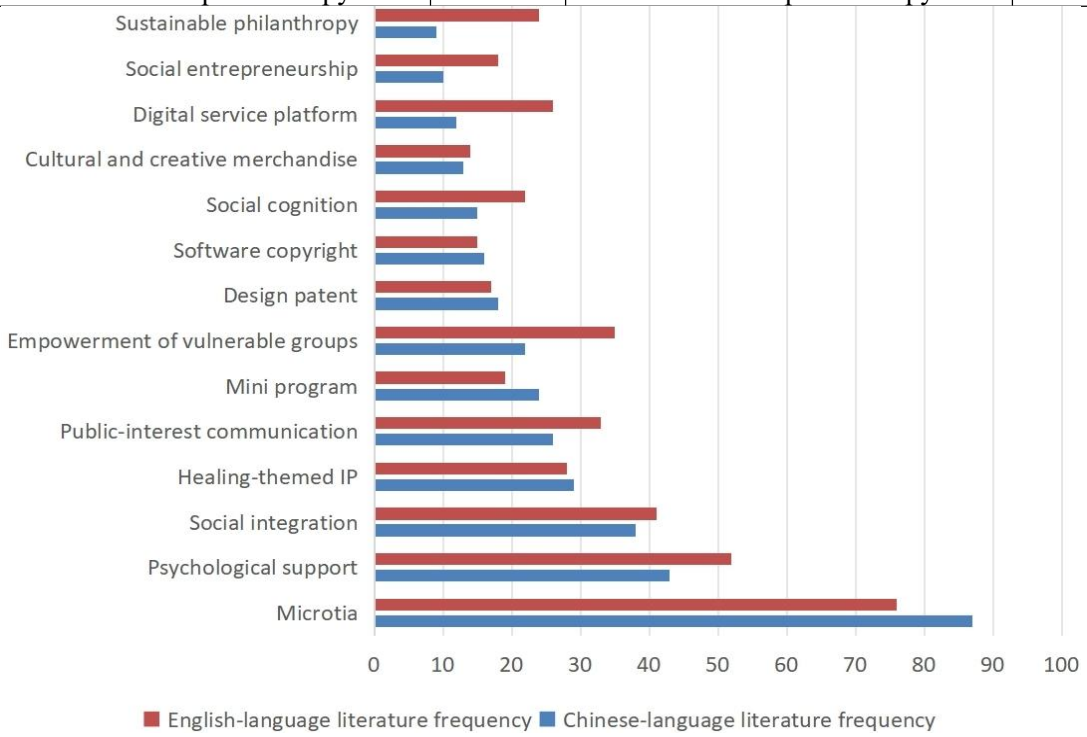

Figure 2. Comparison of High-Frequency Keywords in Chinese and International Microtia Research.

In clinical intervention practice, Yin et al. [7] in a controlled study of 120 patients, demonstrated that short-term structured psychoeducational intervention could significantly improve scores on the psychological resilience scale (CD-RISC), reduce family members' SCL-90 factor scores, improve postoperative adherence, reduce complications, and increase overall satisfaction, thereby providing evidence for perioperative psychological support. Guo et al. [8] showed that a combined family-centered nursing intervention could improve both the psychological status of children and anxiety among family members; positive guidance within the family environment plays a key role in the development of children's self-identity. Zhang [9] focusing on family support systems in a controlled study, found that systematic management of family and social support could significantly improve children's self-confidence scores, confirming the positive role of family-level intervention in psychological development .

Overall, psychological support in the domestic microtia field remains centered mainly on clinical perioperative intervention. Long-term psychological companionship and

social-integration support systems covering the entire developmental course are not yet mature, and lightweight, non-medical support tools for adolescents remain scarce.

4.2 Applications of Healing-Themed IP in Philanthropy

Healing-themed IP is characterized by gentle, empathetic, and positive imagery and narratives and offers distinctive advantages in psychological comfort, emotional support, and public-interest communication. In recent years, it has gradually been applied to youth care, support for vulnerable groups, and mental-health education. Yang [10] noted that rounded and soft visual design, together with simple and positive character traits, can lower audiences' psychological defensiveness and convey a calm and comfortable emotional experience. Its cross-media characteristics also enable it to span comics, cultural and creative products, digital interaction, and other scenarios, thereby sustaining the delivery of emotional value.

Jin et al [11] summarized the core design principles of healing-themed IP: low-saturation and soft color palettes are commonly used; lines are simplified and sharp edges are softened in character design; and narratives focus on small moments of everyday happiness. By using concrete characters to embody abstract emotional care, such design can strengthen emotional resonance among audiences. In charitable practice, combining IP characters with cultural and creative merchandise can increase recognizability and memorability and help public-interest ideas reach broader audiences. In China, current applications of healing-themed IP are concentrated mainly on left-behind children, autistic populations, and public education about depression. Research on dedicated IP design, character-narrative construction, and design-patent commercialization for people with microtia remains limited, and an IP system and cultural-creative empowerment model aligned with the psychological characteristics and developmental needs of this population have not yet been established.

4.3 Digital Tools and Public-Welfare Services for Vulnerable Groups

With the advancement of the Healthy China initiative, protection of the rights and interests of vulnerable groups and the development of public-welfare service systems have become important areas of social concern. Reviewing policy directions from China's "Two Sessions," Pi [12] noted that support for vulnerable groups in China is shifting from single-track medical assistance toward diversified social support. Participation by social organizations, volunteer services, charities, and other social forces continues to increase, while supporting mechanisms such as tax incentives and recognition and reward policies are also being improved.

Digital tools and lightweight mini programs have become important vehicles for public-welfare services for vulnerable groups. Owing to their low cost, ease of use, and broad reach, they are widely applied to information matching, resource integration, community interaction, online support, and related scenarios. Yu [13] demonstrated through design practice that mini programs based on the WeChat ecosystem have a low development threshold and can reach users conveniently. They are suitable for building information-service platforms for populations facing health vulnerabilities, older adults, people with congenital anomalies, and other groups. Such platforms can integrate health education, resource linkage, mutual-aid communication, and other functions, thereby effectively lowering barriers to information access for vulnerable groups.

Existing studies indicate that a combined "official account + mini program" model can provide stable content delivery and service access, improving the continuity and accessibility of public-welfare services. Current applications of digital tools for vulnerable groups are concentrated mainly in eldercare, disability assistance, and chronic-disease management. Research on dedicated service mini programs and information platforms for people with microtia and their families remains limited, particularly with respect to digital-tool designs that integrate healing-themed IP, information services, community support, and science communication, together with the practical registration of software copyright.

4.4 Public-Interest Communication and the Promotion of Social Inclusion

Pi [12] also pointed out that improving public-welfare support systems for vulnerable groups requires strong science-communication support. In the new-media environment, short

videos, micro-videos, and social-media platforms have become mainstream channels for public-interest communication, enabling knowledge dissemination, correction of misconceptions, and formation of social consensus with low barriers and broad reach. Public-interest communication concerning vulnerable groups should balance professional rigor with emotional appeal. Real stories, accessible science communication, and visualized content can enhance public understanding and recognition, thereby contributing to a more inclusive social environment. Diverse communication models combining campus outreach, community education, and coordinated online channels can further expand audience coverage and improve the effectiveness of public education.

Public-interest communication concerning people with microtia still faces problems such as limited content, fragmented channels, and insufficient professionalism. Most communication remains confined to simple appeals for help and publicity about assistance, with a lack of systematic educational content and IP-based communication vehicles. Consequently, it is difficult to achieve sustained changes in public understanding and stereotypes. An integrated public-interest communication system covering
"content–medium–channel–implementation"
therefore needs to be established.

5. Core Themes in International Research

5.1 Long-Term Psychosocial Support for People with Microtia

International research findings are synthesized in this study primarily through international reviews published in Chinese core journals. Considering both early classic follow-up studies and more recent clinical research, international research on people with microtia began earlier and places greater emphasis on multidisciplinary support across the life course. In a systematic survey, Du et al [6] reviewed early international follow-up findings and reported that long-term studies consistently showed that appearance differences and hearing impairment caused by microtia can continue to affect patients' self-esteem, social competence, and emotional state. Surgical treatment alone cannot fully resolve long-term psychosocial adaptation problems, and psychological intervention should therefore be incorporated throughout the care pathway.

Summarizing international clinical experience, Liu et al. [3] noted that peer support, family empowerment, and school-based awareness education are commonly incorporated into comprehensive support frameworks abroad. Peer-support networks established through patient mutual-aid organizations can significantly reduce social anxiety and identity-related feelings of inferiority, while routine educational activities for schools and the public can effectively reduce discrimination and stereotypes and improve patients' social environment. However, mature international models depend heavily on well-developed civil-society organizations and health-security systems. Because cultural and social contexts differ substantially from those in China, these models cannot be directly transplanted.

5.2 Integrated Charitable Applications of Healing-Themed IP and Digital Platforms

In the fields of pediatric medical care and services for vulnerable groups, the integration of healing-themed character design with digital platforms began earlier abroad and has developed more mature practices. In reviewing relevant international cases, Yang [10] noted that gentle and friendly cartoon-style companion characters can effectively alleviate anxiety among pediatric patients during treatment and rehabilitation and improve psychological adjustment. Lightweight digital service platforms can integrate medical information, charitable resources, psychological support, peer communities, and other functions, thereby significantly improving service accessibility and operational efficiency.

Compared with domestic research, relevant international studies and practices place greater emphasis on evidence-based design and user-experience evaluation, and their technical implementation pathways are more mature. However, differences remain in cultural expression, emotional resonance in narratives, and contextual adaptation of communication. These differences from China's local cultural context and the actual needs of people with microtia make direct transplantation difficult.

5.3 Intellectual Property and Translation of Public-Welfare Outcomes

Mature international charitable projects

generally attach considerable importance to intellectual-property protection. Copyright and patent strategies for intangible assets such as product appearance designs, software tools, and branded IP are regarded as important safeguards for standardized and sustainable project development. Relevant research and practice indicate that standardized intellectual-property protection for public-interest IP and digital tools can not only enhance project credibility and regulate the contexts in which outcomes are used, but also provide lawful pathways for value translation in social entrepreneurship and social-enterprise operations. Cultural and creative licensing and product development can, in turn, support charitable services and enable sustainable project operations.

Systematic use of intellectual property in China's public-welfare sector remains at an early stage. Research on patent strategies, software-copyright applications, cultural and creative development, and outcome translation for charitable projects serving vulnerable groups such as people with microtia is limited, and a mature localized operating model has not yet emerged. Overall, domestic and international support systems for people with microtia differ substantially in their priorities and levels of maturity across four dimensions: medical services, psychological intervention, IP-based digital philanthropy, and long-term intellectual-property operations. Their structural systems and core characteristics are compared in Figure 3.

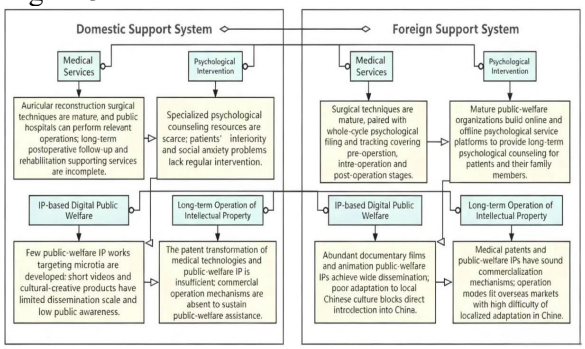

Figure 3. Domestic and International Microtia Support Systems

6. Review and Outlook

6.1 Gaps in Existing Research

Studies have found that both domestic and international researches on microtia generally show a trend extending from medical treatment to psychological, social and digital-based services. Domestic researches have long centered on surgical technique improvement and clinical efficacy evaluation, while themes concerning psychological and social support have gradually increased in recent years. Foreign researches paid earlier attention to patients' whole-life-cycle psychological development, social adaptation and quality of life, forming a more mature relevant research system.

In terms of group support, microtia patients demonstrate significantly poorer health status in dimensions such as personality, emotion, volitional behavior and so on. Anxiety and depression are prevalent among this patient population. Their psychological distress is closely associated with family-member anxiety, household economic pressure, social stereotypes and unwanted attention at school. Family and social support exert positive effects on the establishment of children patients' self-identity. As for the application of healing-themed IP and digital tools, healing-themed IP can reduce audiences' psychological defensiveness and deliver emotional care through gentle, empathetic and positive image narratives. Light-weight digital tools and mini-programs feature low cost, easy operation and wide coverage. They can effectively integrate functions including science popularization and education, resource matching and peer-support communication, lowering the barrier of information access for special groups. Foreign countries have an earlier start and more mature practices in the integration of pediatric medical care and digital platforms, evidence-based design and user experience evaluation, as well as public-welfare intellectual-property protection and achievement transformation.

Meanwhile, this study also identifies the major deficiencies of existing researches: First, the research perspective remains relatively narrow. Clinical medicine continues to dominate microtia research, whereas interdisciplinary studies on psychological support, social integration, and public-interest empowerment are fewer in number and limited in depth, with insufficient multidisciplinary integration. Second, the research content is clearly fragmented. Healing-themed IP, digital tools, and public-interest communication are typically studied independently, and an integrated, closed-loop support model for vulnerable groups has not yet been formed. Integrated empowerment research specifically targeting

people with microtia is almost absent. The current fragmented structure of domestic microtia research, in which different research directions remain relatively independent and lack cross-disciplinary integration, is shown in Figure 4.

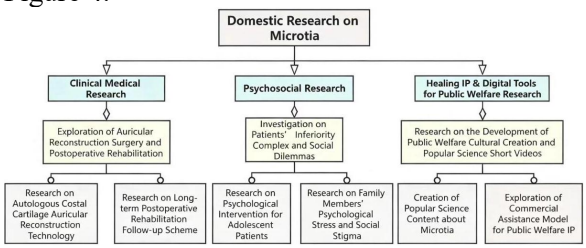

Figure 4. Fragmented Structure of Domestic Research Related to Microtia.

Third, localization and population specificity are insufficient. Existing studies on support for vulnerable groups often target broad categories such as people with disabilities or rare diseases, whereas relatively few studies focus specifically on the psychological characteristics and developmental needs of people with microtia. Exploration of dedicated healing-themed IP, digital service platforms, and cultural-creative empowerment systems is particularly scarce. Fourth, research on outcome translation and sustainability remains weak. There is insufficient research integrating charitable projects with intellectual-property protection, cultural and creative product development, and long-term operating mechanisms, and the sustainability and replicability of such projects lack systematic theoretical support.

6.2 Future Directions

Future research may further focus on life-course support needs among people with microtia and develop a four-in-one empowerment model integrating "healing-themed IP + digital mini programs + cultural and creative merchandise + public-interest communication." Greater attention should be given to the use of lightweight digital tools for information services, psychological support, and community interaction among vulnerable groups. Intellectual-property strategies and outcome-translation pathways for charitable projects should also be improved, and sustainable models of social entrepreneurship should be explored. Finally, targeted science communication and diversified communication channels should be used to promote social inclusion and contribute to the Healthy China 2030 goal of improving the health and well-being of vulnerable groups.

7. Conclusion

Using a combination of bibliometric analysis and content analysis, this study systematically reviews domestic and international literature on social support for congenital microtia and related interdisciplinary fields published between 2015 and 2025, and draws the following main conclusions:

First, microtia research as a whole shows a transformative trend from "disease treatment" to "holistic care". Domestic research has long been centered on clinical surgery. Since 2020, studies on psychological and social support have increased significantly, but they are still dominated by short-term perioperative interventions, and a long-term social support system covering the full life cycle remains immature. International research started earlier with a more complete multidisciplinary support system, yet its localized adaptability in China is insufficient.

Second, healing-themed IP and lightweight digital tools hold unique value and broad prospects in public welfare services for vulnerable groups, but their targeted application in the microtia field is still in a blank stage. Currently, relevant studies are scattered across independent fields such as cultural and creative design and digital public welfare, and a closed-loop model of "IP empowerment + digital services + cultural and creative transformation + public welfare communication" has not yet taken shape. Related public welfare projects also generally suffer from weak awareness of intellectual property protection and a lack of sustainable operation mechanisms.

Third, there are four core shortcomings in current domestic research in this field: narrow research perspective with clinical medicine in absolute dominance and insufficient interdisciplinary integration; fragmented research content with independent development of various directions and no integrated support system; inadequate population targeting, with more general studies and few exclusive designs adapted to the characteristics of the microtia population; weak research on achievement translation and long-term operation, with insufficient theoretical support for project replicability and sustainability.

Overall, building a four-in-one empowerment model integrating healing-themed IP, digital

mini programs, cultural and creative merchandise and public welfare communication is a key development direction for social support for people with microtia in the future. Follow-up research can carry out empirical studies based on specific public welfare projects to verify the practical effects of the model, so as to provide practical support for improving the full-cycle support system for the microtia population and advancing the Healthy China initiative.

8. Acknowledgments

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